University of Ottawa

Doctoral Thesis

Essays on Monetary Policy, Inflation, and Income Distribution

by

Guillermo Rufino Matamoros Romero

Supervisor:

Mario Seccareccia

A thesis submitted in partial fulfillment of the requirements for the Doctorate in Philosophy degree in Economics

Department of Economics

Faculty of Social Sciences

University of Ottawa

DECLARATION OF AUTHORSHIP

I, Guillermo Matamoros Romero, declare that this thesis titled, "Essays on Monetary Policy, Inflation, and Income Distribution" and the work presented in it are my own.

Chapter three of this thesis was done jointly with Dr. Mario Seccareccia. My contribution is equal to his.

I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. Except for such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Signed: Guillermo Rufino Matamoros Romero

Date: October 13, 2023

ACKNOWLEDGEMENTS

First and foremost, I would like to express my deepest gratitude to my supervisor and coauthor, Dr. Mario Seccareccia. Thank you from the bottom of my heart, Mario, for your continuous guidance, patience, and support, and for your infinite generosity and wisdom, all of which have been crucial in writing this thesis. I am incredibly fortunate to have had you as my supervisor and coauthor throughout this long and rewarding journey.

I also owe an enormous debt of appreciation to my thesis examiner, Dr. Marc Lavoie, whose role in this thesis transcended this designation. *Merci infiniment*, Marc, for your invaluable kindness, intelligence, inspiration, and for the many thought-provoking discussions. This thesis has been greatly enriched in substance and depth because of your generous and rigorous feedback.

A special word of thanks goes to my thesis examiner, Dr. Simon Power, who was always an astute and careful reader, consistently offering interesting comments and smart suggestions. Thank you for your huge generosity in sharing your knowledge and time.

I extend my immense appreciation and admiration to my other thesis examiners: *Muchas gracias* Dr. Matias Vernengo, for your several insights and constructive comments. *Merci beaucoup* Dr. Paul Makdissi, for your great questions and your kindness. Your expertise and perspectives have taken a key role in refining my arguments and broadening my academic horizons.

Special thanks are due to Paola Jaimes, Antonino Lofaro, and Louis-Philippe Rochon. Their keen insights, fresh perspectives, and challenging questions provided clarity and direction to my work. I extend my heartfelt thanks to the administrative staff in the department: Alexie, Guilherme, and Martine, who have made this journey smoother due to their excellent job.

I wish to thank all my family in Mexico that encouraged and supported me in many ways throughout my PhD studies.

Lastly, I kindly acknowledge the generous financial support provided by the University of Ottawa and the Institute for New Economic Thinking. Their backing was instrumental in allowing me to focus on my research and ensuring that I had all the necessary resources at my disposal.

ABSTRACT

This dissertation is divided into three distinct chapters looking at the theoretical and empirical relationship between monetary policy, inflation, and income distribution in industrialized countries. The first chapter investigates the effect of monetary policy on the income share of workers at the industry level in Canada and the United States. The second chapter studies the relationship between firms' markups and inflation during the 2021-22 inflation surge in select industrialized countries. The third chapter assesses the Taylor-rule framework of monetary policy with regards to an estimated central bank reaction function for several industrialized countries, analyzing its potential effects on the rentier income share over time. This dissertation makes several contributions to the economic literature, particularly in the field of post-Keynesian empirical macroeconomics.

GENERAL INTRODUCTION

This dissertation is composed of three different chapters looking at the theoretical and empirical relationship between monetary policy, inflation, and income distribution in industrialized countries. The common thread along the dissertation is the interplay among monetary policy, inflation, and income distribution from a post-Keynesian class-analysis perspective. In other words, monetary policy and inflation are seen through their effects on the distribution among the three classes in the economy, namely wage earners in chapter one, profit earners in chapter two, and interest-income earners in chapter three.

The first chapter investigates the effect of monetary policy on the income share of wage earners at the industry level in Canada and the United States. It starts with a review of the contributions of post-Keynesians on the effects of monetary policy on income distribution and then it assesses the impact of changes in the central bank benchmark interest rate on the wage share at the industry level. The contribution of this chapter lies in both providing one of the first accounts of the history of post-Keynesian ideas on the topic and estimating the impact of monetary policy on the industry wage share. The chapter reveals that post-Keynesian economics made important contributions to the understanding of monetary policy and income distribution since at least the 1980s. The conclusion of the empirical section underscores the complexity of the relationship between changes in interest rates and the income share of workers at the industry level, although there is little doubt that the impacts are significant and long-lasting.

The second chapter studies the relationship between firms' markups and inflation during the 2021-22 inflation surge in several industrialized countries. It begins by explaining markup inflation and its critics in the context of the current debate over the sources of inflation. Then it reviews the characteristics of markup inflation within the post-Keynesian theory of markup pricing and complementing it with the Institutionalist approach to inflation that distinguishes between basic inflationary pressures and propagation mechanisms. The second part of the chapter assesses markup inflation for several industrialized countries using descriptive statistics and conventional econometrics. The main contribution lies in empirically estimating markups by considering the contribution of material cost and controlling for changes in capacity utilization over time. It concludes that there is some significant evidence pointing to markup inflation although it is not conclusive.

The third chapter, which is co-authored with Mario Seccareccia, assesses the inflation first monetary policy in relation to its potential effects on the income share of rentiers. The chapter begins by discussing the Taylor rule framework in history and theory. It reviews the adoption of an inflation first monetary policy since the 1970s and 1980s in several industrialized countries, and then the explicit adoption of the Taylor rule in the 1990s. The chapter then looks at the evolution of rentier income shares during these decades and evaluates the Taylor rule framework by estimating a central bank reaction function for a group of industrialized countries. The contribution of this chapter is providing evidence on the behavior of central banks in line with a monetary policy that is biased in favor of the income share of rentiers during the last several decades. The conclusion suggests that although the reaction function of central banks has been favoring the rentiers' income, there has been a change towards a greater concern for unemployment with respect to inflation after the Global Financial Crisis of 2008-09.

CONTENTS

List of Figures

List of Tables

Chapter 1 What is the Link Between Monetary Policy and the Wage Share?

By Guillermo Matamoros Romero

Abstract

Monetary policy and income distribution has become a popular topic in academia following the Global Financial Crisis of 2008-09, but post-Keynesians have been studying it for decades. This chapter investigates the effect of monetary policy on the income share of wage earners at the industry level in Canada and the United States. It starts with a review of the contributions of post-Keynesians on the effects of monetary policy on income distribution and then it assesses the impact of changes in the central bank benchmark interest rate on the wage share at the industry level. The contribution of this chapter lies in both providing one of the first accounts of the history of post-Keynesian ideas on the topic and estimating the impact of monetary policy on the industry wage share. The chapter reveals that post-Keynesian economics made important contributions to the understanding of monetary policy and income distribution since at least the 1980s. The conclusion of the empirical section underscores the nuances of the relationship between changes in interest rates and the income share of workers at the industry level, although there is little doubt that the impacts are significant and long-lasting.

1.1 Introduction

Right after the Global Financial Crisis (GFC) of 2008-09, the attention of mainstream New Keynesian economics towards the effects of monetary policy on income distribution has grown significantly (see Colciago et al. 2019, for a survey of mainstream literature). This is in sharp contrast with post-Keynesian economics, which has been raising this issue since at least the late 1980s (Eichner 1987; Lavoie & Seccareccia 1988; Moore 1989; Niggle 1989). At a first glance, the main difference between post-Keynesian and New Keynesian perspectives is that the latter focuses on personal distribution of income while the former focuses on factor income shares. However, a closer look at the post-Keynesian perspective reveals that their differences are much more profound and are the product of a completely distinct understanding of what monetary policy is about.

For post-Keynesians monetary policy is foremost a policy tool — such as fiscal policy — whose conduct and repercussions are not disconnected from the political economy of a country. Therefore, monetary policy is embedded in a specific institutional framework where the distribution of resources among economic actors plays a critical role. The policy of interest-rate setting is commonly regarded as a form of incomes policy that affects the distribution of income between the rentier and non-rentier groups (Seccareccia & Lavoie 2016; Lavoie & Seccareccia 2021). Besides that, in a three-class economy as the one imagined by Keynes in his *Tract on Monetary Reform*, interest rate policy directly impacts the income share of wage earners (Keynes 1923).

On the other hand, despite recent and ample evidence pointing at significant effects of monetary policy on income distribution (see Kappes 2023), the recognition of a stylized fact says very little if it is not backed by theory. In the New-Keynesian literature, the identified mechanisms are not long-lasting due to the assumptions of long-run neutrality of money and the existence of a natural rate of interest (Seccareccia and Matamoros 2023a). In contrast, post-Keynesian assumptions of money endogeneity and the short-run rate of interest as an exogenous variable together with the rejection of a natural rate of interest (Lavoie 1996), has allowed post-Keynesians to see the interest rate as a cost-income variable or an administered price (Rochon 2010), and so they have established a relation between monetary policy and distribution, although the empirical implications of these have not been fully explored yet, particularly in the case of the relation between the interest rate and the wage-profit shares in recent decades characterized by a high concentration of income and wealth.

In this chapter, I study the link between monetary policy and the wage share by both reviewing the post-Keynesian contributions over time and exploring this link empirically for Canada and the United States in recent decades, making use of the concepts and tools developed by post-Keynesian economics on the subject. In doing so, I review the ideas proposed by post-Keynesian authors from the precursory contributions of John Maynard Keynes, then the founding post-Keynesian authors like Joan Robinson, and the more recent developments of some Canadian post-Keynesian economists. The chapter is divided into five sections including this introduction and the final remarks.

The second section reviews the main post-Keynesian ideas on monetary policy and income distribution, which go far back to Keynes and the founding post-Keynesians—in particular, Joan Robinson and Luigi Pasinetti, ideas that were later developed in the late Twentieth century and early Twenty-first century by other post-Keynesians. I argue that there is a clear connection between the early contributions by Keynes during the interwar period and the more recent post-Keynesian developments. This connection has to do with conveying that monetary policy is a key explanatory variable in determining the distribution of resources in the medium and long run, in periods which feature historically high levels of income and wealth concentration.

The third section puts forth the stylized facts for Canada and the United States in recent decades, particularly regarding the trends in their respective wage shares both for the aggregate business sector and for selected industries, as well as the evolution of their respective monetary policies. Subsequently, section four looks at the empirical relation between monetary policy and the industry level wage share by means of running separate panel VAR models for Canada and the United States. Possible endogeneity issues are addressed through the panel VAR estimations, but perhaps more important, I try to argue that there is no omitted variable bias both by estimating a separate panel VAR model with 58 industries and subindustries that aims to account for changes in industry composition weights, and I carry out a fixed effects model that considers omitted variables such as trade liberalization and labour bargaining power. Although numerous economists have warned of the difficulties of producing meaningful estimates on the relation between monetary policy and income distribution using econometrics (Moore 1989), due to endogeneity, omitted variables, and so on, there is still room to be explored in this area from a post-Keynesian perspective as I try to show, considering the scarcity of studies analyzing such data at the industry level.

The main contribution of this chapter is twofold. First, it provides one of the first attempts to review the post-Keynesian ideas on monetary policy and income distribution in historical perspective. Second, it tries to give some econometric evidence along these lines by showing meaningful estimates of the impact of interest rate policy on the industry wage share both for Canada and the United States. I believe this chapter becomes relevant during these times when the issues of monetary policy and distribution are capturing increasing attention in academia and in economic policy circles, not to mention the current heated discussion on inflation and the response by central banks of raising interest rates. As such, there is a growing need for research on the effects of monetary policy from non-mainstream traditions offering alternative perspectives and policy implications. Finally, it also has the advantage of comparing Canada and the United States experiences using conventional econometric methods but incorporating industry level data as an empirical example of the ideas and monetary policy mechanisms discussed in theory.

1.2 Post-Keynesian Theory of Monetary Policy and Distribution[1]

Antecedents: Keynes's insights in the interwar period

In comparison to mainstream macroeconomics, the common features in post-Keynesian economics are: investment determines savings – both in the short and long run; the central unit of study is a monetary economy in which money is not neutral; time is historical in the sense that the future is uncertain and cannot be predicted; and, institutions matter so that social rules, codes, norms and traditions exert all essential influence on decision making (Lavoie 2014). There is no

[1] This section inspired and became the basis of part of a research paper written jointly with Antonino Lofaro, and Louis-Philippe Rochon about the ideas of monetary policy and income distribution in post-Keynesian and Sraffian economics (Lofaro, Matamoros, and Rochon 2023).

consensus on when post-Keynesian economics was founded, but there is no doubt that the writings of John Maynard Keynes during the interwar period, particularly his 1936 *General Theory of Employment, Interest and Money* (*GT* hereafter), played a key role in the early development of post-Keynesian economics in the hands of its founders – some of whom were Keynes's disciples and contemporaries, namely Richard Kahn, Nicholas Kaldor, Michał Kalecki, Joan Robinson, Piero Sraffa, among others.

As the name post-Keynesian makes explicit, the famous writings of Keynes are not post-Keynesian per se. For instance, despite his continuous efforts, the *GT* could not depart from some short-run Marshallian assumptions regarding a fixed stock of capital, and sometimes even money supply is assumed to be exogenous, an approach that can also been seen in his *Tract*.[2] However, before the *GT* in his 1930 *A Treatise on Money*, Keynes adopted a dynamic perspective on aggregate price formation where prices are driven by changes in the level of investment, thereby rather adopting an endogenous money approach *à la* Wicksell (Seccareccia 2004). Therefore, Keynes did write major works, such as his *Tract* or the *GT*, where he suggests that the monetary authority may influence the price level through the control of the quantity of money and monetary policy ought to focus on the value of the real rate of interest; but he also has other works, such as the *Treatise*, where in a Wicksellian fashion the money rate of interest is set and controlled more directly by the monetary authority.

In any case, I will argue that important features of what would later constitute a post-Keynesian perspective on monetary policy and distribution is found in the *Tract* and in the *GT*. In the former, monetary policy is very much a policy that seeks to control the price level and the value of the currency, whence he pays special attention to changes in Fisher real interest rates. Hence, if I want to dig deeper into the relation between monetary policy and distribution in this early Keynes, my question must be how changes in the price level, specifically in relation to the money rate of interest, affect the distribution of income. In his bestseller *The Economic Consequences of the Peace,* Keynes (2019/1919) pointed out that rising inflation would largely distort the distribution of resources between debtors and creditors under fixed-interest rate contracts. Henceforth, he

[2] Nevertheless, there is a strand of post-Keynesian economists, called fundamentalist or Marshallian post-Keynesians (Lavoie 2014), who perhaps would not agree with the previous two sentences since they accept some of the assumptions of Neoclassical economics such as diminishing marginal returns, that are associated with Alfred Marshall, the mentor of Keynes.

showed a concern for the effect of changes in interest rates over the distribution of income and wealth among social classes, a preoccupation that would remain in much of his subsequent works.

Notably, the first chapter of *A Tract of Monetary Reform* (Keynes 1923) contains a model composed of rentiers, entrepreneurs, and workers, in which changes in the real rate of interest primarily affect the distribution of income through variations in interest payments between the creditor class, or the rentiers, and the other two social classes, the debtors (see Seccareccia and Matamoros (2023a) for more details). This simple redistribution mechanism would put forward the essential fact that the interest rate is not only a price but also a source (and a loss) of income for someone. Furthermore, Keynes singled out that a continuous increase in interest payments could bring about a vicious circle of low investment due to its perverse effects on the behaviour of entrepreneurs. For instance, high interest rates convey large financial returns that would discourage current and potential entrepreneurs to venture their capital in investment projects and instead incentivize them to engage in speculative activities or rentier behaviour.

The *GT* is different because here Keynes stood upside down Say's law and its one-way causality from saving to investment. On the one hand, output adjustments rather than price adjustments take the center stage. On the other, the level of investment is autonomous, and saving is an ex-post variable. Hence, the money rate of interest becomes an entirely monetary phenomenon that would be influenced a great deal by liquidity preference, a highly psychological variable that has to do with the propensity to hoard money, given by expectations and social conventions. The money rate of interest is thus defined as the price for liquidity. Moreover, due to its low elasticity of production and the fact that the monetary authority sets the price for liquidity among commercial banks, monetary policy would basically consist of administering the short-run rate of interest.

It is not that Keynes forgot the implications of the rate of interest on distribution, but he emphasized other aspects in the *GT* related to, for instance, the positive consequences of a low rate of interest on investment and employment. Ultimately, full employment could only be consistent with a low interest rate that stimulates production and jobs creation, while at the same time disincentivizes the hoarding of money because of changing liquidity preference, an activity practiced mostly by the rentier class. In a world of full employment, a low rate of interest would minimize hoarding activities, the rentier class would eventually disappear as an important income group, and income and wealth inequalities would be attenuated, a situation that Keynes (1936, p. 334) ironically called the "euthanasia" of the rentier.

To summarize, I found in Keynes the seeds of what much later would be coined the income distribution channel of monetary policy (Seccareccia and Lavoie 2016; Rochon and Seccareccia 2023), a mechanism that looks at the impact of changes in interest rates on income distribution, and how this in turn affects economic activity and unemployment rates. Admittedly, post-Keynesian economists highlight the importance of the income distribution channel over the traditional interest cost channel. First, early on in *A Tract on Monetary Reform*, Keynes stressed the importance of the rate of interest as a distributional variable but its potential impact on employment and output was missing. On the other hand, although there was some discussion in the *Treatise,* it would not be until the *GT* when Keynes sketched out both how changes in the rate of interest would affect investment and employment rates and how income redistribution among social classes — e.g., between entrepreneurs, rentiers, and wage-earners — could affect the propensity to consume for the community (Keynes 1936, p. 231).

Early contributions: Joan Robinson and Luigi Pasinetti

"As their name indicates, post-Keynesians find their principal inspiration in the work of John Maynard Keynes […]" (Lavoie 2009, p. 2). Obviously, the subject of this chapter is hardly new or the exception. Some of the founding post-Keynesians, notably Joan Robinson in the 1960s and later Luigi Pasinetti in the early 1980s, took up Keynes's insights to provide a clearer and more systematic perspective on how monetary policy impacts income distribution. I have chosen these two authors since Robinson's exposition is almost a natural extension of the ideas that Keynes explored previously, and Pasinetti had the virtue of introducing the dynamics to the problem.

In her magnum opus *The Accumulation of Capital*, Joan Robinson (2013/1969) analyzed the interest rate as a distributional variable with special emphasis on its effect on what she called the rentier share of profit, i.e., the income of the rentier class, which is derived primarily from interest payments on loans that are a deduction from business profits. Furthermore, compared to Keynes she was more incisive in explaining how the distribution of income and wealth both within and among social classes impacts the rate of investment.

For starters, she noticed that, apart from entrepreneurs differing in their psychological inclination to invest, the so-called *animal spirits* that were so important in Keynes' theory, entrepreneurs differ as well in what Robinson termed *borrowing power*. The borrowing power is the capacity of an entrepreneur to get a loan at a certain moment, and it depends on the entrepreneur's respective net income and wealth. It follows that the rate of investment would be conditioned by "the distribution of borrowing power amongst entrepreneurs" (Robinson 2013/1969, p. 244), such that, given a certain distribution, a reduction in the rentier share would increase the rate of investment because the borrowing power of the entrepreneur class has been strengthened and the mass of credit expanded. Following Keynes' propositions, she admittedly sees that there is an immanent conflict between rentiers and entrepreneurs over the distribution of total profits.

On the other hand, Robinson explicitly stated the connections between changes in the money rate of interest, income distribution, and the rate of investment. In her endogenous money framework, she claimed that a monetary policy trying to stimulate investment through low interest rates would be effective if it increases capacity utilization rates. For example, she mentions the importance of the accelerator effect of private expenditure in cases of redistribution that provoke the reduction of the rentier share vis-a-vis the net-profits share. Like Keynes, Robinson was aware of the potential benefits for investment and capital accumulation of a reduction in the rentier share, something that could be accomplished by a policy of low interest rates (Robinson 2013/1969, p. 253).

The contribution of Luigi Pasinetti is perhaps more abstract, but it has the merit of introducing dynamics to the relation between interest rates and income distribution. In his 1981 book *Structural Change and Economic Growth*, Pasinetti (1981) dedicated a whole chapter to the role of the rate of interest. In it, he begins analyzing the simplest case of an economy where labour is the only factor of production, in which the rate of productivity growth equals the rate of real wage growth (the chapter then extends to the general case with capital goods though). He explained that the rate of interest emerges as soon as inter-personal credit relations are present, which implies not only people willing to postpone consumption (creditors) but also other people willing to increase consumption (debtors).

Pasinetti proceeded by asking what would be the rate of interest that keeps constant the distribution of resources between creditors and debtors. He answered that it is the rate of interest that preserves the purchasing power of the sum lent in labour time, which is the rate of interest discounted by inflation (the Fisher real interest rate) that is equal to the growth rate of real wages. This rate of interest would guarantee a constant income share of creditors (also rentier share). Although there is no automatic tendency for the rate of interest to follow real wage growth, he concluded that any other rate would necessarily affect the distribution of income in favour of creditors (rentiers), if it is higher than real wage growth, and vice versa.

Back then Pasinetti did not quite explore the monetary policy implications of his theory, but in subsequent work (Pasinetti 2002), he eventually came up with the normative implications of maintaining the rentier share constant through keeping the real rate of interest equal to real wage growth, so that he named this rate as the "just" rate of interest. He suggested that monetary policy ought to be conducted with reference to the "just" rate of interest to see how it is affecting distribution and who are the winners and losers of this policy.

The pioneers: Eichner, Lavoie and Seccareccia, Moore, and Niggle

Despite all these contributions, the link between monetary policy and distribution was a bit blur. It was rather a side topic in the theories of the early post-Keynesians. It never took the center stage of analysis in their books or major research articles. In that sense, it was not until the late 1980s when a few big names in the post-Keynesian tradition picked it up and provided a comprehensive form of understanding the effects of interest rate policy on the distribution of income and wealth.

Alfred Eichner (1987), Marc Lavoie and Mario Seccareccia (1988), Basil Moore (1989), and Christopher Niggle (1989), all wrote original articles that constitute what may be regarded as the basis of a post-Keynesian perspective on monetary policy and distribution. It is not a coincidence that all these authors wrote in the late 1980s. The consequences of a period of significantly high interest rates that began with the Volcker shock were the high and persistent levels of unemployment and rising income and wealth inequality. However, mainstream economics justified the interest rate hikes as a "painful but necessary" treatment to combat inflation. In this story, monetary policy is purely a monetary phenomenon, and monetary issues are neutral in the long run, meaning that they do not affect the trends in income distribution or employment (for a review of the mainstream perspective, see Seccareccia and Matamoros (2023a)).

Conversely, post-Keynesians had a completely different explanation of both the sources of high inflation in the 1970s – having to do primarily with oil shocks and specific bottlenecks – and the consequences of high policy interest rates in the 1980s. The rise in income and wealth inequality was tied to a switch in macroeconomic policies that redistributed income away from workers e.g., by reducing social spending and implementing across-the-board tax cuts (Moore 1989) and abandoning the full employment commitment while adopting an "inflation first" strategy by central banks (Galbraith 1998). Broadly speaking, the post-Keynesian understanding of short-run interest rates as basically an administered price for the monetary authority and as a cost-income variable, incentivized a few post-Keynesians to explore the links between interest rate policies and distribution by building on previous post-Keynesian works.[3]

To begin with, Eichner (1987) equated the money rate of interest to any of the other distributional variables, such as the wage rate. He claimed that if the supply of credit is perfectly elastic at an exogenous short-term interest rate, usually the base interest rate determined by the central bank, then the rate of interest has nothing to do with time preferences. Instead, it becomes foremost a distributional variable determining the share of income of fixed-interest debt holders, whence the appropriate rate of interest ought to be an outcome of policy decisions rather than market considerations. However, his only explicit recommendation for monetary policy was to keep interest rates equal or slightly above the rate of inflation.

---

[3] It should be noted that in the 1980s as well, other post-Keynesian authors apart from the ones discussed in this subsection – and associated with the Sraffian strand of post-Keynesian economics – made remarkable contributions to the understanding of the interest rate as a distributional variable. In particular, the work of Massimo Pivetti, Carlo Panico, and Alessandro Roncaglia, claimed that, broadly speaking, the macroeconomic profit rate is in part determined by the interest rate and the interest rate is an exogenous variable administered by the central bank (see Zolea 2022; Lavoie 1996). Despite their relevance, I decided not to include them in more depth in this chapter for two reasons. First, it would require a lot more space to fully explain the Sraffian take on this issue and this chapter is already quite long, not to mention that Chapter 2 of this thesis also talks about the Sraffian ideas on the relationship between markups, inflation, and monetary policy. Second, in a forthcoming article written with two colleagues, I try to go over the commonalities and differences of the post-Keynesian and Sraffian ideas on monetary policy and income distribution (see Lofaro, Matamoros, Rochon 2023).

Lavoie and Seccareccia (1988) put together the ideas of Keynes, Robinson, and Pasinetti to produce an original explanation of the concentration of income during the crisis of the 1980s in Canada and elsewhere. They singled out the various mechanisms through which interest rate policy by central banks could impact income distribution and employment levels. They brought in how a rise in the rate of interest increases the rentier share, and this in turn impacts unemployment not only due to reducing the level of investment — as suggested by Robinson, but also influencing effective demand by reducing the aggregate propensity to consume. Accordingly, the authors proposed a new index inspired by the work of Pasinetti – that would later be called the Pasinetti index (Seccareccia & Lavoie 2016), which is a measure of the transfer of income toward the rentier class provoked by interest rate policy.

The Pasinetti index first put forth by them is portrayed by the difference between the Fisher real rate of interest and labour productivity growth: $r – z$.[4] If the index is positive, meaning $r > z$, one would expect a net transfer of income from the non-rentier groups toward the rentier class, and vice versa. It is worth mentioning that Lavoie and Seccareccia (1988) also presented the index using output growth as a proxy for productivity growth, $r – g$, a measure that, to some extent, would resemble the now famous Piketty's (2014, p. 25) law of capitalism, $r > g$, but relying on very different theoretical schemes (see Seccareccia and Lavoie 2016). However, this just makes visible that when the debate on distribution and macroeconomic policy was minimal in mainstream circles, post-Keynesians were already digging into the theoretical mechanisms and evidence of this complex phenomenon.

Furthermore, Lavoie and Seccareccia (1988) put forward that, although the central bank is only able to drive the short-run money rate of interest and what determines the extent of the rentier transfer is the Fisher real rate of interest, monetary policy can be conducted with relative flexibility to make sure that money interest rates follow inflation and wage rate/productivity increases with certain accuracy. Apart from that, monetary policy can also exert influence over long-term interest rates given that they generally mirror short-term interest rates — although the yield curve does

[4] The discussion on which rate of interest is to be utilized is open. It depends on what precisely is expected to be captured with the index. Nonetheless, Seccareccia and Lavoie (2016) argue that a long-term interest rate (e.g.,10-year or more government bonds) would be more appropriate to depict Keynes' original conception of rentiers as a class who makes a living out of the ownership of interest-bearing assets.

have other determinants such as liquidity preference, risk premiums and mark-ups (points also raised by Eichner (1987)).

Following these authors, Moore (1989) stated that since the core of post-Keynesian price theory is based on imperfect competition and markup pricing (e.g., prices are set at some mark-up over unit costs), monetary policy might directly affect the labour income share. Putting it differently, "the functional redistribution effect of changes in interest rates centres directly on the responsiveness of the mark-up to interest rates." (Moore 1989, p. 25) Obviously, this responsiveness would depend on several factors, for instance if the change in interest rates is temporary, on the degree of capacity utilization, and so on. But, in general, long-lasting increases or decreases in interest rates might be passed on to prices by firms to maintain their profit targets. If profits are maintained, the trends in interest rates would be inversely correlated with the share of wages in total income.

On similar grounds, Niggle (1989) argued that monetary policy as well affects the functional distribution of income through changes in the level of interest rates but also depending on the debt-income ratio for the economy. Furthermore, he and Moore (1989) put forth the many difficulties of trying to measure these effects due to, for instance, the fact that changes in interest rates might negatively influence financial asset values, whence affecting capital gains/losses and distribution in the opposite direction as the income distribution channel would normally do.

Subsequent developments: post-Keynesian economics at the turn of the Twenty-first century

The decades that followed were characterized by an increasing number of post-Keynesian economists that wrote on monetary policy and distribution, both providing theoretical contributions and, in fewer cases, empirical evidence. However, the subject remained in the contours of the post-Keynesian research agenda. In what follows, I present some of the subsequent developments that will be relevant in the next section of my chapter.

To begin with, Lavoie and Seccareccia (2019) discussed the Pasinetti index and proposed a labour-commanded Pasinetti index where instead of using the difference between the real rate of interest and labour productivity growth, $r - z$, they defined it as the difference between the money rate of interest and the growth in the money wage rate, $i - w$, which by the way would resemble the original propositions made by Pasinetti (1981) in his labour economy model. This modified Pasinetti index is important because it considers the well-known and recent stylized fact pertaining to the divergence between the growth in labour productivity and the growth in the real wage, which expresses nothing but the rate of change in the mark-up over unit costs (and inversely proportional to the rate of change in the wage share).

An additional but complementary perspective was that of Galbraith (1998) and Seccareccia and Lavoie (2010) arguing that "inflation first" monetary policy – that morphed into inflation targeting monetary policy in the 1990s – has been used against workers by threatening them to raise interest rates and so to increase unemployment if they do not moderate their wage claims. In other words, workers' demands for higher pay have been controlled by central banks who threaten workers that, if such pay increments jeopardize price stability, they will always be ready to raise interest rates no matter the costs. As pointed out by Seccareccia and Lavoie (2010), this procedure is not very different from the incomes policies put in place in the 1960s and 1970s to check inflation by setting voluntary guidelines on the wage claims. The difference is that monetary policy does not need to justify its actions other than on inflation concerns, and its effectiveness to control wage claims is based on fear rather than on deliberation and consensus. In that sense, monetary policy could be seen as an incomes policy that has been effective in keeping inflation in line but at the expense of "slowing down the economy through doses of higher real interest rates and greater unemployment – that is to say, a perverse incomes policy that raises the income of one group, the rentiers, while slowing the income growth especially of wages earners" (Seccareccia and Lavoie 2010, p. 40).

Furthermore, Galbraith (1998) has pointed out the fact that monetary policy affects the income of workers but not of all workers. He argues that some sectors or industries are more vulnerable to changes in interest rates and private spending, such as those industries within the services sector with lower wages and weaker bargaining power, so that they are also the sectors that suffer a great deal under high unemployment rates. These sectors tend to get below-average wage increments that rarely keep up with price inflation. In other words, not all workers have the same bargaining power; they instead can be ranked in what Galbraith (1998, Ch. 4) called traditionally *the wage structure*, according to their income, their bargaining and borrowing power, and their vulnerability in the face of an economic crisis.

As a result, there is a second distributional dimension that concerns the within class redistribution from high income workers to low-income workers whenever there is an "inflation first" monetary policy that maintains significantly high real interest rates along with high rates of unemployment. Conversely, the best time for low-income workers – generally located in the services sector – occurs when the economy is doing well, and in some cases, prices may start to rise (Galbraith 2022). The problem with this is that if central banks happen to curtail economic activity by increasing the rate of interest, this will hurt low-income workers first.

Summing up, the post-Keynesian perspective about the effects of monetary policy on income distribution can be divided into direct and indirect channels. The direct channels are divided into, on the one hand, the straight impact on the wage share caused by changes in the rate of interest. On the other, a second direct channel is the redistribution within workers, where a fraction of the working class (usually with higher income) increases its wage share. Naturally, these two direct effects are expected to impact output and employment levels through changes in the aggregate propensity to consume. Additionally, their effectiveness depends on how debt is distributed in society and within the working class.

On the other hand, the indirect channels have to do with changes in income distribution triggered by changes in the unemployment rate that, in turn, are driven by movements in the rate of interest. This channel obviously depends on the income-elasticity of interest rate changes. Clearly, one can argue in many directions over this point, but it is perhaps widely recognized that the impact is asymmetric in the sense that increases in the rate of interest are generally quite effective in reducing economic activity whereas reductions in it are hardly effective in boosting output. Moreover, the asymmetry in interest rate setting also involves greater difficulty to influence the yield curve at higher levels of interest rates compared to at lower levels (Lavoie and Seccareccia 1988).

1.3 Some Stylized Facts in Canada and the United States

Wage Shares

The wage share expresses the participation of wages in value added.[5] A wage share might be referred to that of a country, an industry, a sector, or a firm. Formally, the wage share is commonly depicted as:

$$s = \frac{WL}{PY} \tag{1}$$

where W is the wage rate, L is the quantity of labour employed, Y is output, and P is the output price. Therefore, higher wage shares are explained by higher real wage rates $\left(\frac{W}{P}\right)$ in relation to labour productivity levels $\left(\frac{Y}{L}\right)$, and vice versa. Logically, in the extreme case where all output accrues to workers, the real wage rate would be equal to labour productivity and profits would be zero.

In growth rate terms (by taking logarithms and differentiating with respect to time), the rate of change in the wage share is equal to the gap between the rates of growth in the real wage and labour productivity:

$$\frac{\dot{s}_t}{s_t} = \frac{\dot{\omega}_t}{\omega_t} - \frac{\dot{l}_t}{l_t} \tag{2}$$

where $\dot{x}_t = \frac{dx_t}{dt}$, w is the real wage and l is the labour productivity. As such, the wage share would only be constant (meaning $\dot{s}_t = 0$) if the rate of growth in the real wage equals labour productivity growth. The steadiness in the wage share was considered a well-known stylized fact for industrial countries in the first half of the Twentieth century, an argument defended by Nicholas Kaldor (1961) and even Keynes (1926, p. 369), who pointed out that this is "one of the most surprising, yet best established facts in economic statistics". Nevertheless, facts changed around the 1980s due to several industrial countries experiencing a long-term fall in the wage share that would become extensively documented in the coming decades (see Sharpe, et al. 2008; OECD 2018). However, there is no consensus yet on the determinants of the fall in the wage share.

[5] There is a difference in the empirical literature that distinguishes between wage share and labour income share, the former being the participation of wages and salaries in value added while the latter being the participation of all labour income in value added. In this chapter, as other authors do (see Taylor and Barbosa-Filho 2021), I skip that distinction so that by wage share I mean labour income share, that is, it includes all labour income.

Table 1.1 depicts the statistics for equation (2) in terms of decomposing the rate of change in the wage share between the rates of growth in labour productivity and real wage in Canada and the United States. First things first, I divided the whole period starting in 1961 in two subperiods since there was a clear breakpoint in the data for both countries in the 1980s with respect to the average rates of growth, where the period of the 1980s onwards portrays, on average, lower rates of growth in labour productivity and real wages compared to the previous decades. Additionally, no matter what period I choose, labour productivity growth is always greater than wage growth regardless of the real wage measure, whereby the wage share necessarily must fall.

Following Galbraith (1998), the distinction between production and consumption wages is that the former represents the real wage deflated by the implicit price deflator (or output price, *P*), reflecting the purchasing power of workers with respect to the goods and services they produce. In contrast, the consumption wage refers to the real wage deflated by the Consumer Price Index (CPI), expressing purchasing power of workers in terms of the goods and services they purchase.[6] Thus, I can get two measures of the gap between real wages and productivity growth rates depending on whether one picks the production wage or the consumption wage. In any case, both countries in Table 1.1 below display a steady fall in the wage share, reflecting a widening in the wage-productivity ratios.

Table 1.1.Labour Productivity and Real Wages

Canada and US, Average Annual Growth Rates, Business Sectors, Selected Periods

Period	Labour Productivity	Production Wage	Consumption Wage	Wage Share	Consumption Wage-Productivity Gap
			Canada		
1961-1980	2.8	2.5	2.8	-0.3	0.0
1981-2020	1.5	1.2	1.1	-0.1	-0.4
Wage-Productivity Ratio 2020 (1961=100):				93	84

[6] More precisely, the real wage growth in equation (2) portrays the production wage $\left(\frac{W}{P}\right)$. Its difference with the consumption wage is just the workers' terms of trade: $\left(\frac{P}{CPI}\right)\left(\frac{W}{P}\right) = \frac{W}{CPI}$ (See Sharpe et. al., 2008).

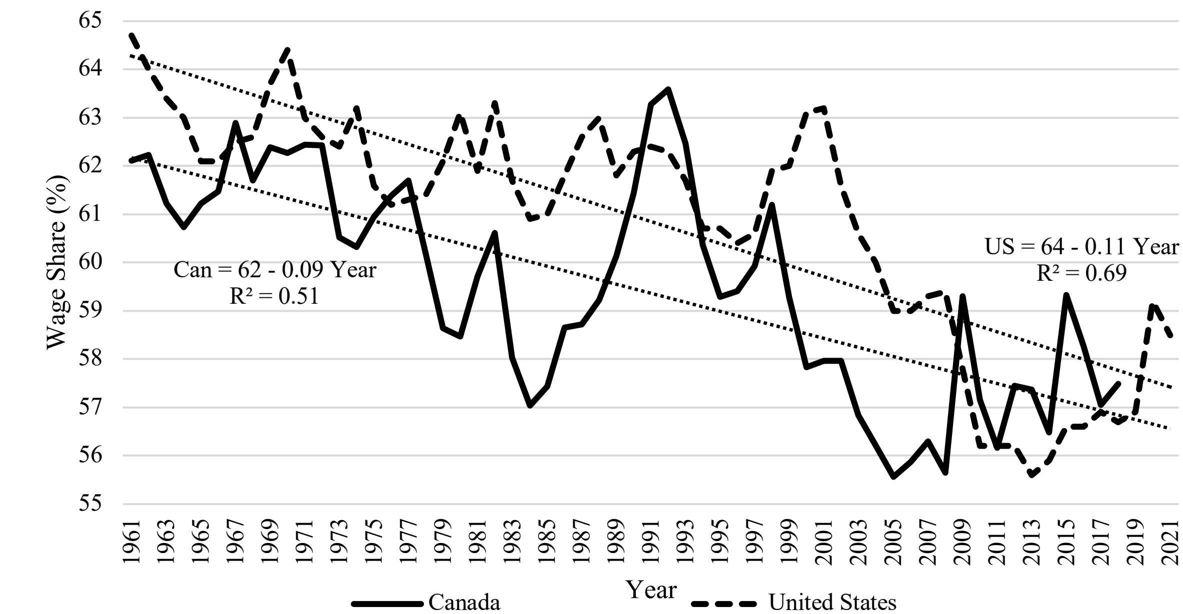
	US				
1961-1980	2.3	2.2	1.7	-0.1	-0.6
1981-2021	1.9	1.8	1.1	-0.1	-0.8
Wage-Productivity Ratio 2021 (1961=100):				90	63

Notes: Production Wage refers to the real wage deflated by the implicit price deflator and Consumption Wage refers to the real wage deflated by the Consumer Price Index. Production wage for Canada covers until 2018.

Sources: Canada data: Statistics Canada, Table 36-10-0208-01, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610020801. US data: Bureau of Labor Statistics, LPC Tables, https://www.bls.gov/lpc/

However, the consumption wage grew significantly less than the production wage in both countries, except in Canada for the period 1961-1980. That means that hand in hand with the increase in the profit share there was a fall in the terms of trade of workers as well, leading to an important deterioration in workers' living standards. This phenomenon was more relevant in the United States compared to Canada if one looks at the magnitude of the decline in the wage share. The data in Table 1.1 is comparable to the findings in Sharpe, et. al. (2008), although the latter shows a fall in the wage share that is more modest in both countries but particularly in Canada. Thus, the long-term widening in the production wage-productivity gap is significant both in Canada and the Unites States, thereby contradicting Gordon (2021) claiming that the gap is only significant for the consumption wage. Moreover, despite productivity and wages being more volatile in the first period, the fall in the wage share involves the two periods, which questions the argument that the decline in the wage share started in the 1980s in these two countries. On the other hand, the deterioration in workers' living standards did accelerate since the 1980s if looking at the last column in Table 1.1, reflecting the consumption wage failing to catch up with productivity.

Figure 1.1 Wage Share in Canada and US: 1961-2021



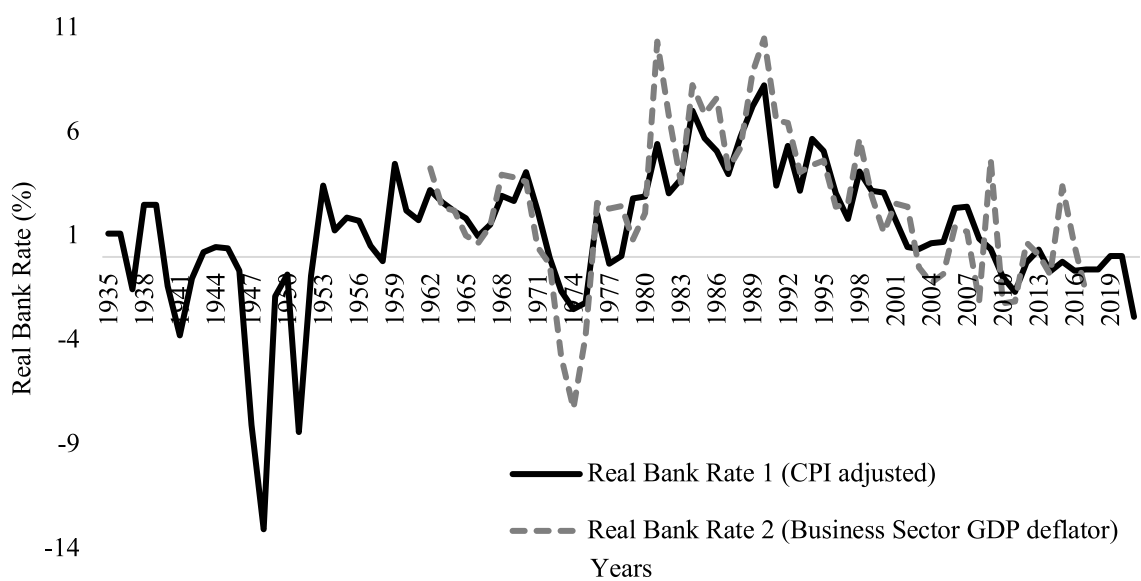
Sources: Statistics Canada, Table 36-10-0208-01, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610020801. Note: Canada data ends in 2018. Bureau of Labor Statistics, LPC Tables, https://www.bls.gov/lpc/

Figure 1.1 clearly shows the long-term fall in the wage share in Canada and the United States since 1961, which is accompanied by a trend line in each case depicting a slightly steeper slope (-0.11 percent per year) and less variability — notice the larger goodness of fit (R^2) — in the United States compared to Canada. In the United States, the wage share was 65 percent in 1961 and reached its lowest level in 2013 with 56 percent after a rapid decrease starting in 2003, but it has increased since the Covid-19 pandemic in 2020 to 59 percent. In contrast, Canada experienced more variability in its wage share, beginning in 1961 with a level of 62 percent, but it fell rapidly from 1973 to 1985 to a level of 57 percent — coinciding with the oil shocks and the early 1980s crisis. However, the Canadian wage share bounced back very quickly from 1986 to 1992, where it peaked at 64 percent, although afterwards it declined steadily until the GFC of 2008-2009 at 56 percent. After the GFC, like the US, the wage share in Canada has been stable at about 57 percent.

Monetary Policies

The evolution of monetary policy is associated with the behaviour of short-run interest rates that are driven by central banks setting the base interest rate from which all other rates follow.[7] In Canada, Figure 1.2 depicts the historical behaviour of the real Bank rate during the 1935-2021 period for both the real Bank rate adjusted by the CPI and the real Bank rate adjusted by the business sector GDP deflator (for a shorter period, 1961-2018). Even though the latter displays greater dispersion, both statistics seem to follow a similar pattern. Real interest rates were generally positive and relatively high in much of the period between the mid-1950s until the GFC – except for a few years in the mid-1970s when rates became negative. Nevertheless, interest rates peaked during the 1980s and early 1990s, initially fueled by the Volcker shock but they remained high until the mid-2000s and went even into negative values after the GFC.

Figure 1.2 Real Bank Rate in Canada: 1935-2021



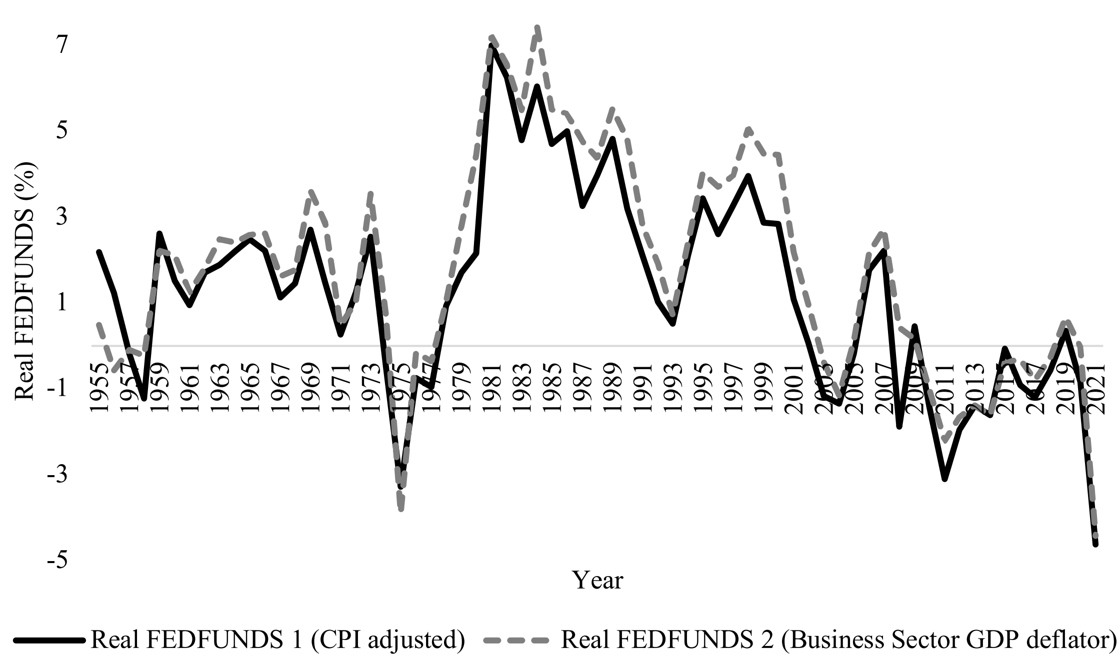
Notes: Real Bank Rate 1 is the Bank rate adjusted by CPI and the Real Bank Rate 2 was adjusted by the Business Sector GDP deflator. Annual data refers to annual averages of the monthly data. The data for the Real Bank rate 2 covers the period 1962-2018.

Sources: Statistics Canada. Table 10-10-0122-01 and Table 18-10-0005-01, links:
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1010012201 and
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000501

[7] Additionally, many authors have shown evidence that long-term interest rates behave similarly as short-term interest rates (see Lavoie and Seccareccia 2021; Rochon and Seccareccia 2023).

Regarding the United States, Figure 1.3 shows the evolution of the real Federal Funds rate adjusted by the CPI and the GDP deflator for the business sector. In this case, the two measures are very close to each other, despite the latter displaying slightly greater dispersion as well. Broadly speaking, the interest rates trajectory is comparable to that of Canada in the sense that it is for the most part above the zero-line beginning in the 1950s until the GFC. Additionally, the period of particularly high real interest rates is in the 1980s and 1990s. Although interest rates were pushed down to negative territory for a couple of years following the Dot-com crisis in the early 2000s.

Figure 1.3 Real Federal Funds Effective Rate: 1955-2021



Notes: Real FEDFUNDS 1 was adjusted with CPI and FEDFUNDS 2 was adjusted with the Business Sector GDP deflator.

Sources: FED Data Download Program, Unique Identifier: H15/H15/RIFSPFF_N.A, and Bureau of Labor Statistics, LPC Tables, https://www.bls.gov/lpc/

There are a few things that are worthwhile to mention after looking at the above data for the two countries. First, the period of low labour productivity and real wage growth that began in the 1980s coincides with the era of very high and persistent real interest rates. This is a well-known observation that has been studied by many authors (see Galbraith 1998; Lavoie and Seccareccia 2021; Seccareccia 2019).

Moreover, during the first half of the Twentieth century, when the steadiness in the wage share was an uncontested stylized fact, Canada experienced close to zero or negative real interest rates. If effectively that was the case, something analogous occurred after the GFC, because wage shares seem to be relatively constant and real interest rates have been at very low levels. In contrast, the long-term decline in the wage share that was only interrupted at the time of the GFC coincides with a period of high real interest rates. These stylized facts have led several economists to claim that there must be a relationship in the sense that very high interest rates have contributed to the fall in the wage share through the income-distribution channel, either considering the direct effect of interest rates on distribution (Lavoie and Seccareccia 2021; Rochon and Seccareccia 2023) or via higher unemployment rates (Galbraith 1998; Seccareccia and Matamoros 2022a).

Some scholars have put forward the difficulties arising when empirically studying the relation between the high interest rates period and the decline in the wage share. To begin with, it is generally acknowledged that the wage share tends to behave countercyclically due to wages being relatively more rigid than output, but so are interest rates: high rates of interest tend to slow down the economy and vice versa – although changes in interest rates as a countercyclical policy tool are procyclical (Moore, 1989). But it might be reasonable to expect a contemporaneous positive correlation between the rate of change in the wage share and interest rates that is explained by economic activity and unemployment.

However, one may adopt a different approach to the problem by studying instead the wage share at the sector or industry level, where admittedly one gets significantly more variation due to the number of industries and individual industry inflation, which might not in principle affect interest rate policies so that one could avoid the issue of reverse causality. As pointed out by Moore (1989, p. 30), "long-run changes in the functional distribution of income between labour and property shares are dominated by changes in sectorial composition". Although it is true that these changes might be driven by technical change and institutional factors, in a world of imperfect competition and normal-cost pricing, one cannot discard the potential impact of monetary policies on the industry wage shares.

Industry Wage Shares

The North American Industry Classification System (NAICS) allows us to compare Canada and the United States in terms of the evolution of their industries and respective wage shares, even though the time series for each country do not cover the same periods and the data aggregation of industries is not precisely the same. Table 1.2 shows data for the industry wage shares in 15 Canadian industries aggregated at the two-digit level according to NAICS. For the first period 1961-1980, the table reveals that the decline in the business sector wage share was mainly driven by a few industries related to the agricultural and extractive industries, along with construction, and information and cultural industries. All other industries present increase their wage share in this period. This is interesting since there are only a few industries (agriculture, forestry, fishing, and hunting, construction, and other private services) that can be identified as labour-intensive that saw a reduction in their wage share. Hence, in this period, a few industries with significant wage share declines are pulling down the aggregate business sector wage share.

The second period 1981-2018 depicts very different trends with respect to the number of industries whose wage share fell. The number of industries with falling wage shares is greater, but one observes comparatively lower wage share declines. Contrary to the previous period, the industries that depicted wage share reductions were relatively more labour-intensive industries, such as manufacturing, trade, transportation, and so on (e.g., if one observes their wage share levels). Furthermore, by looking at the bottom two rows displaying aggregations of goods and services, the decline in the wage share in the first period was primarily caused by goods-producing industries — even the services aggregation displayed an increasing wage share — meanwhile in the second period the drivers were both goods and services industries.

The above changes were rooted in the transformation of the Canadian economy in the second half of the Twentieth century. First, the three decades that followed the Second World War are known as a golden era for Canadian workers in terms of the outstanding improvements of average living standards compared to, for instance, the last couple of decades of the century. Social programs were expanded, and unemployment rates were relatively low, urbanization accelerated a great deal – farm population declined from 27.1 to 6.6 percent (Osberg 2008), transportation and infrastructure systems grew massively, and manufacturing and services industries increased importantly its pool of workers (Russell 2021). As a result, technological and social change were remarkable, whence manufacturing, trade related, transportation, and other services depicted an increasing wage share whereas the opposite occurred to primary and extractive industries.

However, the second period (1981-2018) displays just the contrary pattern in the industries that presented a steady fall in their wage share. Manufacturing, trade related, transportation, and other services saw a decline in their wage shares while, for example, extractive industries experienced the opposite. All this happened at times of greater financial fragility inaugurated by a profound economic crisis in the early 1980s, then a process of trade and capital liberalization since the late 1980s (Seccareccia 2014), followed by another crisis in the early 1990s and, on top of that, the GFC in 2008-2009, thereby entailing relatively high unemployment rates, and increasing income and wealth inequality all over the period (Osberg 2008). Additionally, Blecker and Seccareccia (2014) have documented a greater predominance of extractive and services industries over manufacturing industries following the liberalization strategy, implying a continuous reduction in the share of manufacturing workers.

Table 1.2 Wage Shares by Industry in Canada: 1961-2018

Code, Sector, and Industry	1961	1980	2018	Annual Growth Rate 1961-1980	Annual Growth Rate 1981-2018
Business Sector	62	58	57	-0.3	-0.1
11. Agriculture, forestry, fishing, and hunting	69	48	39	-1.7	-0.5
21. Mining and oil and gas extraction	27	16	27	-2.5	1.0
21. Utilities	25	25	31	0.0	0.4
23. Construction	84	74	71	-0.6	-0.1
31-33. Manufacturing	68	68	58	0.0	-0.5
41. Wholesale trade	68	73	59	0.4	-0.5
44-45. Retail trade	72	78	72	0.4	-0.3
48-49. Transportation and warehousing	63	69	60	0.4	-0.5
51. Information and cultural industries	54	48	47	-0.5	-0.1
52-53. Finance, insurance, real estate and renting and leasing	33	44	45	1.5	0.1
54. Professional, scientific, and technical services	63	73	73	0.7	0.1
56. Administrative and support, waste management and remediation services	47	70	68	2.0	-0.1
71. Arts, entertainment, and recreation	53	61	75	0.7	0.6
72. Accommodation and food services	71	73	77	0.1	0.0
61-62, 81. Other private services	85	74	69	-0.7	-0.1
Goods aggregation	64	53	52	-0.9	-0.2
Services aggregation	59	64	61	0.4	-0.1

Source: Statistics Canada. Table 36-10-0208-01, at
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610020801

As to the United States, Table 1.3 depicts the data on the wage share for 21 selected industries at two and three-digit levels of aggregation for the period 1987-2020. In fact, this time the number of industries at the three-digit level are the majority with 16, whence the degree of disaggregation is greater, but a couple of major sectors are missing (e.g., specific industries in the primary and services sectors). In any case, the second column in Table 1.3 shows the average annual rate of change in the wage share, it tells us whether there was an upward or downward trend over the period. Thus, the industries whose wage share declined were primarily the ones related to manufacturing (codes beginning with 31 to 33), along with some associated with trade and transportation, in particular retail trade and truck transportation. Like in Canada in the period 1981-2018, the majority of these are industries that could be identified as labour intensive if compared to the industries that experienced a long-term increase in their wage share, such as mining, oil and gas extraction, and air transportation. Hence, assuming that the post-1980s period in both countries is comparable, their situation was analogous in the sense that the decline in the overall business sector wage share was driven by the relatively labour-intensive industries having to do with manufacturing, trade, and transportation.

Table 1.3 Wage Shares by Industry in US: 1987-2020

Code and Industry	Average Annual Growth Rate (%) 1987-2020	Wage-Productivity Ratio 2020 (1987=100)
21. Mining	0.3	109
211. Oil and gas extraction	0.4	113
22. Utilities	0.1	104
311. Food manufacturing	0.0	99
313. Textile mills	-0.8	75
315. Apparel	0.5	120
316. Leather and allied products	0.8	132
325. Chemicals	-0.4	86
326. Plastics and rubber products	-0.3	90
327. Non-metallic mineral products	-0.4	87
331. Primary metals	-1.0	71
333. Machinery	-0.5	84
334. Computer and electronic products	-0.1	98
335. Electrical equipment and appliances	-0.3	90
336. Transportation equipment	-0.9	74
42. Wholesale trade	0.3	111
44,45. Retail trade	-0.9	75
481. Air transportation	1.9	189
484. Truck transportation*	-1.2	70
493. Warehousing and storage*	0.4	112
72. Accommodation and food services	0.0	101
Average	-0.1	

* Period starts in 1992

Source: Labor Productivity and Costs, Tables and Charts - Industries, U.S. Bureau of Labor Statistics. Link: https://www.bls.gov/lpc/#tables [Accessed March 23, 2022]

The third column in Table 1.3 displays the wage-productivity ratio in 2020 (real wage divided by labour productivity with 1987=100). This is just another form of presenting the wage share, thereby column three is measuring the extent of the difference in the industry wage share in absolute terms with respect to the year 1987. On the one hand, the industries that depicted the largest fall in the wage share were truck transportation, primary metals, and transportation equipment manufactures. On the other hand, air transportation, leather, and allied products, were surprisingly the industries portraying the highest increases in the wage share.

Unfortunately, there is a lack of data before 1987 for the industry wage shares, but Galbraith (1998) shows evidence suggesting a rapid technical change in several manufacturing industries for the period 1959-1992, particularly before the mid-1980s and for the industries related to chemicals, computers and electronics, transportation equipment, communications, etcetera. However, like Canada — in fact, as part of a broader economic integration strategy in North America, trade and capital liberalization was accelerated since the late 1980s, hand in hand with a major switch in economic policy that brought about rising income and wealth inequality, an increasing employment participation of the services sector, and higher unemployment rates on average (Galbraith, 1998).

Summing up, the Canadian experience clearly reveals that the trend in the wage shares at the industry level is different when comparing the two periods. This phenomenon coincides in time with different monetary policy regimes, where the period pre-1980s is characterized by relatively low interest rates whereas most of the post-1980s era (until the GFC) depicts high interest rates. In the United States, the lack of industry level data before the 1980s makes it difficult to define a possible breakpoint, but the evidence shown by some authors (Galbraith, 1998) and the data starting in the late eighties point to an analogous pattern. Evidently, several other economic and institutional variables changed at the same time as well, such as fiscal and trade policies, demographic, and technical changes, to name a few. However, one cannot exclude a possible relationship between monetary policy and industry wage shares following the lessons of post-Keynesian theory as suggested in section 1.2 of this chapter, since industry level growth rates could have been conditioned by overall interest rate policy.

For example, several services industries depicted significant declines in their wage shares during the post-1980s period – such as transportation, personal services, remediation services, and so on – and these industries were less likely to be affected by liberalization given that they do not produce traded goods. Furthermore, in comparison to the primary or secondary industries, the services industries display lower technical change on average, whence long-term productivity growth tends to be lower as well in these industries. For all of that, the services industries were presumably more impacted by the domestic environment, including monetary and fiscal policies.

1. 4 Econometric Evidence

Methodology

The purpose of this section is to explore the empirical relation between monetary policy and the industry wage share. To start with, even though monetary policy might be exogenous from a post-Keynesian perspective – in the sense that the supply of money is horizontal at a fixed interest rate, central banks' decisions, or their respective reaction functions, are hardly independent of the state of the economy, thereby changes in interest rates would be dependent on other variables such as unemployment, inflation, etcetera. For that reason, the empirical analysis of monetary policy must deal with identifying the so-called monetary policy shocks, that is, changes in monetary policy that are independent.

The literature on the identification of monetary policy shocks is abundant and goes beyond the scope of this chapter; however, my contribution in this section lies instead in utilizing industry level wage shares. By doing so, I could potentially avoid the problem of endogeneity since I get a separate price deflator for each industry so that one could assume that the directionality goes from monetary policy to industry prices rather than the other way around. For convention and simplicity, I follow a widely used identification strategy, which is the conventional panel VAR model. A panel VAR has been used in several articles to address the problem of simultaneous causality through isolating the component of monetary policy that is exogenous (see Thorbecke 2001). Moreover, another remarkable feature is that they do not assume an a priori functional relation between the endogenous variables. Finally, this chapter has the value of including industry level wage shares (see Colciago et al. 2019; Kappes 2023).

Estimates for Canada

The estimations are based on the data presented in the previous section for Canada, which referred to industry level aggregations at two-digit levels according to NAICS, whence there are 15 aggregate industries for the period 1961-2018 in annual observations (from industry 11 to 81 in Table 1.2). For the panel VAR, I follow the same procedure as Thorbecke (2001), and my system specification uses as endogenous variables the rates of change in the industry-level wage share, the industry-level GDP deflator (industry inflation), and the Bank Rate.[8] Following the criteria proposed by Abrigo and Love (2016), I obtained a specification with four lags implying having 765 observations. I carried out the panel VAR estimation in a GMM framework and then I proceeded to calculate the orthogonalized impulse-response functions (IRFs) through the usual Cholesky decomposition. The IRFs do have causal interpretation, although the decomposition would depend on the ordering of the variables.[9] The IRFs measure the variation in the response variable over time because of an orthogonal innovation (exogenous shock) in the impulse variable. The different IRFs in Figure 1.4 (top row) reveal that a positive one standard deviation shock in the bank rate has a contemporaneous negative effect in the rate of change in the industry wage share that is statistically significant at the five percent level. However, this result is sensitive to moving the Bank Rate variable from its first place in the IRF ordering. When this happens, the contemporaneous negative effect vanishes. However, this is not a serious concern since again, the assumption that industry specific prices would not influence monetary policy contemporaneously could be reasonable. Moreover, there is still a negative and significant impact on the industry wage share at year five. On the other hand, the bottom row shows a slightly positive and significant effect in year two that is robust to the IRF ordering.

---

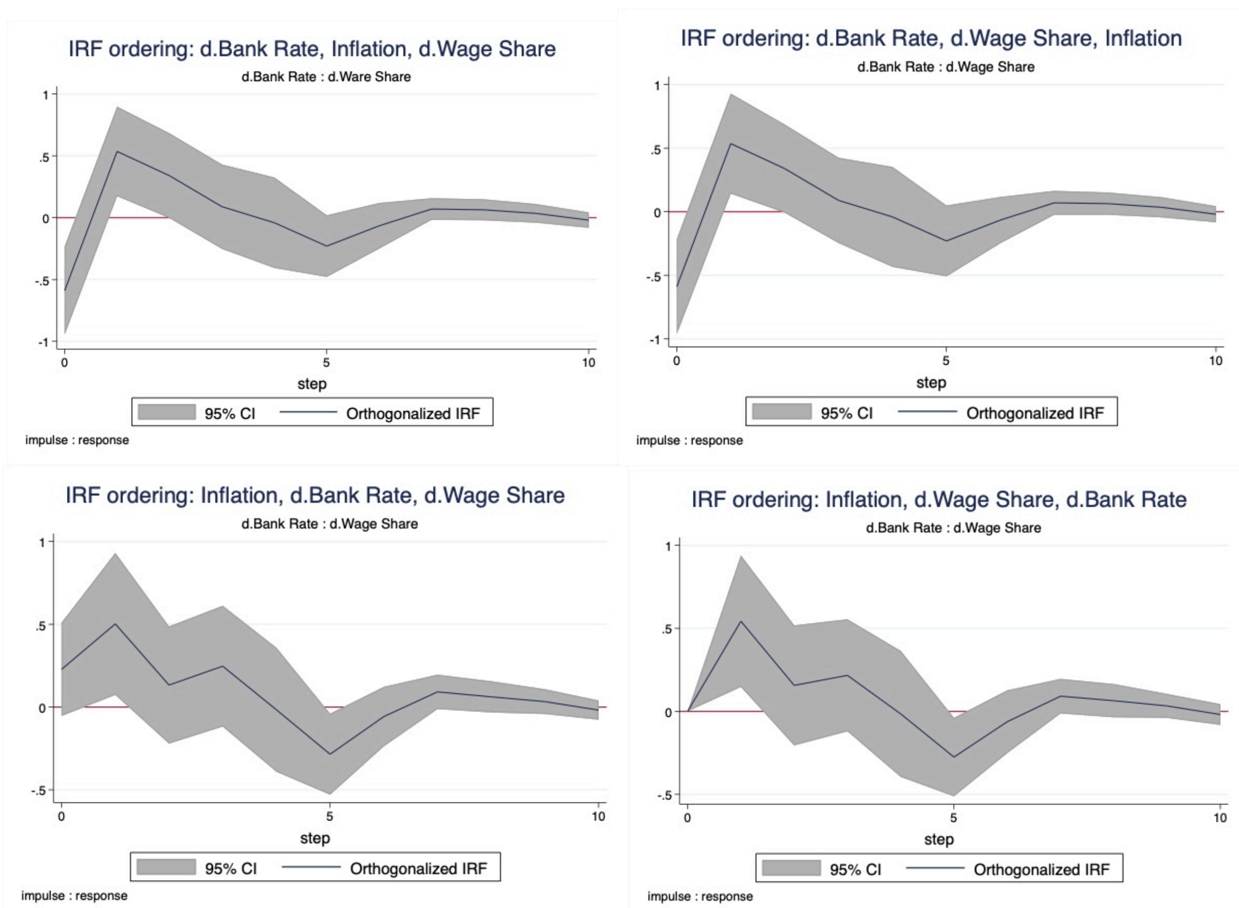
[8] I tried additional endogenous variables and specifications following Thorbecke (2001), such as including the unemployment rate, but I encountered instability issues. Moreover, other important variables that could be perhaps tested, such as capacity utilization rates, are often not available for all industries and periods. Hence, the main specification is the model I found more robust according to the criteria in Abrigo and Love (2016).

[9] The IRF ordering is a constraint on the variables that can be impacted at the time of the shock, i.e., the variables that are placed before in the ordering can impact the subsequent variables at time zero, but the latter variables cannot impact the previous variables in the ordering. This restriction only applies at time zero, all other periods are not affected by the ordering.

Summing up, results of the panel VAR support the idea that there was a significant negative effect of monetary policy on the industry-level wage share, but the timing of the effect is not conclusive in the sense that when changes in the Bank Rate are ranked first in the order of occurrence, its negative effect on the wage share is contemporaneous, whereas when industry-level inflation is ranked first, the negative and significant effect of the Bank Rate on the industry wage share shifts to the fifth year. Additionally, the evidence cannot disregard a slightly positive effect of the Bank Rate on the wage share at year two. This is in line with post-Keynesian theory arguing that a contractionary monetary policy shock would impact the +wage share particularly in the context of markup pricing industries where firms adapt to changes in unitary costs over time, thereby if costs rise due to higher interest rates, firms and eventually the industries would raise the markup accordingly.

Figure 1.4 Impulse Response Functions in Canada

Impulse: Rate of change in Bank Rate; Response: Rate of change in Wage Share

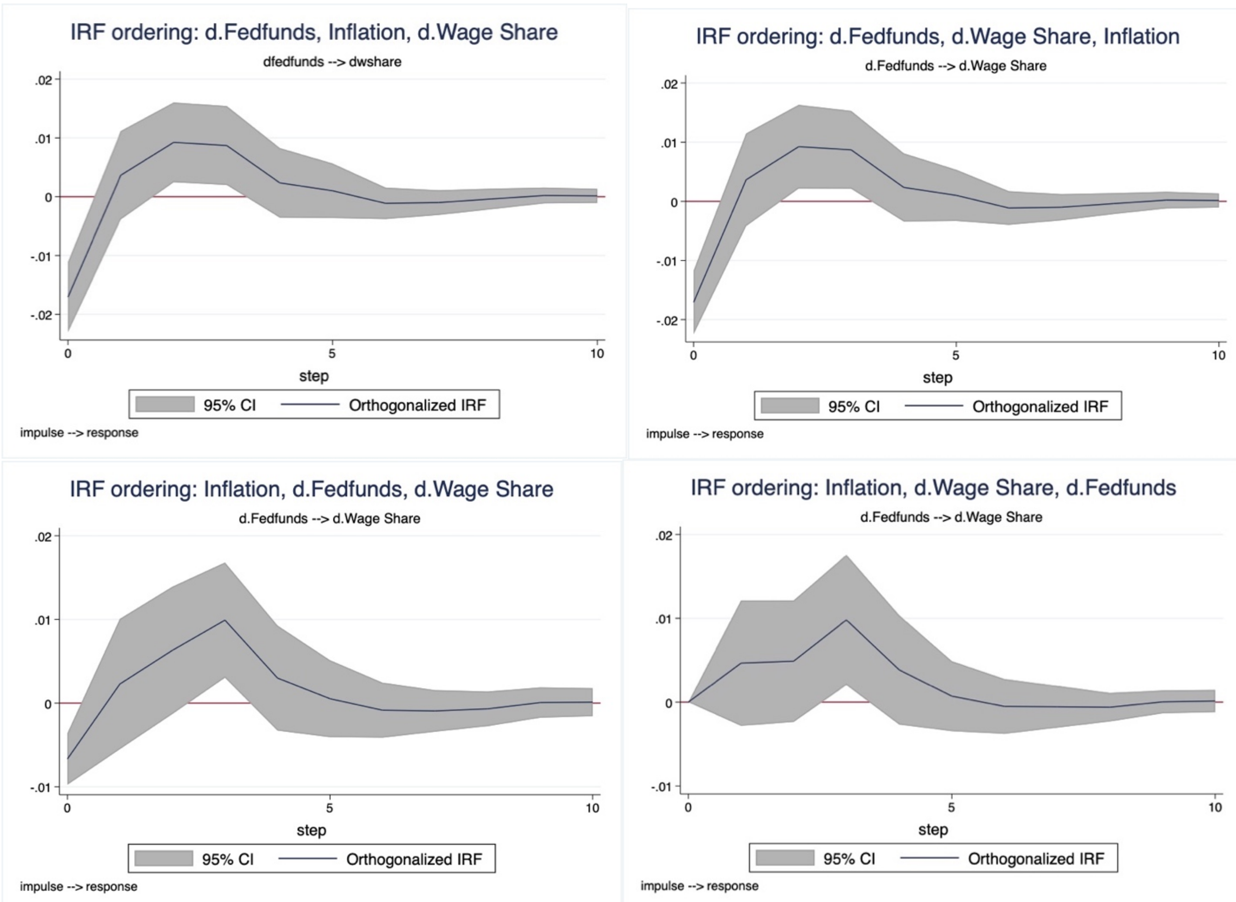


Estimates for the United States

The panel VAR estimation for the United States takes the dataset summarized in Table 1.3 with 21 industries at two-digit and three-digit levels following NAICS for the period 1987-2020 in annual observations. The main system is estimated using three lags following the specification criteria in Abrigo and Love (2016) and the number of observations yields 599. The system specification uses three endogenous variables: the rates of change in the industry GDP deflator (or industry price inflation), the industry wage share, and the Federal Funds rate. The resulting IRFs are displayed in Figure 1.5, portraying the effect over a ten-year period of a one standard deviation positive shock in the interest rate. These graphs show that there is a contemporaneous and significant negative effect of the interest rate on the industry wage share. This effect is robust to the ordering of the variables except when the wage share variable is ranked before the Federal Funds rate (in the bottom right graph). Additionally, one can also observe a positive and significant effect in year three, and in year two sometimes. However, the contemporaneous negative effect on the wage share is apparently of larger magnitude than the positive subsequent effects.

Figure 1.5 Impulse Response Functions in US

Impulse: Rate of change in FEDFUNDS; Response: Rate of change in Wage Share



Addressing possible omitted variable bias

a. Changes in the Industry Composition Weights

There is one important question that should be addressed particularly in the case of Canada where the period covered involves several decades (1961-2018) and the number of aggregate industries upon study is relatively low (15 industries): what if there were significant transformations in the within-industry composition weights? In other words, the panel VAR model for Canada uses 15 industry aggregations that are clearly depicted in Table 1.2, yet these broad aggregations might have experienced changes in the subindustry weights that could have impacted the aggregate industry wage shares.

To exemplify, let's construct a hypothetical case. For simplicity, assume that the manufacturing industry comprises only two subindustries: food manufacturing and textiles. At time t, food manufacturing generated 2 billion dollars in labor compensation and 10 billion dollars in GDP that accounts for a wage share of 0.2 (=2/10). Meanwhile, textiles depict a wage share of 0.8 considering its 8 billion dollars in labor compensation over 10 billion dollars in GDP. Then, the wage share in the manufacturing industry is built by dividing the sum of the labor compensation over the sum of the GDP for both subindustries, that is 10 billion over 20 billion which yields a wage share of 0.5.

Now suppose that at time t+1 both subindustries have expanded production and employment. On the one hand, the less labor-intensive subindustry, the food manufacturing, doubled its labor compensation to 4 billion dollars and doubled its GDP to 20 billion dollars, thereby its wage share continues to be 0.2. On the other hand, textiles also increased proportionally, but less than twice, both its labor compensation to 12 billion dollars and its GDP to 15 billion dollars, so its wage share is still 0.8. However, the wage share for the aggregate manufacturing industry has decreased to 0.46 since the sum of labor compensation is 16 billion dollars and of GDP is 35 billion dollars (16/35=0.457).

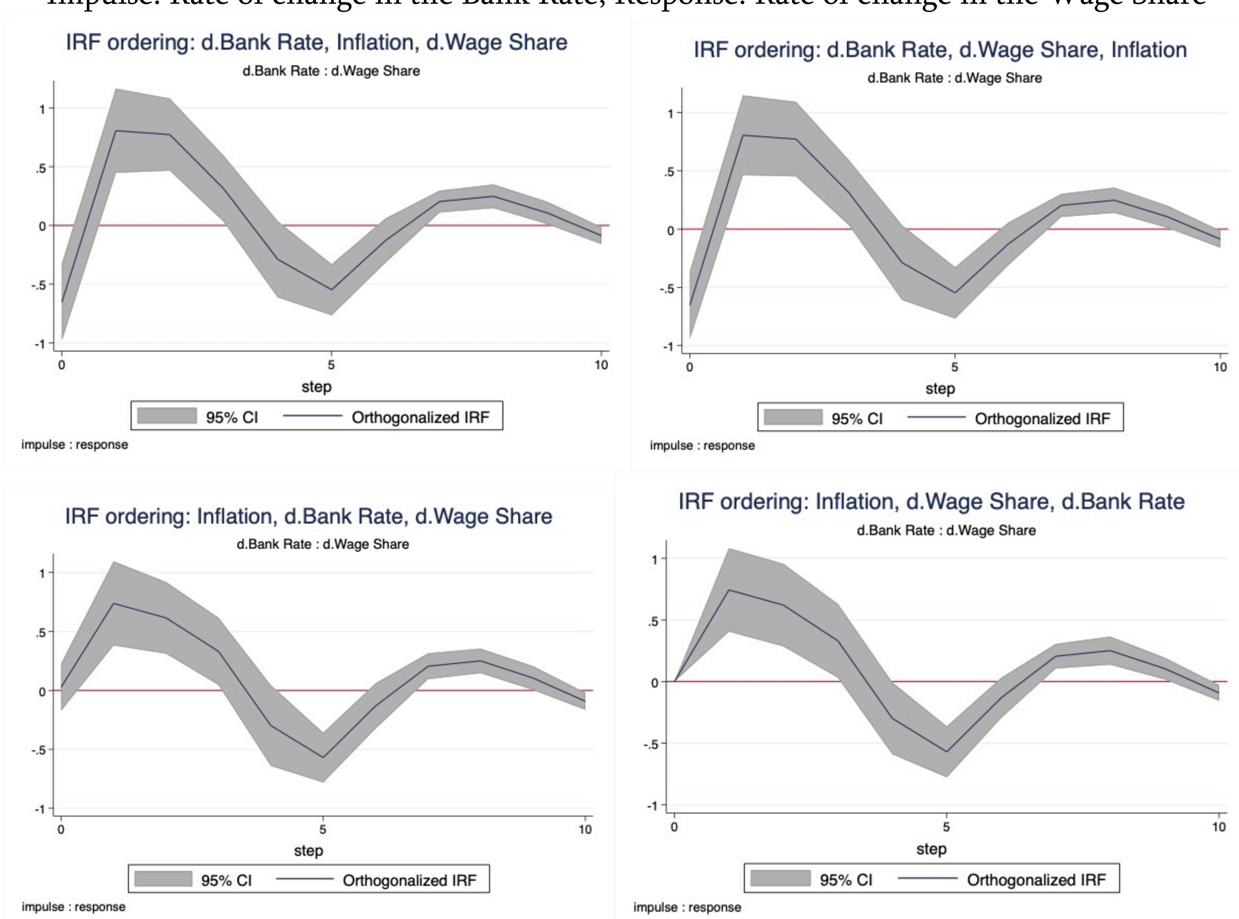
Consequently, even though the two subindustries depict the same wage share at t and t+1, the manufacturing wage share fell because the food subindustry (the less labor-intensive) increased its weight in terms of production and employment as a share of the manufacturing industry. If a similar phenomenon occurred but with actual numbers for Canada, it would be quite reasonable to ask: are the changes in the industry composition weights the drivers of the decline in the industry wage shares in the period studied?

To try to address this concern I pulled out data for Canada at the level of subindustry, that is, at the three-digit level, comprising this time 58 industries and subindustries in total for the period of 1961-2018. Then I proceeded to compute the same panel VAR model for Canada and the corresponding orthogonalized impulse response functions. Figure 1.6 shows the resulting IRFs displaying the impact of a one-standard-deviation positive shock in the bank rate on the rate of change in the subindustry wage share upon different orderings, which reveal that both the negative and positive effects are quite significant.

We observe that when the bank rate is ranked first in the IRF ordering, the contemporaneous negative effect is still there. Meanwhile, the negative effect at year 5 is significant regardless of the ordering. In contrast, there are significant and positive effects at year 2 and 3 that are also robust to the ordering. Apart from that, I found as well positive effects occurring at year 7 and 8, and negative effects after year 10 that are not observable in Figure 1.6. Thus, the effects previously found in Figure 1.4 above are reinforced by these findings after incorporating several subindustries. Overall, it could be argued that changes in industry composition weights did not modify the impact of monetary policy on industry-level wage shares in Canada.

Figure 1.6 Impulse Response Functions in Canada

Impulse: Rate of change in the Bank Rate; Response: Rate of change in the Wage Share



For the case of the United States, the industry composition weights might not represent a serious concern given that the data utilized in the panel VAR is already using several industries at the level of subindustry, particularly for the manufacturing sector. On top of that, not only the number of industries covered is greater than in Canada, with 21 industries and 16 subindustries at the three-digit level, but also the period is shorter (1987-2020). Consequently, if for Canada changes in the industry composition weights do not seem to significantly modify the impact of monetary policy in the industry wage share, it is reasonable to expect a similar situation in the United States.

b. Trade Liberalization and Labour Bargaining Power

Of course, changes in the industry weights are not the only possible omitted variables. Recall that the structural changes in monetary policy that occurred in the 1980s and 1990s towards an "inflation first" strategy were accompanied by policies aiming at trade liberalization and labour flexibilization that could have also contributed to the decline in the industry wage share. For that reason, I would try to provide evidence that monetary policy alone did influence the industry wage share for both Canada and the United States, regardless of the changes in other variables that could be significantly correlated. Hence, I estimated a fixed effects model with the industry wage share and two variables that could potentially introduce an omitted variable bias.[10] As a proxy for trade liberalization, I included the trade openness, which is the share of exports and imports in GDP; and as a proxy for labour bargaining power, I incorporated the trade union density, that is defined as the share of union members (excluding those who are not in the labour force or unemployed) in the total number of employees.

The results of the fixed effects regression are depicted in Table 1.4. The periods covered are the same used in the panel VAR above for each country, and the data is annual as well. All regressions incorporate year and industry fixed effects that account for year and industry-specific circumstances. I estimated three regressions for each country depending on the regressors included. The most important aspect to notice is the outcome in the first two rows pointing out that

[10] To check for possible random effects, I also estimated a random effects model with the same specification and the results are not significantly different from the fixed effects model presented in Table 1.4 in this subsection. Therefore, I decided not to include the random effects regression.

in all cases the coefficient of the Fisher real interest rate is statistically significant both contemporaneously and with one lag, and this result is consistent regardless of the inclusion of more variables. Notably, the value of the coefficients is quite consistent for all specifications, evidencing that the correlation between real interest rates and the change in industry wage shares is robust. Moreover, the associated coefficient is positive at year zero while it is negative with one lag in the interest rate. However, these are simply correlations, it is likely that the contemporaneous positive correlation between interest rates and wage shares is explained by the countercyclical nature in the wage share whereas the lagged correlation could be indeed associated with a potential effect, such as the impact found in the panel VAR model.

As to the Canadian regressions in the first three columns, the coefficients for trade openness and union density are not statistically relevant in any specification. This suggests that neither trade openness nor trade union density play a significant role in the evolution of the industry wage share in Canada for the period 1961-2018. With respect to the United States, results are different since the coefficients associated with trade openness and trade union density are statistically significant. On the one hand, the coefficient of union density is positive and quite large, suggesting that the evolution of labour bargaining power is significantly correlated with the change in the wage share. On the other hand, the coefficient of trade openness is negative and significant for the United States as well. These results should not be surprising at all given that it is generally acknowledged that both labour bargaining power is directly related to the level of wages and that trade liberalization is negatively linked to wages. That is precisely why I am considering these two variables as potentially omitted variables.[11] However, for the purposes of this chapter, what really matters is whether the inclusion of these variables affects the correlation between interest rates and industry wage shares, but this is not likely the case given the consistent correlation between industry wage shares and real interest rates for both Canada and the United States across specification. That is, even though for the United States changes in trade liberalization and labor bargaining power are correlated with changes in the industry wage shares, the correlation of real interest rates is not affected at all by the inclusion of these variables.

[11] Despite not included in Table 1.4 for space limitations, a regression including both trade openness and union density variables at the same time for the US yields very similar results except that the coefficient of trade openness becomes not statistically significant.

How to interpret the coefficients on real interest rate, both contemporaneous and lagged? Again, the fact that the contemporaneous coefficient is positive, like the unemployment rate for Canada, might be indicative that this contemporaneous positive correlation is likely the result of the wage share responding to output fluctuations. On the other hand, the significant negative correlation with the lagged real interest rate is likely reflecting the subsequent effect of a change in the interest rate on the industry wage share.

Table 1.4 Fixed Effects Regression

Rate of change in the industry-level wage share, Canada and United States, selected industries

	(1)	(2)	(3)	(4)	(5)	(6)
Variables		Canada			United States	
Real Interest Rate	0.709***	0.731***	0.709***	0.803***	0.803***	0.827***
	(0.131)	(0.125)	(0.131)	(0.0628)	(0.0628)	(0.0500)
Real Interest Rate (t-1)	-0.225***	-0.232***	-0.225***	-0.146***	-0.146***	-0.141***
	(0.0695)	(0.0678)	(0.0695)	(0.0353)	(0.0353)	(0.0312)
Union Density (dx/dt)		-24.80			2.297***	
		(15.92)			(0.788)	
Trade Openness (dx/dt)			0.943			-0.490***
			(0.604)			(0.102)
Constant	-1.695	-37.14	-1.416	-3.940***	0.314	-1.554**
	(1.111)	(23.45)	(1.006)	(0.651)	(1.703)	(0.675)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	840	735	840	662	662	641
R-squared	0.549	0.574	0.549	0.634	0.634	0.749
Number of industries	15	15	15	21	21	21

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Notes: The number of observations in columns 3, 5, and 6 is shorter since for Canada the data for union density is missing the observations from 1991 to 1996 whereas for the United States the data for trade openness is missing the observation from 2020. Union density data were obtained from OECD Trade Union Dataset and trade openness data from PWT (v. 10, 2019).

c. Possible Theoretical Mechanism

Overall, there is strong evidence of a significant effect of monetary policy on the industry wage share in Canada and the United States. However, the precise sign of the net effect is not completely clear. The panel VAR model shows both positive and negative effects that are quite significant, although the negative effect seems to dominate on average by looking at the IRFs charts. The fixed effects model reinforces the evidence of a significant effect since it rules out possible omitted variables. As such, I believe that the relation between interest rates and the industry wage share is not simple at all. But the post-Keynesian approach has always pointed out the complexity and dynamics of that relation, which is embedded in post-Keynesian pricing theory and interest rates as a cost to the firm in a world of markup pricing. In its simplest formulation, firms set prices according to an industry markup (m_i) over labour costs ($W_i L_i$). Then the industry i output ($Y_i P_i$) would be defined as the following:

$$Y_i P_i = (1 + m_i) W_i L_i \tag{3}$$

solving equation (3) for the industry wage share (s_i) and differentiating with respect to time after taking logarithms yields:

$$\frac{\dot{s}_{i,t}}{s_{i,t}} = -\frac{\dot{m}_{i,t}}{1 + m_{i,t}} \tag{4}$$

furthermore, assuming that the industry markup is a positive and continuous function of the interest rate ($\frac{dm_i}{dr} > 0$), that is, firms in the industry adjust the markup when there is a change in costs, such as interest rates, to target normal profits, then an increase in the interest rate would reduce the industry wage share. However, the timing in the markup adjustment could follow different trajectories, and this depends on several factors related to, for example, the market structure of the industry. Moreover, apart from the industry specific effects, there are aggregate (or general equilibrium) effects on the industry wage shares that certainly are counter-cyclical, that is, wages shares might go up temporarily due to an economic contraction. This could be due to the income distribution channel, whereby following the redistribution of income triggered by an increase in the interest rate, the aggregate propensity to consume would be eventually diminished causing an economic contraction and a temporary rise in the wage share. In other words, there would be negative effects of higher interest rates on industry productivity that might provoke a temporal increase in the industry wage shares. Obviously, the overall effect on the industry wage share in the medium and long run would be negative if the accumulation of the negative effects offsets the sum of positive effects, which could be the situation in Canada and the United States when looking at the long run decline in the respective wage shares.

1.5 Conclusions

This chapter has put forward the important question of the effect of monetary policy on the wage share both from a theoretical perspective centered on some contributions of post-Keynesian economics and from an empirical standpoint with the case studies for Canada and the United States during the last few decades. The chapter starts with a historical review of several of the most original ideas coming from post-Keynesian economists on the subject from the very beginning of the theory. Specially, I tried to highlight the richness and diversity of the developments going back to Keynes and bringing us all the way to the very recent ideas coming from Canadian post-Keynesian economists. Hence, there is a long tradition compellingly arguing that changes in interest rates can have important and multiple impacts on the wage and profit shares in the short and long run.

After that, I turned my attention to the stylized facts for Canada and the United States for the last several decades. There is significant evidence of a long-term decline in the business sector wage share for both countries that began even before the 1980s when a turning point has been identified, but the determinants of such long run decline respond to different phenomena. The industries that drove down the wage share before the 1980s were presumably the more capital-intensive industries whereas after the 1980s they were the more labour-intensive industries, located primarily in the manufacturing and services sectors. The fact that this phenomenon coincides with a period of high interest rates suggests that there could be a significant relation to be tested, although there are other variables that could also be important and need to be tested.

Therefore, I took the data for the industry-level wage shares in Canada and the United States for the periods studied and I estimated a panel VAR model for each country. The results show that the relationship is statistically significant but complex as expected and highlighted by post-Keynesian theory long ago, but the IRFs suggest that the impact might be on average negative. These findings are consistent with the theoretical framework of the post-Keynesian approach, in particular the income distribution channel of monetary policy in the context of markup pricing theory, where the interest rate is a cost-income variable for the firm and changes in interest rates are passed through the markup over unitary costs, thereby the industry wage share might adapt to the new circumstances with relative flexibility. Admittedly, this would not be the only effect in the industry wage shares provided that a tightening in monetary policy might have significant negative effects in the economy due to, in part, a reduction in the aggregate propensity to consume following a transfer towards the rentier groups, which undoubtedly impacts the wage shares. Furthermore, I carried out both a panel VAR model with subindustry level data and a fixed effects model to see if there could be omitted variables driving my results, such as changes in industry composition weights, trade liberalization, and changes in labour bargaining power. The regressions proved that these omitted variables do not drive the significant relationship between interest rates and industry wage shares.

Finally, the fact that there is evidence of a negative effect of a contractionary monetary policy on the wage share in the cases here studied – apart from the documented effects on personal income distribution in the now abundant literature – all of these should be taken into consideration when evaluating the potential consequences of raising interest rates on the economy for the short and long run. In other words, it should be worthwhile for the monetary authorities to consider what are the side effects of trying to combat inflation and whether raising interest rates would perhaps imply a trade-off between short-run price stability and long-run distribution considerations, whence instead jeopardizing long-run stability in the wage shares and employment. This is particularly important nowadays in the face of central banks all over the world initiating a series of continuous hikes in interest rates as a measure to supposedly fight current inflation. However, hardly any one of these central bankers is envisioning the long-run impacts of this policy on other macroeconomic variables apart from inflation.

Appendix 1 Evidence for other industrialized countries

It would be interesting to see whether the effects of monetary policy on the industry wage share also apply for other countries. Nevertheless, I encountered important data limitations regarding industry-level wage shares and GDP deflators that covered years before the 1990s. Therefore, I tried to briefly address this question here by means of estimating a panel VAR model and the corresponding orthogonalized IRFs for a group of selected countries, following the same process as I did for Canada and the United States. Comparable countries are those other industrialized countries whose monetary policies are conducted by their respective national central banks—for instance, members of the European Monetary Union would be discarded. Hence, I picked Australia, Japan, New Zealand, and the United Kingdom for the period 1994-2020 using annual observations following the OECD industry classification (based on ISIC revision 4), comprising 11 broad aggregations.[12]

Considering the relatively short extension of both the time series and the number of industries, I computed a panel VAR model with the observations of the four countries together, that is, I put together the observations for the four countries to construct a simple four-country aggregate, using the industry-level data from the OECD Statistics regarding the industry wage shares, industry GDP deflators, and the corresponding overnight or interbank interest rate. Thus, the panel VAR specification for the four-country aggregate with four lags includes as endogenous variables: the rates of change in the industry-level wage share, GDP deflator, and the interbank rate. Moreover, the corresponding orthogonalized IRFs, that measure the impact of one-standard-deviation positive shock in the rate of change in the interest rate on the rate of change in the industry wage share, are displayed in Figure 1A and show that there is a negative and significant effect at year 4 that is robust to the IRF ordering. This roughly coincides with the evidence found for Canada above where there is also a negative and significant effect at year five. However, this is the only significant effect that can be identified in Figure 1A.

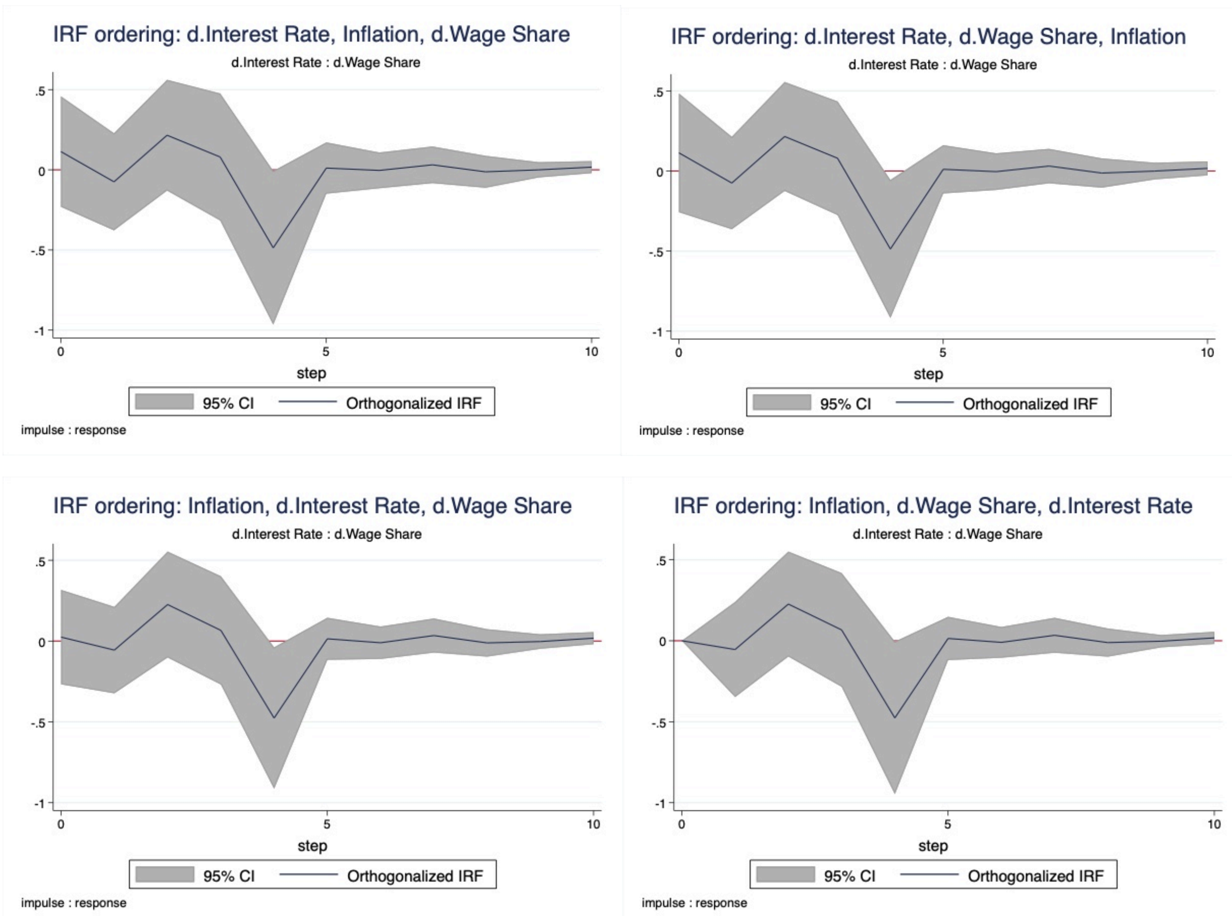
It should be noted that the results of this panel VAR are very limited due to the period and the number of industries covered, given that it could be argued that the most significant changes in the wage shares and monetary policies occurred before 1994. Also, the level of aggregation in each industry is perhaps too large to capture significant changes. For these reasons, I decided to include

[12] The industry aggregations presented by the OECD National Accounts Statistics are: 1, agriculture, forestry and fishing; 2, industry, including energy; 3, manufacturing; 4, construction; 5, distributive trade, repairs, transport, accommodation and food services; 6, information and communication; 7, financial and insurance activities; 8, real estate activities; 9, professional, scientific, technical, admin., support services activities; 10, public administration, compulsory s.s., education, human health; 11, other service activities.

this section in the appendix rather than directly in the text. However, still it is interesting that there is a significant negative effect of monetary policy on the industry wage share at year 4, which undoubtedly does not contradict the previous evidence for Canada and the United States.

Figure 1A Impulse Response Functions in the Four-Country Group

Impulse: Rate of change in the Interest Rate; Response: Rate of change in the Wage Share



Chapter 2 A POST-KEYNESIAN APPROACH TO MARKUP INFLATION IN SELECT INDUSTRIALIZED COUNTRIES

By Guillermo Matamoros Romero

Abstract

Starting in 2021, the current inflation process has spurred plenty of discussion in academic and policy circles. This chapter studies the relationship between firms' markups and inflation during the 2021-22 inflation surge in several industrialized countries. It begins by explaining markup inflation and its critics in the context of the current debate over the sources of inflation. Then it reviews the characteristics of markup inflation within the post-Keynesian theory of markup pricing and complementing it with the Institutionalist approach to inflation that distinguishes between basic inflationary pressures and propagation mechanisms. The second part of the chapter assesses markup inflation for several industrialized countries using descriptive statistics and conventional econometrics. The main contribution of my research is in empirically estimating markups by considering the contribution of material cost and controlling for changes in capacity utilization over time. It concludes that there is some significant evidence pointing to the existence of markup inflation although it is not conclusive.

2.1 Introduction[13]

The recent years have witnessed a heated debate around the primary sources of the current inflation and how to combat it. Almost everyone agrees that part of the inflation comes from global supply-side issues pertaining to supply chain bottlenecks and industry-specific shortages caused by both the reopening of economies from the Covid pandemic and the Ukraine war. However, at least in industrialized countries, there is controversy over the source of the domestic inflationary pressures and how to fight them.

On the one hand, almost like a déjà vu of the 1970s, some economists are reviving Monetarism, whereby they attribute inflation to government deficits incurred during the Covid pandemic and unconventional monetary policies that significantly expanded monetary aggregates (Ambler and Kronick 2022; Dehejia 2022a, 2022b; Greenwood and Hanke 2021).[14] On the other hand, at least in 2022, New Keynesian economists like Olivier Blanchard and Larry Summers (Blanchard et al. 2022; Summers 2022) pointed to an aggregate excess demand that was fueled by a supposedly overheated economy reflected in very tight labor markets and wages growing excessively — although Blanchard has recently changed his mind and contested this story (Bernanke and Blanchard 2023).

In any case, both New Keynesians and Monetarists concur that monetary policy ought to be tightened to adjust inflation expectations and control inflation; they just differ in when and how much central banks should raise interest rates. For instance, Larry Summers argues that a new Volcker shock is needed to return to a two percent core CPI inflation (Bolhuis et al. 2022). On top of that, central banks are decisively hiking interest rates all over the world.

[13] A shorter and earlier version of this chapter was just published in the *Review of Political Economy* (see Matamoros 2023b).

[14] Richard Vague (2017) provides an interesting empirical critique of this monetarist explanation where he looks at different measures of money supply growth and inflation for 47 countries, concluding that "high inflation has infrequently followed rapid money supply growth, and in contrast to this, high inflation has occurred often when it has not been preceded by rapid money supply growth."

Nevertheless, there is a third explanation that has received less support among mainstream economists — or has been discredited with perhaps poor knowledge of it.[15] This view points out that firms' profits have risen to historically high levels even surpassing producer price increments in several cases, whence domestic inflation would be in part driven by rising profits as opposed to rising wages (Storm 2022). In other words, despite the main drivers of inflation that are the supply bottlenecks and shortages that keep pushing costs upward, firms with higher market power acting as price-setters have not only passed on cost increments to prices but they have also increased their markups which pushed up inflation even further (Konczal and Lusiani 2022). As such, this view claims that "aggregate demand has played a relatively minor role in generating inflation pressure. Instead, most of the pressure has come on the supply side: supply chain disruptions, labor market disruptions, and corporations exercising pricing power." (Nersisyan & Wray 2022, p. 3) Besides, fighting current inflation by tightening monetary policy would be not only highly ineffective, thereby requiring large doses of interest rate hikes to tame inflation at the cost of large increases in the unemployment rate, but it would also make matters worse by delaying economic recovery and industry adaptation.

This third explanation underlines that firms with high market power can raise their markups because of supply rigidities and bottlenecks specific to the pandemic and war context. Both bottlenecks and material cost shocks strengthen entry barriers (Storm 2022) and allow incumbent firms to coordinate unit price increments even above their unit cost increases (Weber and Wasner 2023). In this story, part of the current Covid inflation would be explained by increasing markups over normal unit costs (NUC) i.e., unit costs at normal capacity utilization rates following the standard post-Keynesian normal cost pricing (see appendix). Yet how are consecutive increments in business markups translated into the current inflationary episode? I argue in this chapter that the post-Keynesian conflict inflation model and the Latin American Structuralist theory of inflation—

[15]Larry Summers, for example, defends that the high market consolidation in some industries cannot be blamed for the current inflation. Thus, he says: "The emerging claim that anti-trust can combat inflation is 'science denial'" (cited in Mintz 2022). I believe this assertion is misleading because it reacts to an over-simplified version of the argument that has been called "price gouging" or "greedflation". However, as I will try to explain in this chapter, this third explanation is much more sophisticated. It does not attribute the inflationary surge to market concentration, but it does argue that inflation would be lower if the market power by firms in some industries would be indeed lower.

with clear Institutionalist roots (see Danby 2005; Câmara and Vernengo 2004)—both provide an appropriate framework.

The Structuralist/Institutionalist theory of inflation distinguishes between *basic inflationary pressures,* coming from supply-side rigidities and industry-specific bottlenecks (such as raw materials, agriculture, and certain imports) that are expressed in rising material cost, and *propagation mechanisms* that are all the policies and institutional channels that allow firms to shift cost pressures to other social groups e.g. market power, pricing mechanisms, monetary and fiscal policies, and so on (Noyola 1956). Furthermore, the post-Keynesian conflict inflation model provides the necessary formalization of markup inflation based on the notion that inflation emerges as a result of social groups trying to augment or retain their national income share.[16] In the current Covid inflationary context, basic pressures would be located in the supply dislocations and bottlenecks caused by the pandemic and the war, and propagation mechanisms would be identified in the process of firms defending or increasing their income share by raising their markups and boosting the inflation surge.[17]

This post-Keynesian Institutionalist explanation of current inflation has basically resulted from economists observing the recent evidence on price-setting by firms. Some authors focus on the rise of profit shares, some others focus on corporate profits, and others look at growing markups. The common feature is that all of them put the market power by firms at the center of the argument. Nevertheless, simple unit price-unit cost ratios are procyclical whereas post-Keynesian markups are relatively independent of the economic cycle since they are calculated at normal capacity utilization rates i.e., they control for variations in capacity utilization that are common along the economic cycle (see appendix for more details). Because of this, the post-Keynesian Institutionalist approach focuses on markups because they better portray market power of firms.

[16] The seminal article of the Latin American Structuralist theory of inflation was written in 1956 by the Mexican economist Juan Noyola (1956). In it, the author recognizes the influence of Michał Kalecki regarding the concepts of the degree of monopoly and the supply rigidities that applied to developing countries (e.g., the inelasticity in the agricultural industry and the limited import capacity), and of Henri Aujac (1950) concerning his view of inflation as a particular expression of the more general issue of class struggle and conflicting claims over national output.

[17] To avoid confusions, it is important to distinguish the specific propagation mechanisms put forth by the Structuralist inflation theory, underlining the power relations, economic policies, and other institutional factors that are behind an inflation surge, and the conventional propagation or transmission mechanisms of monetary policy, related to the responsiveness of employment to changes in interest rates.

For example, if unit direct costs (UDC) are constant and average total costs are decreasing in output —as several studies and surveys have corroborated (see Lavoie 2022), simple unit price-unit cost ratios go up in an economic upswing, such as the economic recovery in 2022, even if firms do nothing with their markup over NUC. Therefore, growing profits are not necessarily a sign of rising markups that would be contributing to inflation; growing profits could be just the bypass product of higher rates of capacity utilization and lower unit cost. But even more important, in a world where only a fraction of costs is labor cost, increasing inflation and profits can also be explained by rising unit material cost (UMC, intermediate goods and raw materials, both domestic and imported), because unit price-unit labor cost ratios will grow if UMC rises more rapidly than ULC (Lavoie 2023).

The objectives and contributions of this chapter are twofold. First, I explore and provide evidence suggesting that part of the current inflation is explained by increasing markups in several industrialized countries.[18] Accordingly, I present descriptive and econometric analyses in a similar spirit as the IMF (2022) and Hansen et al. (2023) for a group of industrialized countries, Cochrane (2022) and Stanford (2022) for Canada, Bivens (2022b), Konczal and Lusiani (2022), Narsisyan and Wray (2022), and Storm (2022) for the United States; Schnabel (2022) for the Eurozone; and CMA (2022) for the United Kingdom. Nevertheless, as opposed to most studies, I estimate markups over UMC and ULC that, at the same time, control for variations in capacity utilization rates. Second, I put forth a theoretical explanation of markup inflation using the post-Keynesian and Structuralist/Institutionalist approaches.

Some of the critics of markup inflation are quite dispersed geographically – although most of them refer to the situation in the United States, where the debate has been more visible. For instance, Larry Summers claimed that rising profits along with prices is just normal in competitive industries experiencing increases in demand (Bivens 2022a). Another line of criticism posits that increases in profits do not necessarily cause inflation, such as in most of the 2010s when profit margins were high, but inflation was low. In addition, some point to the fact that pre-tax profit margins are large, but they remain at levels comparable to those of the 1950s and 1960s, while after-tax profit margins

[18] In the same way as a wage-price spiral is conventionally defined "as an episode of several quarters characterized by accelerating wages and prices (that is, in which both wage and price inflation rates rise simultaneously)" (IMF 2022, p. 53), a markup-price spiral or markup inflation is here defined as an episode of accelerating markups and prices.

do reach unprecedented levels. However, this is due to the steady reduction in effective corporate tax rates during the last couple of decades. Moreover, it has been argued that there are some industries that have experienced large price increases because of supply shocks, in industries such as Motor Vehicles, Bodies and Trailers, and Parts, but do not depict large profit increments (Politano 2022). Apart from that, there is an additional critique saying that advocates of so-called oligopoly inflation are confusing levels and rates of change. This is because although firms fix price levels through markup pricing, an inflationary process driven by markups would require a continuous growth in markups that is unsustainable due to increasing competition (Vernengo 2022). In the next section I look at whether a one-time jump in markups can raise the inflation rate.

Nevertheless, most of these critics focus on profits calculated as the unit price-unit cost ratio or similar measures.[19] Conversely, markups controlling for capacity utilization would not be vulnerable to such attacks. In addition, advocates of markup inflation do not neglect that the basic and most relevant inflationary pressures are supply chain disruptions and bottlenecks, whereas markup inflation would only be contributing to the current inflation process. But this is not to say that inflation is driven by market forces or some sort of market rationing. Prices are for the most part administered by firms under imperfect competition. The markup-price spiral is just propagating and amplifying the effect of supply shocks on inflation, and this is translated into nominal profits growing more than nominal wages. One of the functions of the post-Keynesian Institutionalist approach is to address this type of concerns by distinguishing between the basic inflationary pressures — supply side rigidities and bottlenecks — and the propagation mechanisms, in the form of income and price adjustments mediated by institutions, policies, and market structures.

The chapter is divided into four broad parts, including the introduction and conclusion. The second part presents the theory behind markup inflation that is primarily based on the conflict inflation model of post-Keynesian economics together with the Institutionalist theory of inflation. It starts by addressing whether markup inflation is theoretically possible in response to some criticisms made by New Keynesian economists as well as some from the Sraffian strand of post-Keynesian

[19] For instance, Konczal and Lusiani (2022) use the ratio of sales over COGS (cost of goods sold) as markup proxy, but in practice it is analogous to the ratio of unit price-unit cost, which is different from the post-Keynesian markup of the difference between unit price and NUC or the Kaleckian markup over UDC, as found in Seccareccia (2015).

economics. And it concludes with a remark on monetary policy in the context of markup inflation. The second part of this chapter discusses the proper measure of markups, then it analyzes descriptive evidence on markup and inflation trends during different inflation periods for several industrialized countries, all which serve the purpose of shedding light on the relationship between markups and inflation in the context of a significant UMC shock. This part concludes by carrying out a pooled OLS regression of inflation on the markup while controlling for changes in capacity utilization for a group of industrialized countries. The fourth and final part rounds up.

2.2 Markup inflation in theory

Can larger markups generate inflation?

The possibility that higher markups could generate price inflation has been generally dismissed by conventional macroeconomic models.[20] In fact, New Keynesian economics is one of the few mainstream approaches that deal with imperfect competition in their macroeconomic models. The basic New Keynesian model introduces a markup over marginal cost, but this "markup is constant given the assumption of a time-invariant elasticity of substitution" among differentiated goods (Galí 2015, p. 57). In the basic New Keynesian model with sticky prices and flexible wages, price inflation is a positive function of inflation expectations and output fluctuations above the "natural" output level (Galí 2018). Given the assumption of a decreasing marginal product of labor, markups are related to inflation insofar as they are the difference between prices and marginal costs, such that price inflation reflects a positive output gap, meaning rising marginal costs and lower expected average markups with respect to the "desired" markups – defined as the prevailing markups in the long run under fully flexible prices (Galí 2015).

[20] Interestingly, Paul Makdissi kindly pointed out that there are some recent papers in the conventional microeconomics literature that have assessed the possibility of markup inflation (see Menezes and Quiggin 2022; St-Pierre 2023). It would be interesting to look at the similarities between these contributions and the post-Keynesian views.

Despite the elasticity of substitution is commonly assumed invariant in New Keynesian models, there is the question on whether a one-time decrease in it that raises the desired markup would lead to higher inflation. Bhandari et al. (2021) investigate this possibility comparing the optimal monetary policy response in both representative agent and heterogenous agents New Keynesian models (RANK and HANK models). In both types of models, however, an unexpected one-time decrease in the elasticity of substitution, that is, a positive one-time markup shock increases inflation temporarily because the desired markup goes up and this widens the markup gap for some time.[21] Nevertheless, Galí (2015, p. 62) states that in the long run “the natural level of output is independent of monetary policy, and invariant to preference shocks.”

Regarding alternative economic approaches, imperfect competition and markup pricing has been very common in Kaleckian economics, and more generally in post-Keynesian economics[22], but in terms of the causes of price inflation, the possibility of markup inflation is not a subject free of controversy. In general, post-Keynesian models assume constant marginal cost (or unit direct cost) and decreasing unit costs (which includes overhead costs) up to full capacity, but firms commonly operate with idle capacity. Hence, an increase in output does not affect prices because UDC remains constant, and unit costs decrease. The markup (z) is defined in its simpler Kaleckian form as a margin over UDC or, more realistically, as a margin over NUC (see Lavoie 2022). An increase in the markup would thus raise prices proportionally, but the question is whether this can cause price inflation. From a purely accounting perspective, markup inflation (or profit inflation,[23] as

[21] Interestingly, Bhandari et al. (2021, p. 2561) find that the optimal monetary policy responses to markup shocks in their heterogeneous agents’ model “are an order of magnitude larger and opposite in direction from those in a corresponding representative agent economy.” Under the assumption of income and wealth heterogeneity among agents and incomplete financial markets, they conclude that interest rates should be lowered when there is a positive markup shock that raises inflation since “a positive markup shock creates an unexpected drop in wage income and a rise in profits, a Ramsey planner can provide insurance payments to workers by lowering nominal rates to boost wages” (Bhandari et al. 2021, p. 2561).

[22] As explained in detail by Marc Lavoie (2022), Kaleckian economics might be considered one large strand of post-Keynesian economics associated with the contributions of the Polish economist Michał Kalecki, who, according to Joan Robinson (cited in Lavoie 2022, p. 49), was better able “to weave analysis of imperfect competition and of effective demand together and it was this that opened up the way for what goes under the name of post-Keynesian theory”. Thus, hereafter I simply refer to post-Keynesian economics to encompass the Kaleckian and similar approaches to inflation.

[23] The theory of monetary circuit, which has several common features with post-Keynesian economics, also considers profit inflation as a process in which firms constantly increase their desired rate of return on costs and this is reflected in a higher inflation rate (Parguez 1996).

Paul Davidson calls it, since it implies a growing profit share (Lavoie 2022, p. 594)) can come from a positive rate of change in the markup, at least temporarily since the wage share, $(1+z)^{-1}$, cannot decrease forever. However, a one-time markup hike would not, in principle, generate inflation.

What is the relationship between markup and inflation in post-Keynesian economics? For most post-Keynesians, inflation is always and everywhere a distributive phenomenon. This means that, in essence, price inflation results from incompatible income claims between social groups, say, workers and the owners of firms. This framework is focused on the determination of the inflation rate and the markup according to the bargaining power of workers and firms. However, the baseline model of conflict inflation is focused on wage-price inflation, i.e., how the inflation rate accelerates when firms have sufficient bargaining power to pass on every increase in the nominal wage rate so that the real wage and the markup rate do not change (see Blecker and Setterfield 2019; Lavoie 2022).

It is interesting to note that wage-price inflation has been always recognized in the broad economics literature, either in the form of rising wages and marginal costs through a positive output gap in New Keynesian economics, or in the form of greater social conflict triggered by workers pushing nominal wages too much. Nevertheless, this recognition is hardly the case with markup inflation, which signifies firms gaining larger bargaining power such that they can increase their target markup and income share. This might be in part because, as argued above, markups cannot rise forever since the profit share would approach unity and the wage share would tend to zero. Income shares are constrained to the zero-one space. More importantly, until the Covid crisis, there had not been a significant period suggesting the possibility of inflation pushed up by accelerating markups in industrialized countries. For instance, the long-run decline in the wage share that occurred from at least the 1980s to the Global Financial Crisis of 2008-09, was rather accompanied by low average price inflation (ILO-OECD 2015; Guschanski and Onaran 2021). Thus, if any, the evidence shows instead an era of wage-price semi-deflation that has been often referred to as the era of the flat Phillips curve (see Ratner and Sim 2022).

Yet, post-Keynesian economics is not a uniform theoretical construct. There are important debates among the many different strands and, considering the current Covid inflation, the possibility of markup inflation has generated a lot of discussion. One of the criticisms comes from the Sraffian tradition arguing that ultimately prices of production, that are determined by the dominant technique in the industry including a normal rate of profit, are the center of gravitation for market prices regardless of the price setting behavior and the degree of competition in the industry. In short, markup inflation cannot last too long because of the inexorable pressure of competition. In the words of Franklin Serrano (2012):

> "The way prices of production may regulate the full cost prices of firms is by getting them in trouble whenever their actual costs plus their desired markups are too high relative to the costs (including normal profits) of the dominant technique, thereby attracting new entrants or cause some rival firms inside that market not to follow price rises that are due to increase in costs particular to that firm or "excessive" desired markups of these firms."

Nevertheless, Lavoie (2022, Ch. 3.7.3) provides an alternative interpretation of prices of production in which they are by no means the center of gravitation of market prices or administered prices, but rather prices of production are administered prices when rates of capacity utilization are at normal levels. As a result, there is no convergence whatsoever toward prices of production, such that exceptional barriers to entry may well encourage firms to raise markups for a while without serious market penalty. Furthermore, Roncaglia (1978, Ch. 2) argues that the dominant "technique" involves many non-technical factors of socio-political nature, which depend on the specific historical development of a country, such that it is likely that dominant firms would be able to raise markups for some time. This perspective is perfectly compatible with an increase in the price level caused by markups because, for instance, supply chain bottlenecks reinforcing oligopolistic power could give firms in some industries the necessary room to hike markups. Still, it is argued that changes in oligopolistic power may involve short-lived changes in the price level, not a sustained process of price inflation. In the next subsection, I will argue that changes in the bargaining power of firms can generate markup inflation.

In fact, markup inflation would be what distinguishes the post-Keynesian analysis of Covid domestic inflation from the mainstream view that blames primarily the growth in wages. For example, the BIS (2022) Annual Report points out that the core of the inflation engine is the wage-price formation process. The report argues that inflation in history could be divided into low and high inflation regimes. High inflation regimes were seen during the First and Second World Wars, and in the 1970s and 1980s era following the oil price shocks. However, the transition from low to a high inflation regime depends on how first-round effects of price increments that are generally exogenous and assumed temporary, such as commodity price shocks, are transformed into second-round effects that are triggered by wage-price spirals.[24]

To sum up, wage-price inflation is hardly controversial, it is widely acknowledged by economists. The question is why this is not the case for markup inflation since, for example, it could be argued that first-round effects, or basic inflationary pressures (following Structuralist terminology), can potentially morph into second round effects (though propagation mechanisms) that trigger an episode of markup inflation. And if so, how to distinguish between wage and markup inflation? To begin with, I believe, we first need to make sense of it in a model.

The basic conflict inflation model and markup inflation

The conflict inflation model was developed by post-Keynesian authors that built on the idea that inflation is foremost a distributive phenomenon.[25] The model does account for changing markups that could contribute to price inflation (see Taylor 1989). Taylor and Barbosa (2021) point out that the mainstream approach to explain inflation, focused on the equation of exchange PY=VM, is erroneous if one accepts that money is endogenous because V and M turn out to be determined inside the model. Thus, an appropriate approach must instead focus on the cost composition of production, i.e., gross value of output can be divided into gross profits, total wages, and

---

[24] For instance, a passage in the mentioned report says:

"Sustained inflation ultimately involves a self-reinforcing feedback between price and wage increases – so-called wage-price spirals. Changes in individual prices can broaden into aggregate inflation. And they can also erode real wages and profit margins for very long spells. But, ultimately, they cannot be self-sustaining without feedback between prices and wages: profit margins and real wages cannot fall indefinitely. So, beyond the important impact of aggregate demand conditions on wage- and price-setting, a key question is how changes in relative prices that pass through to the aggregate price index ("first-round effects") can trigger feedback between price and wage increases ("second-round effects")." (BIS 2022, p. 46)

[25] The idea of inflation as a distributive phenomenon is not necessarily post-Keynesian. For instance, it has been sometimes attributed to Henri Aujac (1950) (see Noyola 1956). Yet there are some seeds of the idea in the analysis of German hyper-inflation of the 1920s by Joan Robinson (Câmara and Vernengo 2004), considered one of the indisputable founders of post-Keynesian economics. Part of the idea can also be found in former IMF Chief Economist, Olivier Blanchard, in the WS/PS model proposed in his article "The Wage Price Spiral" (Blanchard 1986) in the *Quarterly Journal of Economics* (see Lavoie and Rochon 2022).

intermediate inputs, which yields the following definition after considering that domestic inputs can be decomposed into profits and wages:

$$PX = \Pi + \mathrm{WL} + eP_M M \tag{5}$$

where gross output is decomposed into profits (Π), wages (WL), and the value of imported inputs (where e is the nominal exchange rate, P_M is the price of imports in foreign currency, and M is the quantity of imported inputs). Mainstream economists underline the contribution of inflation that can come from wage growth, but from a pure accounting perspective, inflation can come from the growth in profits and/or in the value of imported inputs, as the authors argue:

> "in addition to "excessive nominal wage growth" from a tight labor market, inflation can also come from an "excessive desired rate of profit" in structuralist models. The two effects have the same importance, but changes in the firms' markup over cost have not been emphasized by most mainstream models" (Taylor and Barbosa 2021, p. 134)

Equation 1 might be expressed assuming that prices are fixed by adding a markup (z) over the sum of ULC and UMC (which both comprise UC) in the following way:

$$P = (1 + \mathrm{z})\left(W\frac{L}{X} + eP_M\frac{M}{X}\right) = (1 + z)(ULC + UMC) \tag{6}$$

Ideally, z would be independent of the rate of capacity utilization up to full capacity and so higher markups would be presumably explained by market power or other institutional factors.

In the context of the baseline conflict inflation model, a one-time jump in the market power by firms that leads to a higher markup, ceteris paribus, causes a higher rate of inflation in equilibrium. This is because a higher market power increases the target markup rate by firms, which means a lower target real wage by firms. Since price inflation is defined as the gap between the actual and target real wage by firms, the lower the target wage the greater the wages gap and price inflation. In equilibrium, when the real wage and markup are constant, the inflation rate would be higher, and the equilibrium real wage lower, compared to before the initial rise in the target markup (see Dutt 1987; Blecker and Setterfield 2019; Lavoie 2022).

To see this clearly, the basic conflict inflation model can also be presented in terms of the bargaining over the markup, instead of the real wage.[26] Assuming the markup pricing assumption in equation 2 above, there would be an inverse relationship between the markup (z) and the real wage ($\frac{W}{P}$):

$$\frac{1}{(1+\mathrm{z})} = \frac{W}{P} \cdot \frac{L}{X} + \frac{eP_M}{P} \cdot \frac{M}{X} \qquad (7)$$

all else constant, the higher the markup the lower the real wage. Also, *ceteris paribus*, picking a markup rate would be equivalent to choosing a real wage.

Leaving aside UMC for now to focus solely on the possibility of markup inflation, the two dynamic equations of the basic conflict inflation model can be presented in terms of actual and desired markup rates as the following:

$$\widehat{W} = \theta(z - z_w) \qquad (4)$$

$$\widehat{P} = \lambda(z_f - z) \qquad (5)$$

in which z_w and z_f are the target or 'desired' markup rates by workers and firms, respectively; θ and λ are the speed of adjustment parameters by workers and firms; and the four parameter values reflect the bargaining power of each group; finally, $\widehat{W}$ and $\widehat{P}$ are the respective rates of growth in the nominal wage rate and the general price level. Assuming no labor productivity growth for simplicity, the medium-run equilibrium is attained when the markup rate is constant ($\hat{z} = 0$), meaning that the real wage is also constant, $\widehat{W} = \widehat{P}$.[27] Using this latter condition to solve the system of equations 3 and 4, the equilibrium markup yields:

[26] The conflict inflation model can incorporate more variables and parameters that make it much more realistic, such as introducing productivity growth, price indexation, the real exchange rate, the unemployment rate, etcetera (see Blecker and Setterfield 2019; Lavoie 2022). However, the phenomenon of markup inflation may be observed in the simplest model formulation, while the extensions of the model, in general, do not change the possibility of markup inflation.

[27] Assuming instead positive labor productivity growth ($\hat{a} > 0$), the equilibrium real wage would grow at the pace of labor productivity: $\widehat{W} = \widehat{P} + \hat{a}$.

$$z^* = \frac{\theta z_w + \lambda z_f}{\theta + \lambda} \tag{6}$$

and plugging equation 5 into 4 and assuming $z_f > z_w$ to get a positive equilibrium inflation rate, we get:

$$\hat{P}^* = \frac{\theta\lambda}{\theta + \lambda}(z_f - z_w) \tag{7}$$

as such, a higher bargaining power of firms as reflected in higher values of z_f and λ gets translated into higher equilibrium markups and inflation rates. This would be precisely the phenomenon that has been described as markup inflation. By the way, a more appropriate name would be market power-inflation because it is triggered by the strengthening of market power by firms. Clearly, the model also contemplates wage inflation, which implies lower values of z_w and θ that are translated into a lower equilibrium markup level and a higher inflation rate.

However, our main concern is the relationship between the bargaining power of firms and inflation, which is positive. To see this graphically, we can draw the relation between the level of bargaining power of firms and the inflation rate by joining the equilibrium values of the markup rate at different levels of bargaining power. This is depicted in Figure 2.1 below, where it is shown how the equilibrium inflation and markup rates are higher as the bargaining power of firms increases. As specified in the equation of price inflation (equation 4), an increase in bargaining power of firms means that both or any of the two parameters, λ and z_f, increase. Also, while the increase in λ raises both the slope and the ordinate of the $\hat{P}$ function, the increase in z_f only raises the ordinate. However, we can reasonably assume that a rise in the bargaining power of firms elevates both parameters together. The various presentations of the model coincide with a situation in which λ and z_f would be directly affected by, for instance, greater monopoly power, industrial concentration, product differentiation, and weaker antitrust regulation (see Dutt 1987; Blecker and Setterfield 2019; Lavoie 2022).[28]

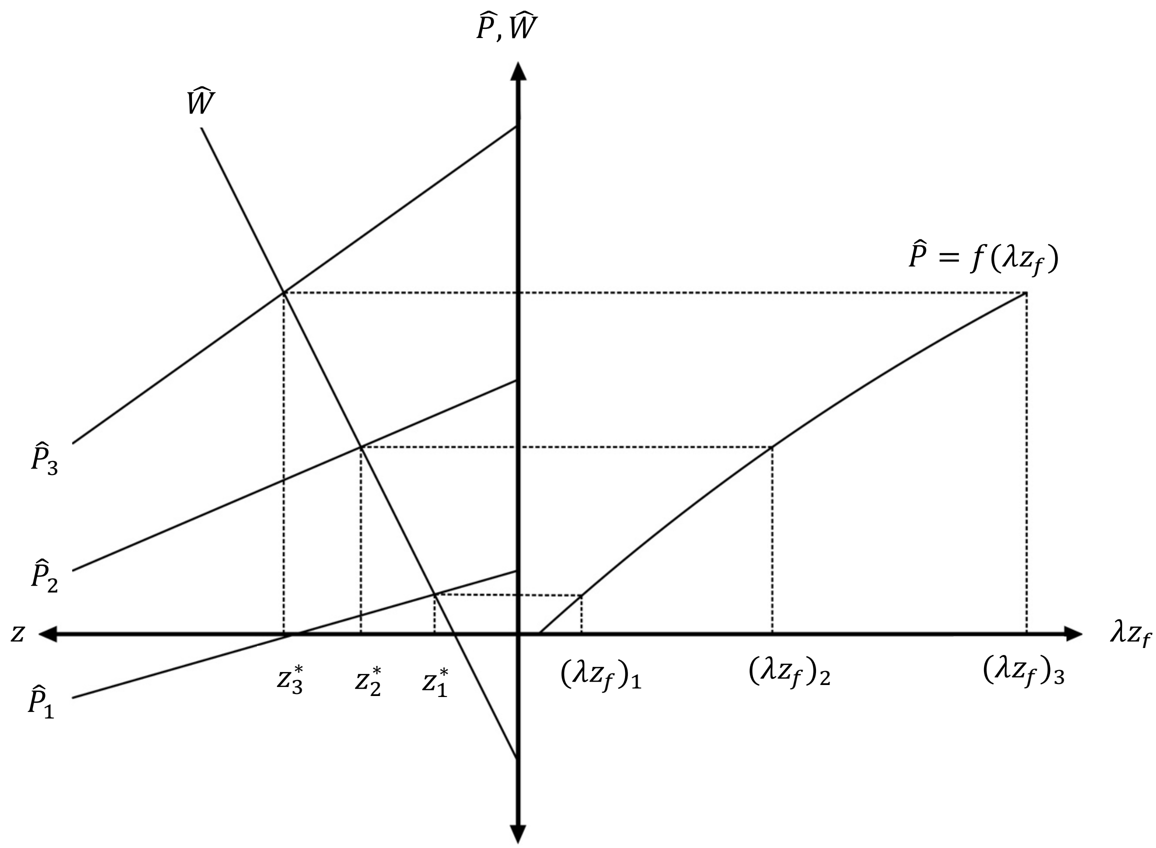
[28] More precisely, λ is presented as a speed of adjustment parameter, that is, the larger its value the closer is the equilibrium markup rate (z^*) to the target markup rate by firms (z_f). In the extreme case where λ goes to infinity, the equilibrium markup rate is equal to the target markup rate, $z^* = z_f$. Logically, raising the

Figure 2.1 portrays that the function resulting from the effect of a rising bargaining power of firms i.e., a proportional increase in λ and z_f together, on the rate of inflation is positive and decreasing, that is, $\frac{\partial \hat{P}}{\partial(\lambda z_f)} > 0$ and $\frac{\partial^2 \hat{P}}{\partial^2(\lambda z_f)} < 0$. The shape of the curve would depend on the differences in the increments of λ and z_f. In the extreme case where only z_f rises, the function would be a straight line with a positive slope, while the curvature depends on the increase in λ with respect to z_f. Thus, based on this model, a rise in bargaining power by firms that leads to a larger markup rate can cause higher price inflation, that is, markup inflation is perfectly feasible within this model.

---

equilibrium markup rate by solely increasing λ is constrained by the value of the target markup rate. In contrast, raising the target markup rate would always increase the equilibrium markup rate, although the target markup rate will never be reached: $z^* < z_f$. Thus, it is reasonable to assume that both z_f and λ rise along with firms' bargaining power.

Figure 2.1 Markup Inflation in the Conflict Inflation Model



On the other hand, Lavoie (2023a) has put forth an important aspect in the markup inflation debate, because labor cost comprises only a fraction of unit cost, whereby UMC (which includes domestic and imported intermediate goods and raw materials) accounts for another relevant share of unit cost. Thus, he argues, given a markup, if UMC grows faster than ULC, the price-ULC ratio would increase. Nevertheless, the conflict inflation model can easily incorporate UMC in the process of price formation. If so, in line with Lavoie (2023a), accelerating UMC would increase equilibrium price inflation and increase the markup (while decreasing the real wage). To see this, Setterfield (2022) included a stochastic parameter to the price inflation equation (equation 7), representing UMC shocks, such that rising UMC would increase price inflation and reduce the real wage in equilibrium for the duration of the supply shock. This is critical in the current context of Covid and war inflation because rising UMC is undoubtedly the main contributor of the 2021-22 inflation surge (Bernanke and Blanchard 2023), so to really make a case for markup inflation, it is necessary to disentangle the contribution of rising UMC from the contribution of rising markups.

Apart from the conflict inflation model and even though most post-Keynesian models assume a constant markup,[29] there is a whole body of literature, particularly identified with the work of Alfred Eichner, that sees the markup not only as an evolving variable with multiple determinants –such as market power, targeted profits, etcetera (Seccareccia 1984), but also as a key variable in the determination of prices in and of itself. Indeed, Seccareccia (2015, p. 65) affirms that "[…] Eichner pointed primarily to the behavior of the markup of the megacorp in impacting overall price formation." Thus, changes in the firm and industry-level prices would be in part responding to a variable firm and industry-level markup. Nevertheless, following Eichner, the markup and pricing policy by the firm would be constrained by three factors:

> "(1) the substitution effect; that is, the assumption that, given the cross elasticity of demand, customers may increasingly opt for substitute products as prices are increased; (2) the entry factor; that is, the fear of attracting new firms into the industry as prices and cash flows rise; and (3) government intervention in the form of antitrust prosecution as the higher prices attract more public scrutiny." (Seccareccia 2015, p. 64)

Furthermore, inspired and expanding the work of Kalecki on prices, Paolo Sylos-Labini (1979) studied the relationship between prices, inflation and income distribution. In the context of the 1970s high inflation episodes, he singled out the two key elements raised recently by Lavoie (2023a) when looking at inflation and profits, namely, the contribution of both material costs and overhead labor costs. Remarkably, he underscores the conflict of interests underlying inflationary processes that involve three classes: workers, industrialists, and raw material producers.

It is very interesting to note that, due to the recent data pointing to a markup-price spiral that could be intensifying current inflationary pressures, some mainstream circles have ruled out a potential wage-price spiral (see IMF 2022, Ch. 2) or they are even open to the possibility of markup inflation

[29] I am tempted to say that most New Keynesian and post-Keynesian models coincide in assuming a constant markup rate. Nevertheless, the motivations are very different as can be inferred. While New Keynesians assume a constant elasticity of substitution, related to given individual preferences and an emphasis on micro-foundations; post-Keynesians, in contrast, assume constant bargaining power of groups, which conveys a specific institutional setting reflecting a focus on macro determinants.

(Boissay et al. 2022). This is because markups and profits have kept up with inflation and, in some industries, have outpaced price increments. For instance, a recent article published by the BIS claims:

> "Firms' pricing power, as measured by the markup of prices over costs, has increased to historical highs […] in a high inflation environment, higher markups could fuel inflation as businesses pay more attention to aggregate price growth and incorporate it into their pricing decisions […] Indeed, this could be one reason why inflationary pressures have broadened recently in sectors that were not directly hit by bottlenecks." (Boissay et al. 2022, p. 4)

Finally, the Structuralist/Institutional approach to inflation also provides critical concepts to understand the rise in market power by firms due to the pandemic and war disruptions and how this is channeled towards accelerating inflation. Noyola (1956) and Taylor (1989), for instance, pointed out that supply-side rigidities or bottlenecks in price-inelastic industries, such as food and energy sectors, are translated into rapid price increments in concentrated industries. In this framework, basic inflationary pressures are represented by the UMC shocks and industry-specific bottlenecks and disruptions of 2021-22. Propagation mechanisms are conveyed by firms able to pass on fully or over-proportionally rising UMC to prices due to a market power reinforcement by surviving businesses after the pandemic turmoil. The combination of growing UMC and supply-side bottlenecks and industry-specific shortages, led to firms carrying over basic inflationary pressures to workers in the form of generalized price increments — instead of squeezing wages, like what might have happened in the early-2000s commodity boom (see Matamoros 2023a).

In a similar vein, Storm (2022) underlines that not only several firms had to shut down due to the measures to contain the pandemic, thereby increasing market consolidation, but those surviving firms ended up in a privileged position to access input and foreign markets. The result was entry barriers becoming larger and enhancing oligopolistic power of incumbent firms. In fact, this process could be another important reason why average markups might have grown during the pandemic. As Lavoie (2023b) and Nikiforos and Grothe (2023) claim, average markups will necessarily rise as firms with lower individual markups exit markets due to the severe crisis during the pandemic — because these firms have less market share and thus are less resilient. Therefore, a change in the composition of firms could be driving the rise in average markups despite no change in individual firm markups. Nevertheless, in my view, this would not invalidate the contribution of rising markups to inflation, which is the cornerstone of markup inflation.

Monetary policy and markup inflation

Addressing a wage-price spiral by raising interest rates might be painful in terms of employment and wages but it could be effective from the point of view of both standard New Keynesian and post-Keynesian economics. On the one hand, New Keynesians would see a wage-price spiral as a symptom of an overheated economy or a significant positive output gap. A positive output gap means that the actual level of output exceeds the natural output level, which is nothing but a result of the actual real rate of interest being lower than the "natural" rate of interest. It follows that central banks should hike rates decisively to align the interest rate to its normal level and, at the same time, bring inflation expectations down. If the policy implies higher unemployment rates and lower wage growth, this would be only in the short run because in the long run what determines employment and stabilizes wage and price inflation is the evolution of the natural rate of interest (Galí 2018).

On the other hand, in general, post-Keynesians reject the existence of a natural rate of interest — or at least a unique natural rate. They offer serious critiques of the policy of giving central banks the sole goal of controlling inflation by basically administering the base interest rate to match any supposed 'natural' value. However, conceding that this is the policy that most central banks in industrialized countries are *de facto* pursuing, a significant hike in interest rates will likely reduce price inflation if it comes from a wage-price spiral. A rise in the unemployment rate would debilitate the bargaining power of workers and, in turn, restrain nominal pay increments. The contractionary monetary policy would become effective, and the wage-price spiral would fade away.

This explanation is consistent with the most recent BIS diagnosis, in which the main task of central banks is to prevent first-round inflationary pressures from transforming into second-round effects by acting quickly and decisively. In other words, central banks must cool down the economy because low unemployment rates increase the bargaining power of labor such that first-round inflationary pressures in the event of low unemployment rates are potential ingredients that can give rise to a wage-price spiral. Interestingly, the BIS recognizes that monetary policy does affect the process of wage and price setting, claiming: "It is the monetary policy framework that has the biggest influence on inflation expectations as well as on the features of wage and price formation." (BIS 2022, p. 58). One example it gives is the low inflation regime in the late-1980s and 1990s, which could be in part attributed to the decline in the wage-setting power by workers that helped the economies to avoid second-round effects on inflation (see also Ratner and Sim 2022).

The picture is different if domestic inflationary pressures are not coming from a wage-price spiral. If instead inflation is coming from supply-side factors, then raising interest rates would be very ineffective to combat it. This is because monetary policy tightening would have a negligible effect on the supply-side pressures. The fact that the Phillips curve is relatively flat does not mean that changes in interest rates would not have aggregate demand effects through the income distribution channel (Rochon and Seccareccia 2023). Workers at the lower end of the income distribution ladder along with vulnerable firms are the ones that will be hit harder both by rising borrowing costs and higher unemployment rates.

Furthermore, within the conflict inflation model, the situation of larger markup rates along with higher inflation rates would eventually have a negative effect on both wage and output growth, resulting in stagflation. Nevertheless, stagflation will come up earlier if markup inflation is accompanied by a restrictive monetary policy. As Lavoie (2022, p. 612) argues: "It can be noted in particular that an increase in interest rates could lead to higher targeted costing margins and hence to lower real wage targets for firms, thus inducing slower growth and faster inflation." In other words, raising interest rates imply higher interest costs for firms, thereby firms would try to increase their target markups by raising prices in a way that could delay inflation from falling (see Parguez 1996).

On another front, Bhandari et al. (2021), using a state-of-the-art HANK model, made a compelling argument in favor of lowering interest rates when there is a positive markup shock that increases inflation temporarily and reduces wages vis-à-vis profits. This is because, when there is inequality in the distribution of wealth and incomplete financial markets (i.e., poorest agents cannot self-insure against negative income shocks), it is more efficient in terms of welfare to temporarily stimulate employment and increase wages at the lower end of the distribution — even if inflation goes up to some extent — compared to a policy of "leaning against the wind" that raises interest rates, thereby prioritizing price stabilization over income and wealth distribution (insurance motive).

> "Such a one-time markup shock also changes the mix of factor payments by increasing dividends and lowering wages. […] When Arrow securities are missing, monetary policy can improve welfare by providing insurance against aggregate shocks. To offset a drop in labor income, the Ramsey planner sets interest rates to *increase* real wages. Since real wages are firms' marginal costs, a monetary policy action that provides insurance is opposite to one that promotes price stability." (Bhandari et al. 2021, p. 2587)

The authors conclude that, in the context of high-income inequality, the motive of providing financial insurance against negative income shocks (i.e., focusing on income and wealth distribution) "quantitatively dominates the motives to stabilize nominal prices that have typically driven New Keynesian policy prescriptions." (Bhandari et al. 2021, p. 2596)

Finally, numerous Sraffians endorse the view that the money interest rate, which is determined exogenously by monetary policy, would influence the profit rate and price inflation (see the seminal works of Pivetti 1985 and Panico 1985).[30] This approach underlines that monetary policy would affect price inflation through its effects on the distribution of income, such that rising interest rates could even aggravate inflation if they increase the conflict among economic actors. This Sraffian approach is consistent with the ineffectiveness of using monetary policy tightening to combat current Covid inflation along with markup inflation.

Within the Sraffian framework assuming imperfect competition and no gravitation towards prices of production, the balance of power among workers, firms, and financiers, mediated by institutional factors including central banks, would all be crucial in the determination of price inflation (Zolea 2022). Thus, not only it is likely that a greater power imbalance between workers,

[30] Lavoie (1995) argues that, from a logical perspective, it is the real interest rate that impacts the profit rate and the markup, and not the money rate alone. If so, in general, current rate hikes might have a more moderate impact on the markup given the Covid inflationary episode. This, however, does not prevent that increasing money rates have a differential impact on smaller *versus* larger firms, where small firms, with a lower degree of monopoly and more dependent on bank borrowing, might be getting squeezed as opposed to big firms, that have greater monopoly power and a lot of "internal" financing *à la* Eichner (see Seccareccia 2015).

firms, and financiers, might result in greater price inflation due to accelerating markups and profits, but also a restrictive monetary policy could widen the power imbalances and become a ballast in the fight against inflation.

2. 3 Evidence on markup inflation

Definition of the markup

There is some recent evidence on markup inflation during the current Covid inflationary surge. Perhaps, the evidence could be divided into two branches. First, the findings supporting a significant uplift in oligopolistic power during the pandemic years, in which case firms could more than fully pass on cost increments to consumers. Second, there is the evidence of markup inflation per se i.e., of accelerating average markups and prices during 2021-22. This part focuses on the latter for the specific case of some industrialized countries.[31]

Along these lines, Konczal and Lusiani (2022) find evidence that market power, measured as the average firm's size-adjusted markup before the pandemic, is significantly correlated with the increase in markups and profit margins in 2021 in the United States, that is, industries with higher average pre-Covid markups had higher increments in their markups during Covid. There are also findings of decreasing market competition in the United Kingdom since the GFC of 2008-09 along with rising industry markups during the pandemic years (CMA 2022). Additionally, Isabel Schnabel, member of the ECB's executive board, shows that a proxy for the markup, measured as the difference between prices and ULC, was the main contributor to inflation in 2021 for the Euro Area countries. She adds:

[31] The whole issue of inflation and the potential contribution of markups in developing countries is a different story due to, in part, the role played by exchange rates and the pass-through of exchange rates depreciation and prices (see Vernengo and Caldentey (2023), for a critical and enlightening perspective on the causes of the pandemic inflation surge in industrialized and developing countries). In the industrialized countries considered in this chapter, however, the mentioned exchange rate pass through does not seem to play a major role.

> "To put it more provocatively, many euro area firms, though by no means all, have gained from the recent surge in inflation. The fortunes of businesses and households have diverged outside of the euro area, too, with corporate profits in many advanced economies surging over the past few quarters." (Schnabel 2022)

Nevertheless, as noted earlier, price-ULC ratios have two important flaws. First, at least in theory, they are dependent on changes in capacity utilization since ULC include overhead labor costs, and not just direct labor costs. As such, they would be rising with the reopening of economies during the Covid pandemic and the corresponding increase in capacity utilization. Second, price-ULC ratios do not include UMC, which would be very important to account for during Covid inflation, since rising price-ULC ratios could be the automatic result of UMC growing faster than ULC.

This part tries to look at the evidence to test the hypothesis that part of the Covid inflation is driven by increasing markups in several industrialized countries. To do so, I look at the evolution of markup measures and inflation rates across selected industrialized countries.

Simple markup equations emerge from the traditional post-Keynesian assumption that prices are fixed by setting a markup over UMC and ULC, as in equation 2 above. After taking equation 2 and defining $j = \frac{UMC}{ULC}$, the price equation in logarithms can be expressed as follows:

$$\log(P) = \log(1 + z) + \log(1 + j) + \log(ULC) \qquad (8)$$

using the common approximation of $\lim_{x \to 0} \log(1 + x) \approx \log(x)$, and differentiating with respect to time, the price equation in terms of rates of growth is:

$$\hat{P} = \hat{z} + \hat{j} + \widehat{ULC} \qquad (9)$$

which implies that there will be positive inflation if, ceteris paribus, ULC growth is positive, or markup growth is positive, or UMC grows faster than ULC. In this regard, if inflation is greater than the sum of the growth in *j* and ULC, part of it would be explained by the growth in the markup, which would be a sign of markup inflation. However, as Lavoie (2023a) clearly pointed out, a positive gap between $\hat{P}$ and $\widehat{ULC}$ — a growing price-ULC ratio — could be explained without resorting to a positive markup growth i.e., with no change in the markup whatsoever, $\hat{z} = 0$. First, if capacity utilization is rising, ULC will grow less than normal ULC, because in theory the former depends inversely on capacity utilization. Second, provided UMC is an important cost component, not controlling for the growth in *j* leads to an omitted variable bias, which would overestimate the growth in the markup so long as UMC grows faster than ULC. In any case, equation 9 can also be interpreted as the simple markup equation depicting the difference between price inflation and the rate of change in total prime cost (Seccareccia 2015, p. 74).

Nevertheless, the problem with the actual calculation of the rate of change in the markup in equation 9 is that there is no data on direct or normal ULC nor UMC. Perhaps because of that, some authors prefer to show just price-ULC ratios as a proxy for markups. But for the purposes of this chapter, it becomes crucial to estimate markups controlling for the variation in both UMC and capacity utilization. Henceforth, I divide the evidence in two subsections: one that addresses the issue of growing UMC using descriptive statistics; and a second subsection that tackles both UMC and controls for fluctuations in capacity utilization using conventional OLS regressions.

Descriptive analysis: Markups, inflation and UMC shocks

In this subsection, I calculate a markup over the weighted sum of ULC and UMC for six industrialized countries in three different historical periods where UMC grew significantly along with inflation. These periods correspond to the 1973 oil shock, the 1979 oil shock, and the 2021 energy price shock. I estimate markups over UC (i.e., ULC and UMC) based on equation 9 above for six industrialized countries: Belgium, France, Germany, Italy, Netherlands, and US. For the estimation of UMC, I take two different indexes: the FIBER Industrial Materials Index, and the Commodity Research Bureau (CRB) Index, both pulled out from Haver Analytics. Furthermore, I utilize the country average of the share of imports in total supply at purchasers' prices as a weight in the UC sum when computing the rate of growth in the markup.[32] The implication of using this

[32] The share of imports in total supply at purchasers' prices is found as a percentage in Table 45 of the SNA at OECD Statistics. Despite the series only covers since 2010 for all countries except the US that starts in 1997, the available data shows that this share varies very little over time. For instance, the US share of imports in total supply in 1997 is 0.06 and in 2021 it is 0.07. I took the average of the available period for each country, which in the US is 0.07, as a weight in the calculation of the markup over the weighted sum of UMC and ULC. Of course, this share is much higher for smaller and more open economies, such as Belgium and Netherlands that both depict an average share of 0.26 for the period 2010-2019.

share as a country specific weight is that variations in UMC will have a stronger impact on the markup in countries that have a larger import share, such as Belgium and Netherlands, compared to countries with a lower import share, like the US.

a. The 2021-2022 inflation surge

Figure 2.2 depicts the growth in markups and prices for the six industrialized countries mentioned, for the period 2019-2022 in annual data. As a robustness check, I provide two estimations of markups with two different UMC indexes. As the name indicates, markup (FIBER) is calculated using the FIBER index whereas markup (CRB) uses the CRB index. Moreover, Figure 2.2 also displays the GDP deflator inflation and the CPI inflation, since the GDP deflator is used as the output price in the markup equation whereas CPI inflation gets more attention from central bankers and social groups.

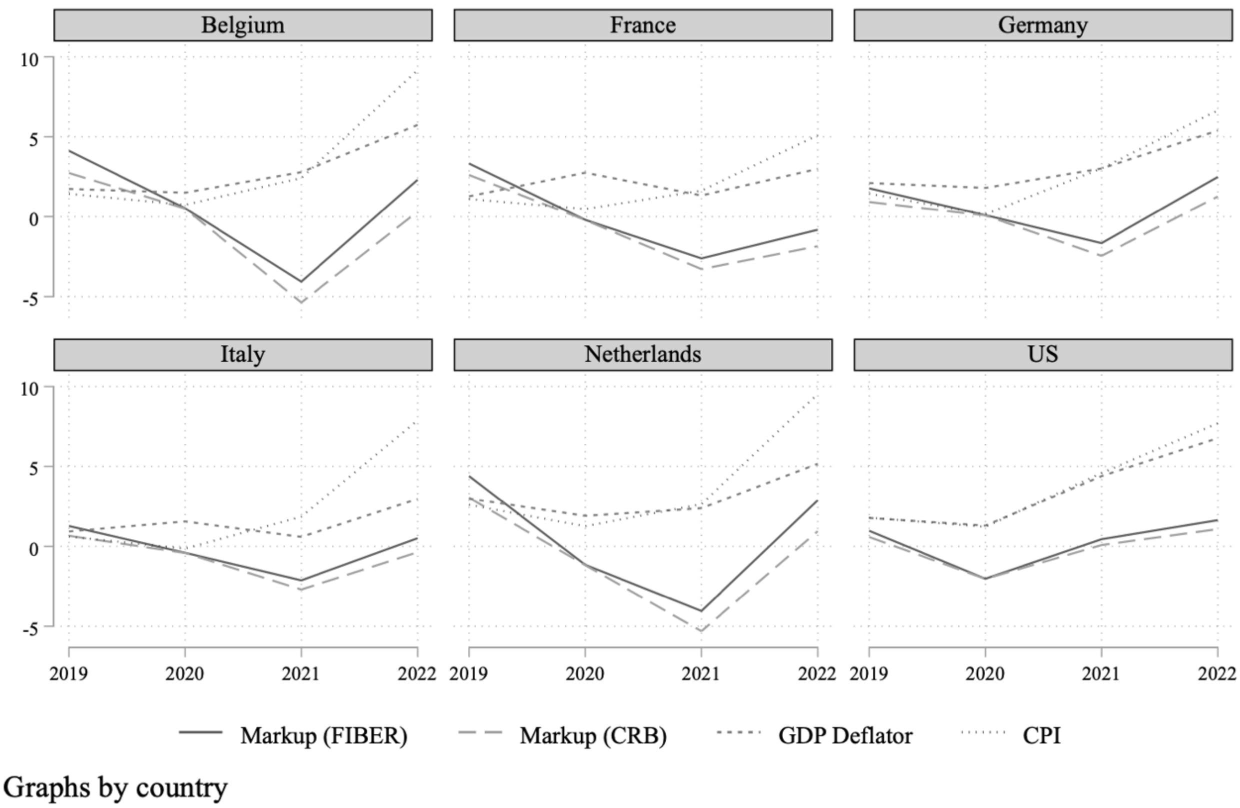
For starters, what is commonly referred to as the pandemic inflation surge is the fact that CPI inflation started to pick up in 2021 and it accelerated in 2022. Also, GDP deflator inflation appears to be following CPI inflation except in 2021 in France and Italy. The year 2021 is clearly associated with the initial shock in UMC caused by the war and pandemic related disruptions and bottlenecks. In terms of markups, the UMC shock is very large such that markups could not catch up and instead they declined significantly in 2021. However, markups recovered and rose in 2022 — in all countries except in France — together with inflation and with rising UMC. Therefore, the evidence is mixed in the sense that 2021 shows rising inflation and decreasing markups whereas 2022 depicts even higher inflation and rising markups.

In other words, the year 2021 portrays declining markups that were driven by the initial shock in UMC. But inflation kept growing in 2022 and this price acceleration was accompanied by a solid recovery in markups. In principle, the evidence is consistent with the Structuralist/Institutional theory of inflation where the initial UMC shock in 2021 is the basic inflationary pressure that triggered further redistribution adjustments in the form of accelerating inflation in 2022. The propagation mechanism of inflation was firms able to catch up after the initial shock by raising markups in 2022 and this seemed to be contributing to greater inflation rates.

On the other hand, it has been argued as well that inflation accelerated in 2022 because labor productivity growth was negative in countries like the US and Canada (see Pressman 2023; Lavoie 2023b). This is true by definition and it is captured by equation 9 above. All else constant, negative labor productivity yields higher ULC growth and higher inflation. Nevertheless, the growth in markups depicted in Figure 2.2 is already accounting for variations in labor productivity growth since markups are calculated including ULC, which is defined here as the ratio of labor compensation per worker to output per worker. In other words, the impact of ULC growth on inflation is capturing both fluctuations in labor productivity growth and in wage growth. Thus, the positive rate of growth in markups in 2022 is controlling for the increase in ULC growth that is explained in part by the fall in labor productivity that year.

Summing up, the price and markup evolution suggests that if there is a case for markup inflation, it was until the year 2022, when both inflation and markups rise together. In contrast, the 2021 inflation episode does not have to do with markups, but it could be primarily attributed to growing UMC. It is important to note, however, that although the two markup estimates seem to be evolving together, suggesting that material costs indexes follow each other closely, the rise in markups in 2022 is dependent on the material cost index in Belgium and Italy. The growth in the markup is only positive in both countries when it is computed with the FIBER index, whereas it is negative or zero in case of the markup (CRB).

Figure 2.2 Growth in Markups and Price Indexes: 2019-2022

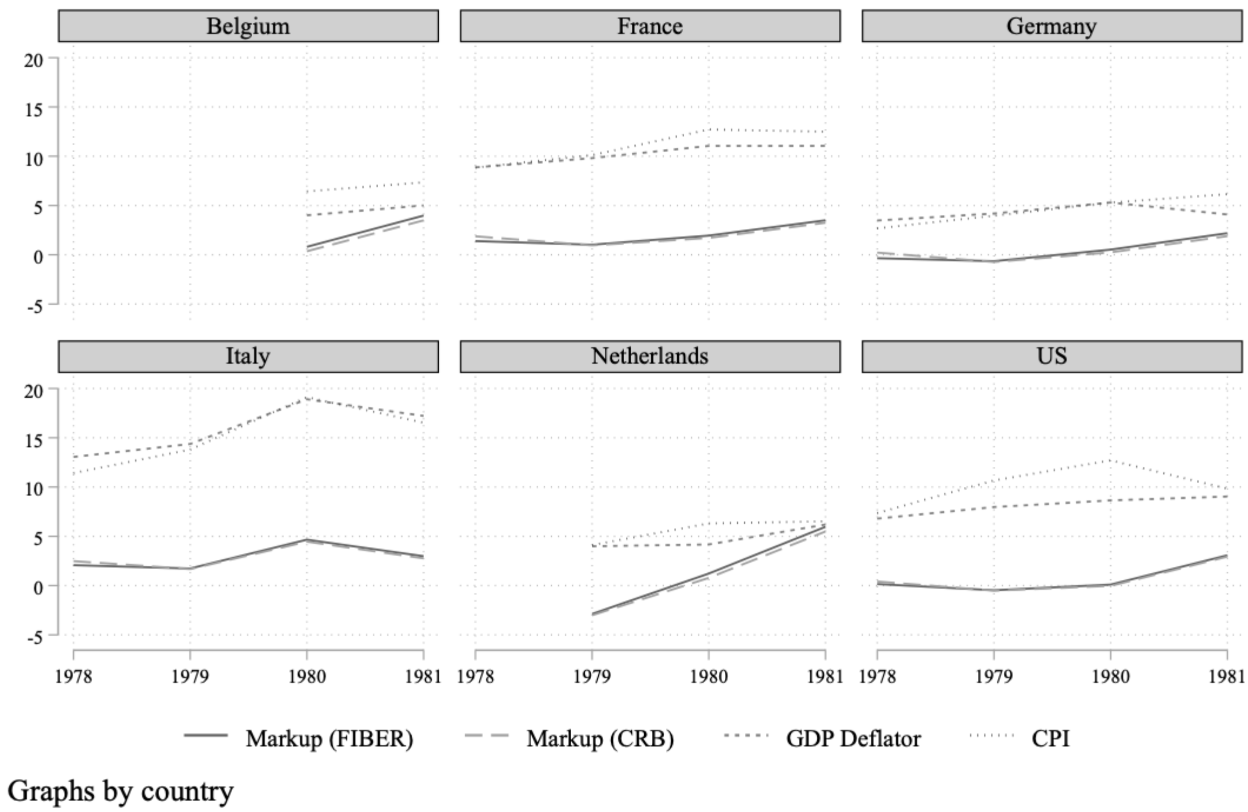


Source: Own calculations based on data from AMECO, Haver Analytics, and OECD Statistics

b. The 1979 oil price shock

To support the story of the 2021-22 inflation dynamics in which markup inflation may have a role in accelerating inflation in 2022, I compare the inflation and markup evolution during an analogous period with a significant UMC shock. Figure 2.3 depicts the same descriptive statistics as Figure 2.2 but this time looking at the 1979 oil price shock. These two periods have been widely used for comparison since they share important characteristics, such as accelerating price inflation, low unemployment rates, and nominal wages failing to catch up (see, for recent comparisons, Hansen et al. 2023; Alvarez et al. 2022; IMF 2022, Ch. 2), although there might be some structural differences given the fact that, for instance, the bargaining power of workers has been declining since the 1980s and is very low during pandemic inflation (Ratner and Sim 2022) or that average households in the lower-income quintiles depict comparatively higher debt ratios (Costantini and Seccareccia 2020). Also, the fact that I am looking at these six industrialized countries is because of the lack of data on ULC and capacity utilization (which I will use in the next part of the chapter) going back to the 1970s.

Figure 2.3 Growth in Markups and Price Indexes: 1978-1981



Source: Own calculations based on data from AMECO, Haver Analytics, and OECD Statistics

Figure 2.3 displays the rates of growth in markups and price indexes but for the period 1978-1981 in annual data. Regarding inflation rates, they were rising from at least 1979 until 1980 and then they start to decline in 1981. As expected, the 1979 oil shock impacts positively inflation rates but they accelerate even more the year after in 1980. This behavior exactly mimics what occurred in the 2021-22 inflation surge. However, the markup response is less clear in this respect. Firstly, some of the countries with available data display a slightly declining markup in 1979 very likely due to the UMC shock, such as Germany, Netherlands, and the US, but the fall in the markup is more modest compared to the fall in 2020, whereas other countries depict positive rates of growth in the markup, like France and Italy. Secondly, the year after the initial shock, in 1980, sees positive but small rates of growth in the markup, except in France and Italy where they are positive and increasing.

One important thing to note, however, is that inflation rates are comparatively higher in the late-1970s compared to 2021-22, such that the 1979 shock functioned as an additional inflation pressure that added up to an environment of close to two-digit inflation. In that sense, it is not clear by how much some of the positive rates of change in the markup in 1979-80 would be contributing to accelerating inflation. For this reason, I carry out econometric analysis of possible markup inflation for this period in the following part using some conventional OLS regressions.

That said, overall Figure 2.3 displays a roughly comparable pattern of markup and inflation behavior in 1979-80 with respect to 2021-22, both in terms of initial declining markups the year of the UMC shock and a corresponding subsequent increase in markups the year after, presumably due to firms trying to catch up after the rise in UMC and this process could have perhaps contributed to the inflation process.

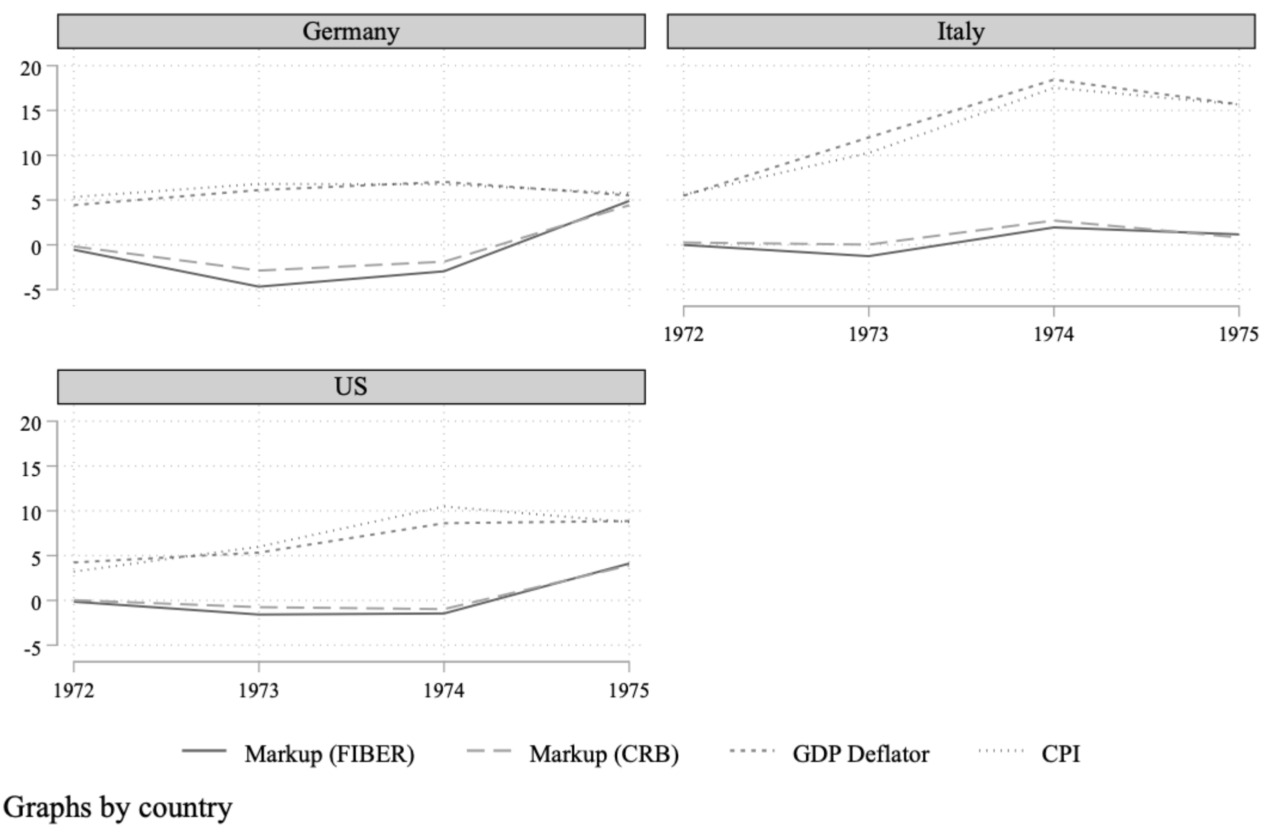
c. The 1973 oil price shock

Finally, I tried to go back in time even more to compare the first OPEC oil price shock as to its possible effect on inflation and markups with respect to the 2021-22 inflation. Unfortunately, I could only collect data for Germany, Italy, and the US for this period. Figure 2.4 depicts the evolution of markups and inflation rates for these three countries in the period 1973-1975, where inflation is neatly growing in 1973-1974 and then starts to go down in 1975. Thus, the inflation behavior is somewhat analogous to the two previous periods analyzed with respect to accelerating inflation triggered by a UMC shock that extends for about two years.

Nevertheless, the evolution of markups is not quite like the other inflation surges. For instance, Germany, and the US display negative rates of growth in the markup in 1973 and 1974, although Italy does show a slightly declining markup in 1973 and then a growing markup the following year. In general, in this case markups do not seem to be contributing to inflation except perhaps in Italy, thereby contrasting with the inflation episodes in 1979-80 and 2021-22.

To sum up, it is safe to say that there is some descriptive evidence pointing towards possible markup inflation in 2022 driven by firms rising markups to catch up with the UMC shock in 2021. But further analysis is needed for at least two reasons. First, one must measure the statistical association between growing markups and rising inflation in 2022 and try to assess the contribution of markups on inflation, and to compare it with the inflation episodes in 1980 and 1974. Second, and perhaps more important, one must control for an omitted variable bias that in this case would be the fluctuations in capacity utilization, since post-Keynesian theory suggests that the growth in the markup over UC would be positively associated with the growth in capacity utilization, due to the inclusion of overhead labor cost. In the following part, I try to address both concerns with the use of standard econometric techniques.

Figure 2.4 Growth in Markups and Price Indexes: 1972-1975



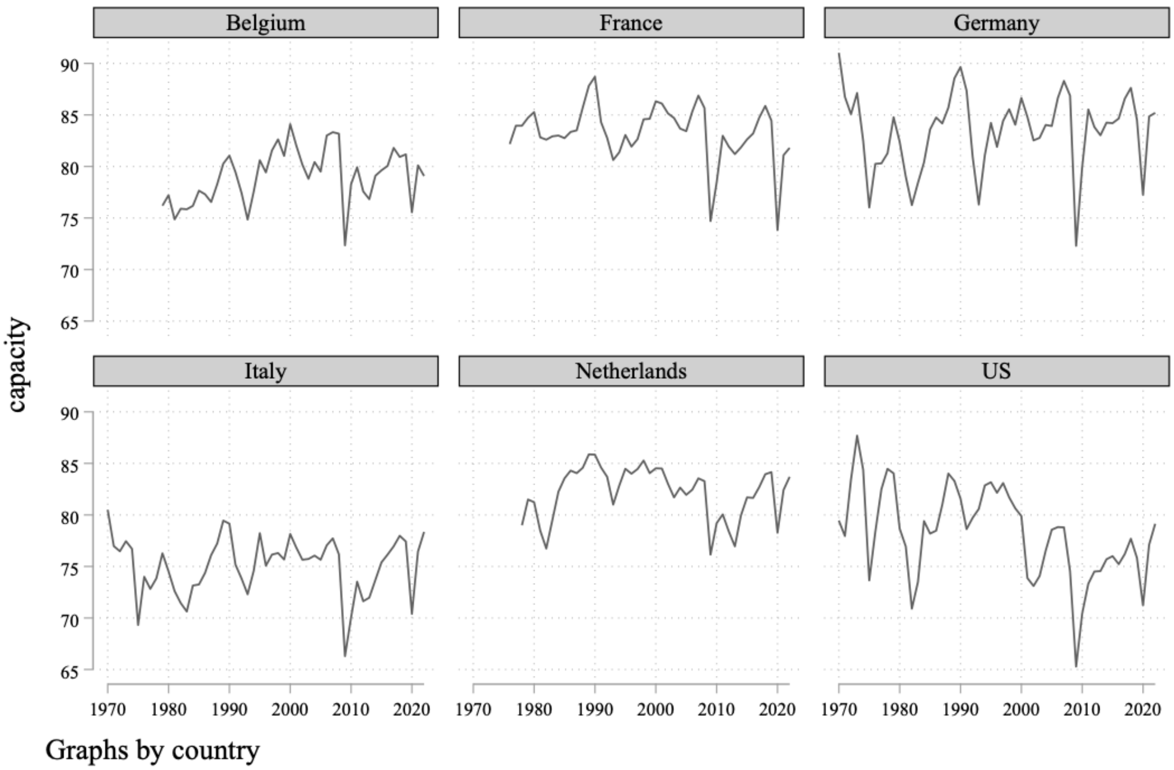
Source: Own calculations based on data from AMECO, Haver Analytics, and OECD Statistics.

Regression analysis: capacity utilization, markup, and inflation

From a mainstream perspective, Larry Summers and others have argued (see Mintz 2022) that markup inflation is just an expression of a supply constraint that is exerting pressure on prices, so that rising markups are not really pushing inflation up, but it is markets that are too tight and firms that have reached full capacity. In short, markups are rising because inflation is higher. From a post-Keynesian Institutionalist approach, markups are independent of capacity utilization up to full employment while firms are always able to fix prices due to market power and other institutional features. But not only that, we know that in theory the markup over NUC would be independent of fluctuations in capacity utilization (see Appendix). The problem is that there is no data on NUC so that ideally researchers must control for variations in capacity utilization when estimating markups. This subsection primarily deals with this by estimating some POLS regressions for the six industrialized countries studied in the previous subsection, while at the same time tries to provide some concrete estimates of the contribution of markups to inflation in 2022.

To start with, Figure 2.5 shows the evolution of capacity utilization rates for the period 1970-2022 in annual data. The first thing to notice is that utilization rates are not abnormally high in the years after the pandemic. Utilization rates seem to be still recovering from the 2020 drop caused by the pandemic measures, with the exception perhaps of the US where the utilization rate in 2022 is slightly higher than before the pandemic. However, it cannot be argued that the 2021-22 inflation surge is responding to capacity utilization rates because they are not particularly high by historical standards. Secondly, utilization rates in the US are trending downwards over time, they were often above 80 percent in the US before the 2000s, while they have been always below 80 percent following the 2002 dot-com crisis. In the remaining countries, utilization rates do not have a clear historical trend. Moreover, it is easy to distinguish the booms and busts in the different economies by observing fluctuations in capacity utilization rates, notably the significant fall in utilization rates during the 1980s crisis and the 2008-09 GFC, and how these rates take some time to recover.

Figure 2.5 Capacity Utilization Rates: 1970-2022

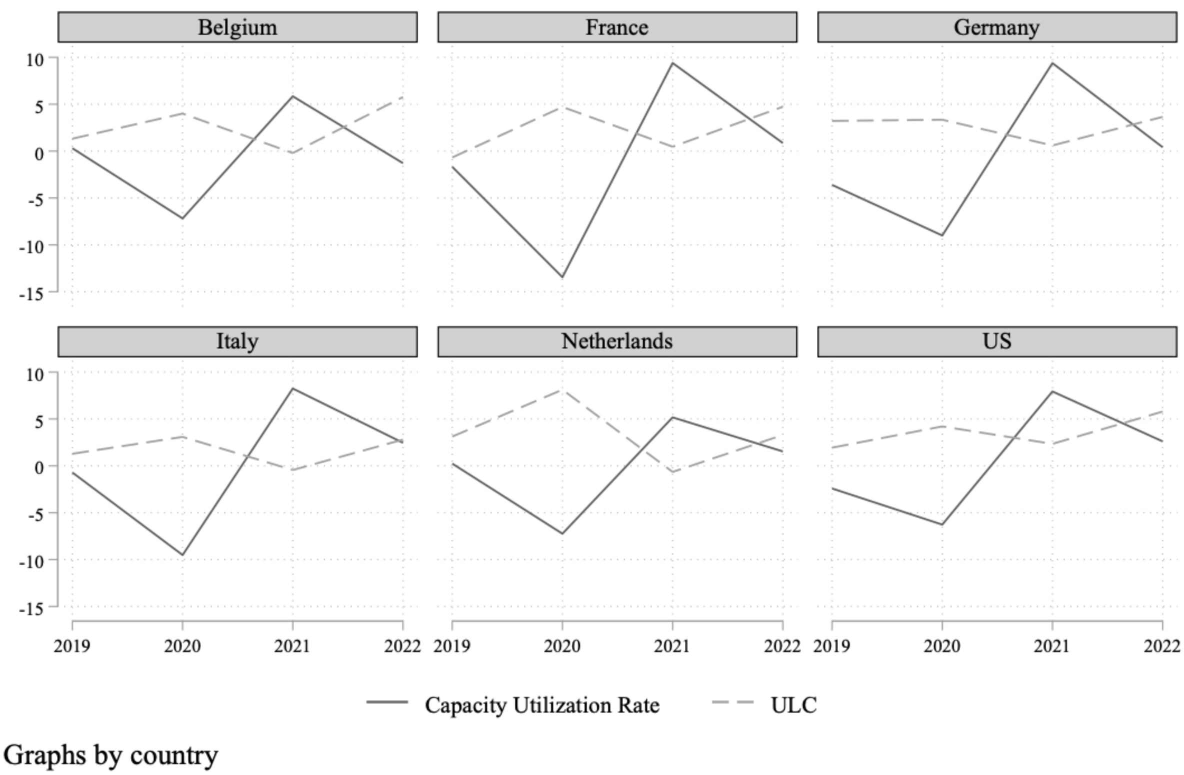


Source: Business Tendency Survey, OECD Statistics

It can be argued, instead, that it is the growth in capacity utilization that is pushing markups up during the 2021-22 inflation surge. To see this, Figure 2.6 depicts the annual rates of growth in capacity utilization and ULC in the period 2019-22 for the six countries in the sample. As expected, there is a significant fall in capacity utilization in 2020 due to the pandemic, and then it bounces back in 2021 and afterwards it is positive but small in most countries in 2022 — except in Belgium where it is negative.

On the other hand, the growth in ULC moves somewhat in opposite direction to capacity utilization rates as predicted by the post-Keynesian theory of normal cost pricing, in the sense that when capacity utilization rates grow, this tends to attenuate the rate of growth in ULC because of overhead labor cost that is fixed over the economic cycle. Conversely, a decline in capacity utilization contributes to the increase in ULC provided that overhead labor cost is spread across a smaller output. For instance, when capacity utilization went up in 2021, the growth in ULC was very close to zero or negative in most countries. Then, in 2022, ULC grew significantly more than capacity utilization (also explained by low or negative productivity growth), which was positive but declining. Thus, it becomes relevant trying to control for the growth in capacity utilization when computing markups.

Figure 2.6 Growth in Capacity Utilization and ULC: 2019-2022



Source: AMECO and OECD Statistics

Yet it is still to be seen whether the growth in capacity utilization affect markups over UC in the way predicted by the theory i.e., if the growth in capacity utilization increases markups per se due to overhead labor cost and whether this is translated into higher inflation rates. To do so, I carry out a POLS regression of inflation on markups over UC by controlling for the growth in capacity utilization. The results of the regression are depicted in Table 2.1.

Table 2.1 POLS Regressions: 1971-2022

CPI inflation (columns 1 to 4) and markup (columns 5 to 6), selected industrialized countries, 1971-2022, annual data

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	CPI Inflation				Markup *(dx/dt)*	
	FIBER		CRB		FIBER	CRB
AR (1)	0.915***	0.904***	0.923***	0.911***		
	(0.0345)	(0.0338)	(0.0383)	(0.0376)		
Capacity *(dx/dt)*	0.0835***		0.0872***		-0.111***	-0.113***
	(0.0227)		(0.0233)		(0.0291)	(0.0320)
Markup *(dx/dt)*	-0.132***	-0.163***	-0.149***	-0.179***		
	(0.0471)	(0.0489)	(0.0455)	(0.0457)		
Markup $_{2022}$ *(dx/dt)*	2.209***	2.255***	1.233	1.286		
	(0.348)	(0.342)	(1.626)	(1.647)		
Markup $_{1980}$ *(dx/dt)*	1.649***	1.664***	1.559***	1.569***		
	(0.129)	(0.134)	(0.111)	(0.113)		
Markup $_{1974}$ *(dx/dt)*	1.427	1.547	0.577	0.729		
	(1.248)	(1.169)	(1.180)	(1.128)		
Constant	0.323***	0.384***	0.370***	0.433***	0.758***	0.731***
	(0.0965)	(0.100)	(0.108)	(0.111)	(0.114)	(0.120)
Observations	283	283	283	283	289	289
R-squared	0.858	0.850	0.827	0.818	0.048	0.046

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Columns 1 to 4 specify CPI inflation as the dependent variable and the rate of change in the markup as the independent variable. The first two columns depict the markup calculated with the FIBER index as UMC whereas columns 3 and 4 show the markup with the CRB index. Moreover, columns 1 and 3 control for the growth in capacity utilization to compare how the inclusion of this variable affects the estimation.

To start with, the capacity utilization coefficient is positive and significant, implying that a one percentage point increase in the rate of growth in capacity utilization is associated with a 0.1 percentage point increase in the rate of inflation on average, regardless of using the FIBER or CRB indexes. This is a very small correlation though. The markup coefficient for the whole period is negative and significant in all specifications. A one percentage point increase in the growth in the markup is associated with a decrease of between 0.1 and 0.2 percentage point in the inflation rate on average. Again, this correlation is very small, for instance, considering that the mean of inflation is around 3 percent, and the standard deviation is 3 percent as well.

To measure the extent to which markups would be contributing to inflation during the acceleration of inflation in 2022, I introduce an interaction term referred to the markup in 2022, that is, what would be the correlation between inflation and the growth in the markup conditioned on the year 2022. The results show that in 2022, the increase of one percentage point in the growth rate of the markup is associated with an increase in 2 percent in the rate of inflation, when the markup is calculated with the FIBER index (columns 1 and 2). This association is independent of variations in capacity utilization since the coefficient does not change between columns 1 and 2. Furthermore, results are consistent with the markup inflation narrative positing an important contribution of markups to accelerating inflation in 2022. However, if the markup in 2022 is computed with the CRB index (columns 3 and 4), the markup coefficient is positive, but it is not significant anymore, such that the statistical significance of markup inflation in 2022 depends on the proxy of UMC. On top of that, this result is robust regardless of controlling for capacity utilization, thereby suggesting that in this case controlling for the growth in capacity utilization is not statistically relevant.

In addition, I include two more interaction terms referred to the markup conditioned on the years 1974 and 1980, which were years of accelerating inflation following a significant UMC shock. On the one hand, the markup coefficient in 1980 is also positive and significant, which means that a one percentage point increase in the growth rate in the markup is associated with roughly 1.5 percent increase in the inflation rate on average in 1980. The markup interaction coefficient in 1980 is like the 2022 coefficient, suggesting that markup inflation might have played a role in 1980. Also, this result is both robust to controlling for capacity utilization and for changing the UMC index. Although it must be said that average inflation rates in those years were significantly higher on average in the late 1970s compared to 2021-22. On the other hand, the markup coefficient conditioned in 1974 is not statistically significant in all specifications. Unlike the years of 2022 and 1980, markup inflation does not seem to play any role during the 1973-1974 inflation surge.

Finally, columns 5 and 6 depict results of a POLS regression where the growth rate in the markup is the dependent variable and the growth rate in capacity utilization is the independent variable.

This is just to try to shed light on the relationship between capacity utilization and markups given that the capacity utilization coefficient is positively associated with inflation, despite the size of the coefficient being very small (columns 1 and 3). It would be expected that growing capacity utilization would likely increase markups in theory, but the capacity utilization coefficient in the last couple of columns of Table 2.1 suggests that the relationship is negative and statistically significant, hereby this relationship is more complex and there might be also a countervailing effect playing out, for instance, à la Kalecki through growing markups that lower real wages and this, in turn, decreases both effective demand and capacity utilization.

Overall, there is evidence suggesting significant markup inflation in 2022 after controlling for capacity utilization. However, this evidence is dependent on the measure of UMC utilized to compute the markup. It seems that the growth in capacity utilization does not play a very important role in the evolution of markups, after controlling for it, but UMC does matter in assessing markup inflation. Perhaps more research is needed at the industry or firm level in determining empirically the pass through of UMC shocks towards markups to conclude whether markup inflation in 2022 was a generalized phenomenon. Despite that, the comparison with other historical inflation periods pinpoints that markup inflation after an initial positive shock in UMC is sui generis to the 2022 and 1980 inflation years.

2.4 Conclusions

The previous analysis puts forward that markup inflation is relevant in the context of the current 2021-22 inflation surge. The views that simply discredit markup inflation on theoretical grounds are not consistent with the conflict inflation model of post-Keynesian economics and the Institutionalist theory of inflation where basic inflationary pressures — in this case a positive UMC shock — interact with firms raising markups as a response to catch up (propagation mechanism), thereby contributing further to the initial inflation shock. Also, the opinions that disregard markup inflation by pointing to a supposed lack of evidence are, to some extent, contradicted by the evidence put forth in this chapter for six industrialized countries. Nevertheless, the evidence on markup inflation in 2022 is not conclusive given that it depends on the measure of UMC to compute markups.

Moreover, this chapter provides a comparison of different inflation episodes along with the 2021-22 inflation surge, with respect to markup behavior and controlling for variations in capacity utilization, in which the basic inflationary pressure was a UMC shock, such as the 1979-1980 and the 1973-1974 inflation episodes. In this regard, markup inflation is also observed in 1980 whereas it does not show up in 1974, whence pointing out that, despite the common UMC initial inflation pressure, markup behavior responds differently in magnitude and direction in each case. In other words, it is not automatic that following a UMC shock, markups would rise subsequently to catch up; it depends presumably on the institutional factors at hand. Moreover, controlling for the growth in capacity utilization when calculating markups does not make a significant difference on assessing markup inflation.

In line with recent evidence on the 2021-22 inflation process (see Bernanke and Blanchard 2023), this chapter argues that propagation mechanisms are not identified in wage-price spirals rooted in a more militant and powerful working-class vis-a-vis capital owners. Instead, for some industrialized countries, increasing market power of firms is contributing to inflation through increasing average markups. However, accelerating markups could be explained either by firms on average raising markups or, as Lavoie (2023) points out, by increasing market concentration among the firms with higher markups i.e., a change in the composition of incumbent firms with no change in markups at the firm level. I would argue that although the latter does not imply that firms raised their individual markups, this is still markup inflation since it is explained by increasing market power of firms and how this ultimately contributes to price inflation.

As it has been well documented (see Ratner and Sim 2022; Taylor and Barbosa 2021), the long-run erosion of labor bargaining power has prevented workers to put enough pressure on wages and prices. Thus, specific class conflict in the traditional view reflecting workers successfully fighting for the distribution of resources has not been the primary factor behind Covid and war inflation. In short, there is no evidence of a wage-price inflation spiral.

Yet, it is also true that markup inflation would account for only one part of the current inflation surge. Therefore, the fight against it must address primarily the basic inflationary pressures located in the supply-side disruptions and scarcities in specific industries. However, solving these issues might help as well to reduce the excessive market power by firms and so inflation could be further reduced by weakening entry barriers and special market access for incumbent firms.

Given the above inflation diagnostic, what would be the role of monetary policy? In other words, is there any room for monetary policy to combat effectively current Covid inflation? Clearly tightening monetary policy would not directly tackle any of the basic inflationary pressures. The only way through which interest rate hikes could reduce inflation is by contracting economic activity. However, rising interest rates may have also perverse effects on markups via higher overhead costs, if smaller indebted firms may be under pressure over time to raise markups to cover the higher interest costs. This can create further challenges in the fight against inflation and monetary policy might become a ballast in this battle.

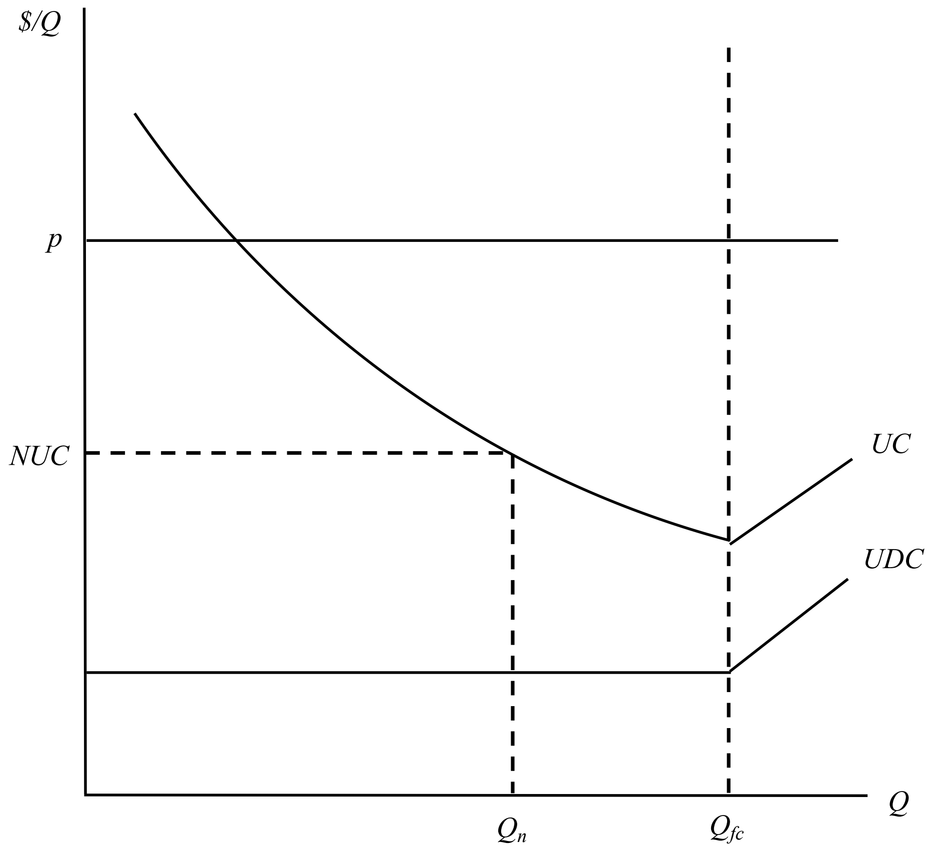
Higher interest rates could mean greater indebtedness for the lower income quintiles, that are already the groups with higher debt-to-income ratios, thereby increasing inequality and economic vulnerabilities. With it, the mentioned power imbalances among social groups are reinforced and so propagation mechanisms of inflation would not likely cease. Furthermore, larger income and wealth disparities would negatively impact economic activity through the income distribution channel of monetary policy. That said, recently not only post-Keynesians but also mainstream economists have pointed out the very limited role of using monetary policy to stabilize inflation and output and so they instead recommend directing monetary policy towards improving the distribution of income and wealth (Bhandari et al. 2021).

Finally, this chapter falls short on some aspects. First and foremost, I was only able to assess markup inflation at a country-level aggregation while conclusive evidence on markup inflation would need to be complemented with industry- and firm-level data. Apart from that, the markup measures utilized in this chapter are estimates of the theoretical markup measure, which is the markup on NUC that both includes normal ULC and UMC. As a result, the lack of available data of any of these costs measures implies that they must be substituted by proxy variables. Clearly, it can always be debated whether the proxy variables are appropriate. My feeling is that this very fact must lead to both investigate and provide further evidence with additional markup measures and take the results found here with a pinch of salt. For example, more research could look at more disaggregated markup measures to reveal other aspects of the markup inflation process. Lastly, the sample of countries is limited to some industrialized countries with available data. It would be worth to explore markup inflation in emerging countries that are very important in the global supply-chains. I leave these and other concerns to future research.

Appendix 2 Markup pricing and capacity utilization

To understand the challenges of calculating the markup, Figure 2A depicts a simple presentation of the post-Keynesian cost curves for the firm and how markups are calculated (see Eichner 1976 for a more complex exposition). Post-Keynesians assume that firms fix a markup on NUC, equal to the difference between unit price (p) and NUC, that is $\left(\frac{p-NUC}{NUC}\right)$ in Figure 2A. The problem with calculating markups over ULC and UMC — which both comprise unit cost (UC) — is that UC decreases as the rate of capacity utilization goes up (since they include overhead labor cost) up to full capacity (Q_{fc}). Beyond the Q_{fc} production level, UC and unit direct costs (UDC) start to increase. For instance, in an economic boom, production exceeds output at normal capacity, which means $Q > Q_n$ and $NUC > UC$, such that profit margins would be greater than markups computed at Q_n. In this sense, p-ULC ratios are procyclical whereas markups at normal capacity utilization would be relatively independent to variations in capacity utilization. In addition, Kaleckian markups, as the ratio of unit price-unit direct costs (UDC), are constant up to full capacity, as shown in Figure 2A.

Figure 2A Post-Keynesian Markup Pricing



Chapter 3 The Dominance of 'Inflation First' Monetary Policy and the Rentier Income Share in Industrialized Countries

By Guillermo Matamoros Romero and Mario Seccareccia

Abstract

This chapter assesses the Taylor rule framework of monetary policy in relation to its potential effects on the income share of rentiers. The chapter begins by discussing 'inflation first' monetary policy in history and theory. It reviews the adoption of an 'inflation first' monetary policy since the 1970s and 1980s in several industrialized countries, and then the explicit adoption of the Taylor rule in the 1990s. The chapter also looks at the evolution of rentier income shares during these decades and evaluates empirically the Taylor rule framework by estimating a central bank reaction function for a group of industrialized countries. The contribution of this chapter lies in providing evidence on the behavior of central banks in line with a monetary policy that is biased in favor of the income share of rentiers during the last several decades. The conclusion emphasizes that although the reaction function of central banks has been benefitting the rentier income share, there has been a change towards a greater concern for unemployment with respect to inflation after the Global Financial Crisis of 2008-2009.

3.1 Introduction[33]

The purpose of our research is to analyze the effect of monetary policy on the functional distribution of income by adopting a Keynesian socioeconomic class framework, which remains an approach common to post-Keynesian/institutionalist economists (for a more substantive review of this approach, see, for instance, Seccareccia & Lavoie 2016, and Seccareccia and Matamoros 2022a, 2023a). Inspired by Keynes's original class analysis that can be traced back a century to *A Tract on Monetary Reform* (1923)[34] and then the *General Theory* (1936), we consider how monetary policy impacts on the income dynamics of three broad classes because of these groups' special social class interests *qua* wage earners, profit earners and interest-income earners (the latter constituting Keynes's "rentier class").

This chapter investigates, more precisely, whether monetary policy has favored the income of one group, that of rentiers (i.e., the savers or net creditors within a community) relative to the income of the non-rentier groups (or net debtors). This has been especially discernable since the widespread adoption of an "inflation first" monetary policy starting in the latter half of the 1970s with the related acceptance, either implicit or explicit, of the Taylor-rule policy framework by central banks in major industrial countries, particularly during the early-1990s. These central banks championed combatting inflation over all other possible goals, but they also became committed to and began to engage in an almost surgical form of inflation targeting (IT) within national economic space.

At the same time, however, throughout the era of this 'inflation first' monetary policy framework within national economies, world trade and financial markets were becoming ever more liberalized

---

[33] An earlier and slightly different version of this chapter was published as a working paper by the Institute for New Economic Thinking (see Seccareccia and Matamoros 2023b).

[34] Interestingly, former Governor of the Bank of Italy, Ignazio Visco (2023), has referred to Keynes' class analysis in *A Tract on Monetary Reform* in the Governor's speech at the recent IARIW-Bank of Italy Conference to pinpoint that inflation and deflation both have "an effect in altering the distribution of wealth between different classes" (p. 1). Keynes (1923) believed that monetary policy focused, say, on combating inflation, impacts both on the distribution of the flow of incomes across socio-economic classes and the distribution of the stock of wealth pertaining to each class. Our investigation adopts Keynes' three-class methodology as a simplification, in a manner roughly analogous to the two-agent New Keynesian models that assume Hand-to-Mouth individuals and fully insured individuals.

and globalized in the post-Bretton Woods international order. Therefore, an emerging global trade and financial system evolved quite parallel to the 'inflation first' monetary policy, generating a built-in deflationary bias on a world scale as it rested on what became the generally accepted post-Bretton Woods export-led growth model (Seccareccia 2014). This globalized system only witnessed a substantial reversal (that is, a sort of unintended deglobalization consequence) during the latter years of the COVID-19 crisis of 2021-22 because of the appearance of crippling global supply chain problems that triggered inflationary pressures not observed since the 1970s and 1980s, and which were being further fueled by the war in Ukraine.

Furthermore, we wish to draw attention to the ongoing debate over the Taylor rule, which is usually presented superficially in the context of the "rules versus discretion" debate in the conduct of monetary policy. In this case, through an analysis of its operating instrument and response function, we show how the Taylor rule framework is consistent with prioritizing inflation-fighting over all other possible goals. As it is well known, because of a possible structural break in monetary policy implementation after the Great Financial Crisis (GFC) of 2007-2009 (see Seccareccia & Kahn 2019), particularly in the US, the Taylor rule has returned as a significant policy concern with increasingly overt political pressure for its official (and not just its implicit) adoption at the US Fed, especially over the last dozen years, including during the COVID-19 pandemic.

In fact, Taylor (2011) began himself to promote his rule of officially legislating changes to the Fed's mandate by implementing his specific interest rate-operating rule. In recent times in the US, some Republican representatives have argued that the Fed has been given too much discretion in the pursuit of its current dual mandate *cum* its official 2 percent inflation target "add-on" since 2012. In its place, the Fed authorities should be bound by a precise formal rule, that is, they should be guided strictly by the Taylor equation (for a summary of the recent political debates, see, among others, Davidson 2022). Former Fed chair, Janet Yellen (2016, fn. 8), while not officially adopting it, did suggest a more traditional Keynesian interpretation of the Taylor rule by tilting the weights strongly in favor of the unemployment gap. Unquestionably, the whole political economy of how this rule should be adopted remains a major flashpoint as the problem of inflation has moved once again to centerstage within monetary policy circles since early 2022.

While recognizing that post-Bretton Woods global forces may well have played a role in the evolution of incomes within national economic spaces, the object of our investigation is to analyze how the widespread popularity of the Taylor-type rules within both official and implicit IT regimes had very specific consequences on income distribution between rentier and non-rentier income earners. To do this, we have divided this chapter into three important sections that try to cover broad history, theory, and evidence on the subject-matter.

We begin below with a study of the connection between rentier interests and the adoption of the Taylor rule as a general framework to meet specific inflation targets. In other words, what has been the political economy, with pressure coming particularly from the financial sector to combat inflation over all other possible goals, and to introduce and integrate the Taylor rule as a framework to conduct monetary policy within IT regimes? This section puts forth the historical and institutional context within which the adoption of the Taylor rule has taken place.

This is followed by a description of the stylized facts over the last half century since the collapse of the Bretton Woods system as pro-rentier/monetarist ideas took hold of macroeconomic policy in most Western countries. We analyze different measures of rentier income such as variants of what has sometimes been defined as the Pasinetti index. We then explore the theory behind the Taylor rule in relation to its potential consequences on the rentier income share. This leads to a comparison between the Taylor rule and the Wicksell rule with regards to the implications on interest rate policy and on the functional income distribution. To what extent can the Taylor rule be considered a real interest rate rule whose purpose is that of stabilizing rentier income while perhaps destabilizing incomes of non-rentier groups?

Finally, we address empirically whether monetary policy has benefitted rentiers compared to non-rentier groups during the era of the 'inflation first' monetary policy that prevailed since the 1970s, especially by the end of the Bretton Woods era, which coincided somewhat with the first OPEC oil price shock in the fall of 1973. While the inflation first policy perspective has maintained a stranglehold over monetary policy since the late 1970s, the official Taylor rule dominance began roughly three decades ago in the early 1990s and lasted until the GFC but which, despite its decline as a policy rule over the last dozen years (as we shall argue below), it still dominates the debate over the conduct of monetary policy in major industrialized countries. To analyze this, we explore conventional econometrics for several industrial countries over that whole era since the 1970s. Because of the paucity of data and difficulty with the conventional national accounting measures, we compare variants of the Pasinetti index as proxies for the evolution of the rentier share. Another purpose of our proposed research is not only to shed light on what is most certainly a neglected aspect of monetary policy on income distribution but also to point to the current relevance of the post-Keynesian ideas to understanding the political economy link between monetary policy and the functional distribution of income.

3.2 The Taylor Rule: An Historical Perspective

The Taylor rule was officially put forth as a framework to conduct monetary policy only in the early 1990s (see Taylor 1993). Yet, it synthesized an outline for monetary policy that followed the abandonment of the Keynesian priorities of high employment and growth, which had existed previous to the high inflation environment of the 1970s, and which now asserted that Keynesian central bank meddling with the money supply, namely that of seeking supposedly to push up real output above (and/or the unemployment rate below) its "natural" level through money supply stimulus, would create inflationary instability in accordance with the Friedmanite accelerationist interpretation of the Phillips Curve.

As previously alluded to, accompanying the double-digit inflation rate starting from the mid-1970s, which was associated with a series of important oil-price shocks, there developed a certain policy consensus about the need to slay the inflation dragon, even though within the contested terrain of monetary policy neither business leaders nor organized labor, as separate political pressure groups, held as much hostility towards inflation as did the broad financial/rentier sector. As we shall see below from the stylized facts, the 1970s was a difficult decade for rentier income earners as high inflation abruptly eroded rentier shares internationally with real interest rates reaching negative levels not witnessed since the crisis era immediately following World War II and attaining even lower levels than the values reached during the 2021-22 inflation surge. As Smithin (1996) pointed out, the inflation experience of the 1970s left such a scar on rentier income that, in the contested terrain over income claims, we witnessed what he dubbed the "revenge of the rentiers", which, as is well-known, brought to the macroeconomic policy scene what De Long (2000) referred to as the "political monetarism" of the late 1970s and early 1980s fixated on controlling the money supply. While based on Friedman's precepts on the presumed stability of the velocity function of money, what were adopted internationally were even more naïve and stripped-down operational versions of political monetarism, as policy priorities quickly evolved in favor of fighting inflation via attempts to "control" monetary aggregates such as net unborrowed reserves at the US Fed, and M1 or M3 targeting (as in Canada and the UK respectively).

When monetarism "crashed and burned" in the 1980s (as De Long (2000, p. 92) expressed it), especially following the Volcker shock mythology (see Tymoigne 2023), there slowly rose from the monetarist ashes of its predecessor a New Keynesian *cum* Neo-Wicksellian macroeconomics, particularly as central bankers cried out for some new policy anchoring during that decade, but without jeopardizing the inflation first priority to which, by then, virtually all central bankers were paying lip service. Indeed, throughout the 1980s, central bankers were in quest of a new approach once it had become a kind of secret of Polichinelle that monetary aggregates are essentially endogenous variables and the monetary authorities came to recognize that, because of *force majeure*, they can neither directly control base money (and its components) nor other monetary aggregates, such as M1 and M2, without causing significant macroeconomic havoc.

Eventually, a neo-Wicksellian veneer of the reaction function slowly came to cover and replace the monetarist logic during the 1980s. While central banks were moving away from targeting money aggregates with the emphasis on some new central bank instruments and indicators, such as the Monetary Conditions Index (MCI) as in Canada, in which interest rate considerations came to feature prominently (see Lavoie & Seccareccia 2013, pp. 71-72), already in the 1980s there was emerging the implicit or explicit formation of some particular central bank interest rate-operating rule, while still maintaining inflation fighting at the very top of macroeconomic policy priorities and mandating central bankers with the single task of fighting inflation in accordance with the previous conventional 'inflation first' monetarist credo. In the same line, Asso et al. (2007, p. 22) claim that "except perhaps for the 1979-1983 period, the main instrument of Fed policy in the post-Accord period (1951-) has been a short-term interest rate, with the federal funds rate gaining increasing importance through the 1960s."

Indeed, even though explicit/official IT policy began to be adopted in 1990 by New Zealand, followed by Canada and several industrialized and developing economies in the years ahead, Bernanke and Mishkin (1997) argue that several countries were implicitly implementing "inflation-focused" monetary policies years or even decades earlier, such as Germany and

Switzerland which started in the mid-1970s. The authors point to three main reasons to support the view that IT policies commenced long before their official adoption.

First, the need for a nominal anchor as "a way to reassuring the public that monetary policy would remain disciplined" (Bernanke and Mishkin 1997, p. 104), that is, a warranty that rentiers' income would be given priority, particularly after the collapse of the exchange-rate peg in the early 1970s and the subsequent period of negative real interest rates. Second, IT functioned as tool to lock in low inflation supposedly achieved through very tight monetary policies in the 1980s. And third, the shift in mainstream macroeconomic theory towards a long-run neutrality of money, whereby "there is no long-run trade-off between output (or unemployment) and inflation, so that monetary policy affects only prices in the long-run" (Bernanke and Mishkin 1997, p. 104). Summing up, the long-term neutrality of money, the justifications of monetary policy rules on the ground of the importance of "precommitment and credibility", as well as the new conventional wisdom saying that low inflation is good for economic growth, all three ideas became widely accepted among central bankers.

Together with the neo-Wicksellian logic, all these features quickly opened the door to the Taylor rule approach to monetary policy formulation. The focus of the Taylor rule was to frame monetary policy decisions, by relying seemingly on the knowledge of the inflation gap, the output gap, and one real-interest rate estimated parameter. The stage was set for the popularity of this policy framework, especially within the emerging IT regimes beginning in the early 1990s. Despite the heroic attempt to try to reconcile the Taylor rule with monetarist causality (see Taylor 1999), as it has been emphasized elsewhere (see Seccareccia 1998), the Taylor rule framework was the direct lineal descendant of an old Wicksellian loanable funds approach. Despite its limited popularity in the early twentieth century among theorists of central banking, particularly during the interwar era before the Great Depression, Wicksellian theory never found much favor among macroeconomic policymakers until the 1980s and 1990s, once fiscal policy became downgraded to running balanced budgets and monetary policy became the exclusive instrument to achieve macroeconomic stabilization through direct interest-rate setting.

Abstracting from the obvious recognition and implementation time lags in central bank interest-rate setting (thereby removing time subscripts in our equation below), the Taylor rule framework is normally described as resting on the familiar three elements found in the standard Taylor rule formula (Taylor 1993, p. 202):

$$i = \rho + \pi + \alpha(\pi - \pi^*) + \beta(q - q^*) \qquad (1)$$

where i is the nominal central bank benchmark rate of interest, ρ is a constant term, which in real terms ($i - \pi$ when $(\pi - \pi^*) = (q - q^*) = 0$) was interpreted as some constant "natural" or "neutral" rate of interest; α and β are policy coefficients, π and q are the actual inflation rate and real output respectively with π^* being their target inflation and q^* some sustainable "full capacity" level of output compatible with a Friedmanite natural rate of unemployment (u^*). Indeed, given the presumed link between potential output and the natural rate of unemployment, especially if the former was derived by an estimate of the latter, one could easily restate the output gap as an unemployment rate gap ($u^*- u$) and use it interchangeably as in equation 1' below:

$$i = \rho + \pi + \alpha(\pi - \pi^*) + \delta(u^* - u) \qquad (1')$$

The policy appeal of this central bank reaction function represented by equation 1 (or its *alter ego* equation 1') is important to highlight. Firstly, the policy framework fits the pro-rentier 'inflation first' priority that became politically anchored throughout the late 1970s and the 1980s era, since primacy was given to the inflation gap $(\pi - \pi^*)$, that is, the difference between the actual inflation rate (π) and the target inflation rate (π^*), with the latter becoming officially 2 percent in most IT regimes during the 1990s regardless of the precise weights of the coefficients for α and β which Taylor had originally identified as 0.5 respectively. The reason why those weights may be of secondary consideration in the 'inflation first' priority is because the second gap ($q - q^*$), the so-called output gap, was never conceived as an independent argument to target by a central bank (as would a Keynesian policymaker) but only an information variable that the central bank can use to combat future inflation pre-emptively in setting its benchmark interest rate, i, as understood within the "New Consensus" models of that era. Hence, through its operational interest-rate instrument, i, both gaps in the Taylor reaction function have as ultimate focus the attainment of the central bank inflation target, whether it is the first term, by responding to the current inflation vis-à-vis target inflation, or the second term, which is communicating to the decision maker how to impact on future inflation based on the traditional Friedmanite Phillips curve.

In fact, the Vice-Chair of the US Fed Alan Blinder, for instance, argued that this interpretation of the Taylor rule would be more in line, although still inconsistent, with the Fed's dual mandate of pursuing "maximum employment" and "stable prices". In his words:

> "The phrase "maximum employment" is conceptually awkward. In the presence of a price stability objective, it cannot possibly mean the largest number of jobs that the economy can generate. One reasonable interpretation would set u* equal to the natural rate of unemployment, the only unemployment rate consistent with stable inflation, and interpret the goal as stabilizing unemployment around its natural rate. […] my experience at the Federal Reserve led me to believe that many members of the Federal Open Market Committee (FOMC) interpret the "maximum employment" mandate in precisely this way." (Blinder 1997, p. 4)

Thus, the only reason to include the unemployment or output gap in a central bank's reaction function is to stabilize inflation in the short run consistent with a low and stable long-run inflation path. In this rationale, the existence of a unique natural unemployment rate (or NAIRU, for non-accelerating inflation rate of unemployment) within the Phillips curve theory (where there is a short-run trade-off between inflation and unemployment) becomes a cornerstone for IT regimes. According to Blinder, central bankers would have the NAIRU in mind when deciding the benchmark rate of interest:

> "Well, I can assure you that my central banker friends would not be surprised to learn that academic theories that assume that they seek to push unemployment below the natural rate then deduce that monetary policy will be too inflationary. They would doubtless reply, "Of course. That's why we don't do it." Therein lies the solution: Direct the central bank to set k = 1 — that is, not to seek unemployment lower than the natural rate. In the world of practical central banking, this "solution" is, I submit, adopted as if it were second nature." (Blinder 1997, p. 14)

Clearly, this interpretation of the Taylor rule relies on the existence of the Phillips curve. If the latter does not hold, the unemployment or output gap makes no sense at all in the Taylor formula. In a world with a flat Phillips curve, the dual mandate becomes completely incompatible with an 'inflation first' monetary policy, as John B. Taylor (2012, p. 125) explains:

> "The first step toward a more consistent policy would be to remove the dual mandate and bring the Fed's focus to a single goal. That goal should be price stability. […] The addition of the dual mandate to the Federal Reserve Act was based on the now-outmoded concept that was popular in the 1970s. Higher inflation, it was thought, would bring about lower unemployment. This notion has since been proved wrong empirically and theoretically."

The logic of the Taylor rule was simple, it was to raise the benchmark nominal rate and, by implication, the real rate, $r = i - \pi$, whenever the actual inflation rate would be inching up above its target and whenever the unemployment rate would be below its "natural" level from which these output gap measures were often indirectly derived. This view of the Taylor rule is quite different from what is sometimes referred to as the Yellen rule that would take equation 1' and engage in an unemployment gap-tilting exercise by placing a much higher weight on δ than α. The latter is done with the prospect of minimizing both gaps as within a genuine dual mandate case rather than one emphasized by Taylor above, whose sole mandate would be *de facto* to achieve present and future inflation rates consistent with an inflation target alone (see, for instance, Yellen (2016), and Nikolsko-Rzhevskyy, Papel & Prodan (2017)).[35]

Furthermore, despite the fact that central banks were no longer focusing on monetary aggregates (which they could no more pretend to "control" after the early 1980s debacle), there was still a real sense of continuity with the broader monetarist baggage. This is not only because the pro-rentier priority of combating inflation had remained intact but because the whole paraphernalia of the short-run versus the long-run Phillips curve remained largely unchanged albeit somewhat more superfluous within a neo-Wicksellian framework. Hence, by the 1990s, when mainstream macroeconomists came to adopt progressively the Wicksellian "natural" or "neutral" interest rate analytics (that is, without any necessary recourse to the Phillips curve reasoning), mainstream macroeconomists could continue to confound the two without recognizing the jump in logic from

---

[35] See Asso et al. (2007) for a historical interpretation of the Taylor rule where the different weights attached to the inflation gap (p) and the output gap (y) have reflected different policy priorities over time:

"The Great Depression created a constituency which tended to emphasize the importance of minimizing y (and hence tended to increase the weight attached to y). Inflation was accommodated, as a necessary cost of keeping debt servicing low (pre-1951), tolerated, or 'controlled away'. The Great Inflation and the costs associated with the Great Disinflation created a constituency that sought to minimize p (and hence tended to increase the weight attached to p)." (pp. 6-7) the Friedmanite labor market concept of the "natural" rate of unemployment to the Wicksellian two interest-rate dynamics generated by a disequilibrium in the capital markets arising from a gap between the money rate and the natural rate of interest. This quandary of mixing Wicksellian and monetarist logic arises because, within the Taylor rule reaction function, the natural rate of interest (namely the estimated ρ term of the Taylor equation), would be the real policy rate of interest that was consistent with an equilibrium state in which both the inflation gap (π - π*) and the output gap (q - q*) are zero, that is, a state in which the actual unemployment rate has also reached its natural level.

Perhaps most importantly, even those who rejected the single-minded focus on fighting inflation, especially in the US where there had been a long battle during the 1960s and 1970s to adopt a dual mandate, the strong Keynesians who had promoted and favored the dual mandate were now somewhat drowned out and out-maneuvered politically because of the confusion arising from the Taylor rule framework. It was rather ironic that the very Keynesian historic amendment to the Federal Reserve Act, namely the Humphrey-Hawkins *Full Employment and Balanced Growth Act* was passed and adopted by the US Congress in 1978 that mandated the US Fed to achieve price stability (which could be interpreted as the inflation component of the Taylor equation) *and* full employment (which could be considered consistent with a particular monetarist interpretation of the unemployment component of the Taylor equation).

In the Keynesian spirit of the Humphrey-Hawkins Act, the monetary authority would be faced with the task of trying to minimize jointly the inflation gap and the output gap to achieve two goals — full employment and price stability— but with only one instrument, the central bank policy rate. As we have written elsewhere (see Lavoie and Seccareccia 2021, and Seccareccia and Matamoros 2022a), this is really what the art of central banking should be all about in trying to reconcile two or more separate objectives, as it was done within the Keynesian context of the early postwar period through both fiscal and monetary policy coordination. In countries such as the US, a series of Fed Chairs going back to Alan Greenspan were pressured and encouraged to experiment with higher weights on the unemployment component as an independent objective in its reaction function.

However, as discussed above, in a hybrid neo-Wicksellian universe and with the fiscal authorities constrained to running government budget balances, the two principal components of the Taylor equation would be interpreted by the monetary authorities as a mere information set whose unique goal is to bring the central bank policy rate into line with the presumed natural rate, ρ, that would be consistent with achieving the 2 percent inflation target. It is as if the dual mandate had been completely subverted and flipped on its head and submerged within a Taylor-rule policy perspective.

This conflict over the adoption of the Taylor rule has continued unabated even in recent times since the equation has become a political instrument to pressure central bankers to stick to the 'inflation first' commitment which, as we shall see, had changed somewhat after the GFC via "flexible" IT, during which period other concerns assumed greater prominence, especially because of fears about deflation and secular stagnation. Recently, as inflation fighting has now been reprioritized, central bankers are under enormous political pressure to get back to the Wicksellian interpretation of the Taylor rule. For example, in response to the pressure coming from primarily Republican representatives at the US Senate, Fed Chair, Jerome Powell, was quoted as saying at the Senate hearings in June of 2022, that the Fed's policy rate was now moving up "much closer to where various forms of the Taylor rule are …" (quoted in Davidson (2022)) thereby suggesting that the Taylor formula is being used as a political tool to suppress the Keynesian spirit of the US Fed's dual mandate. Indeed, like in the 1970s and 1980s, the Taylor rule has now become, once again, a policy hot potato, which its adoption, or its lack thereof, is used in this political blame game of why central bankers have not sufficiently prevented inflation from taking hold during the pandemic.[36]

3.3 Some Stylized Facts on the Rentier Income Share

The goal of this section is to provide some context of the period that we identify with the dominance of the 'inflation first' monetary policy with respect to the evolution of functional

[36] For instance, Asso et al. (2007, p. 26) found that the first mention of the Taylor rule at a FOMC meeting was in 1995 by Janet Yellen, who at the time argued to keep the federal funds rate at 5 percent, following the Taylor rule estimates, instead of raising it to 7 percent as the so-called "Greenbook" forecasts suggested.

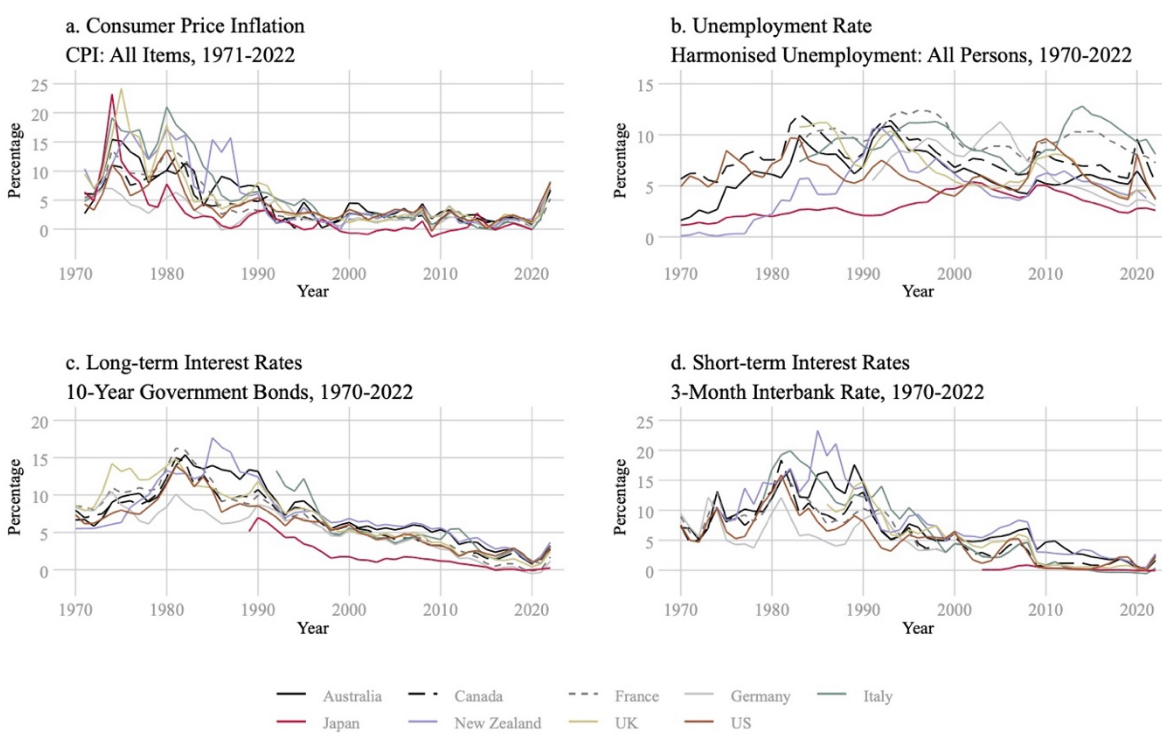
income distribution. To do so, we show some statistics on the conventional rentier income share for several industrialized countries using national accounting measures, but we also present data on alternative measures of rentier income. While direct calculations of the rentier income share could be more in line with the original rentier concept by Keynes (1923, 1936), for instance, measured as the share of net interest payments from businesses and the government out of GDP, these measures have serious issues of limited data availability among countries. Therefore, it becomes critical to present alternative rentier income measures that can be used for several countries and for much longer periods.

But we would first like to show the evolution of some relevant macroeconomic statistics that allow readers to better understand monetary policy regimes (and which will be used in the econometric section below). For starters, panel (a) in Figure 3.1 shows CPI inflation for nine industrialized countries – the G7 plus Australia and New Zealand – for the period 1971-2022 (Japan is missing 2021 and 2022 observations of inflation). Broadly speaking, inflation was relatively high before the mid-1990s and it remained low and stable afterwards (generally below 5 percent) until 2021, when it accelerated and surpassed 5 percent of annual inflation. Thus, we observe at least two types of inflation regimes: a high-inflation regime in the 1970s, 1980s, and after the COVID-19 crisis in 2020; and a low-inflation regime from the 1990s until the COVID-19 crisis.

Panel (b) displays the annual unemployment rate for the same nine countries for the period 1970-2022. There is no clear general pattern across countries. However, it seems that unemployment rates were relatively low but increasing in the 1970s. Then, higher unemployment rates are observed from the 1980s onwards, when unemployment rates frequently rose above 10 percent, whereas unemployment rates below 5 percent were very rare. We do not observe a simple negative relationship between inflation and unemployment rates as predicted by the Phillips curve. On the contrary, except for the inflationary surge in 2021-22 that was accompanied by declining unemployment rates, the broad pattern would suggest a positive correlation between inflation and unemployment rates that contradicts any notion of the traditional Phillips curve. Moreover, we can trace a decline in unemployment rates after the GFC that coincides with very low and flat inflation rates for the period 2010-2019. Yet, some unemployment data are missing, particularly for the 1970s: the series start in 1982 for France; in 1991 for Germany; in 1983 for Italy and the UK, and the 2022 observation is missing for New Zealand and the UK.

Panels (c) and (d) show the behavior of long- and short-term interest rates, respectively. Long-term interest rates refer to interest rates for 10-year government bonds, whereas short-term interest rates refer to three-month interbank rates or comparable three-month instruments. To begin with, both short- and long-term interest rates depict a very similar evolution. Second, there is a clear pattern in both short- and long-term interest rates that mimics with some lag the evolution of CPI inflation. Interest rates were relatively low in the early-1970s and then they increased in the late-1970s, after the oil price shocks and the inflationary surge. Moreover, interest rates very slowly decreased from their peak in the 1980s and it was not until post-GFC years that interest rates reached levels below 5 percent, whereas inflation rates were systematically below 5 percent since the 1990s. Given this similar but lagged evolution of interest rates with respect to inflation, we would expect as well at least two regimes of inflation-adjusted interest rates that can potentially shape rentier income trends: a low-interest regime in the 1970s and after the GFC; and a high-interest regime in the decades in-between (i.e., the 1980s to the 2000s). As to data availability, long-term rates start in 1992 for Italy and in 1989 for Japan. Regarding short-term rates, data begin in 1979 for Italy, in 2003 for Japan, in 1974 for New Zealand, and in 1986 for the UK.

Figure 3.1 Evolution of Select Macroeconomic Variables



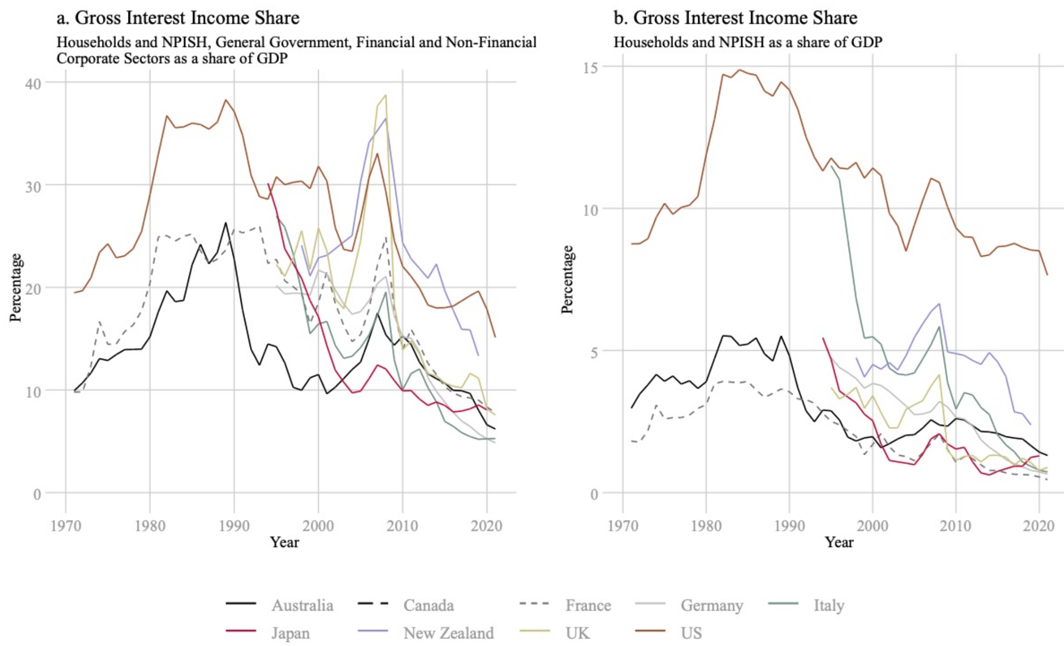
Source: Monthly Monetary and Financial Statistics (MEI), OECD.Stat

Considering the definition by Keynes of the rentier as the person who would be making a living chiefly out of interest income payments, the rentier income share could be specified in various forms if we look at the institutional sectors as defined in the 2008 System of National Accounts (SNA), which is the current methodology at the OECD Statistics (United Nations 2009, Ch. 4). In it, Table 14A specifies four institutional sectors abstracting from the rest of the world sector (ROW), such that we get the following identity as to interest payments/receipts:

$$R_h + R_f + R_c + R_g = P_h + P_f + P_c + P_g \qquad (2)$$

where R stands for interest receipts and P for interest payments from the different institutional sectors according to the subscripts of households (h), financial corporations (f), non-financial corporations (c), and general government (g). Hence, as a first approximation of rentier income share, Figure 3.2 depicts gross interest income as a share of GDP in two different forms. In panel (a), the left-hand side of equation 2 is portrayed for the nine industrialized countries as a share of GDP from 1971 to 2021, although only Australia, Canada and the United States begin in 1971. The gross interest income share for the four institutional sectors shows a significant increase in the 1980s and early 2000s, whereas it stays relatively low in the 1970s and decreases quickly after the GFC. Panel (b) displays the gross interest income share solely for the household sector – formally, the sector is households and non-profit institutions serving households (NPISH), and it shows a similar evolution as panel (a) although at a much lower level, except for the jump in the GFC which is more modest. Nevertheless, broadly speaking, we do observe a significant rise in interest income accompanying the Volcker shocks in the 1980s and then a gradual decline afterwards, as expected once interest rates started to fall along with inflation rates, and then this decline is interrupted as we neared the GFC.

Figure 3.2 Gross Interest Income Shares: 1971-2021



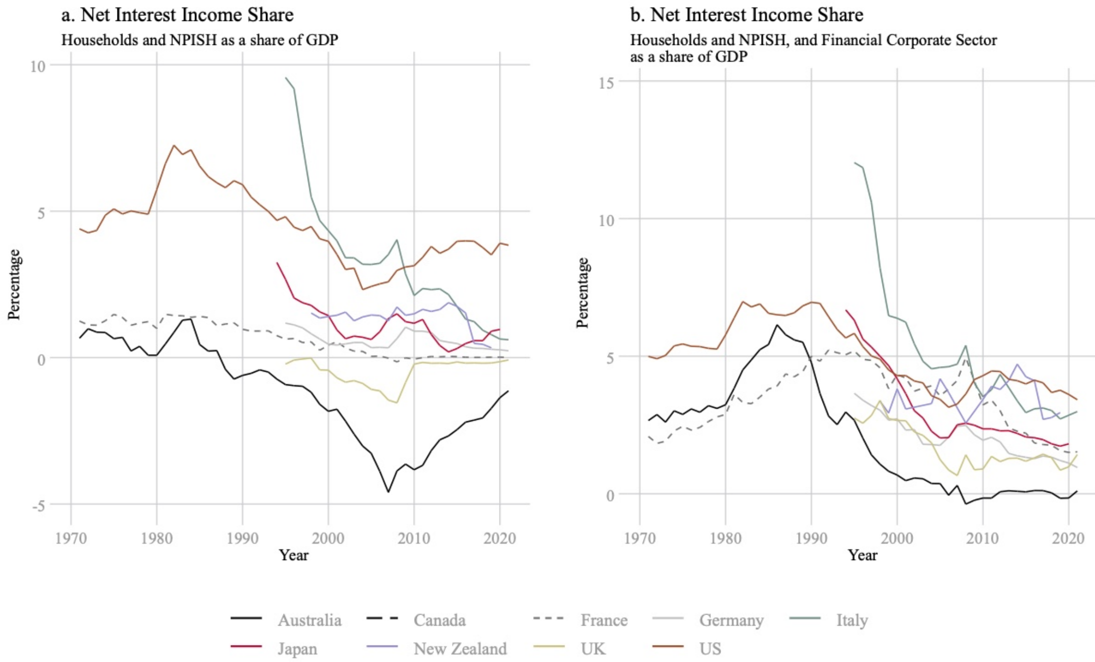
NPISH: Non-Profit Institutions Serving Households
Source: Tables 1 & 14A, System of National Accounts (SNA), OECD.Stat

Equation 2 can also be rearranged to portray net interest income as a share of GDP as in Figure 3.3 below. Panel (a) depicts the net interest income share for households and NPISH from 1971 to 2021 for the nine selected industrialized countries. In general, for the three countries with available data, the evolution of the rentier shares peaks in the 1980s and then starts to fall gradually until the GFC, where it jumps and then stabilizes at a very low level after the crisis. However, panel (a) shows a peculiar behavior for Australia and the United Kingdom, where the interest share turns negative for a significant period. Düenhaupt (2012) found negative net interest shares for households in the United States in the mid-2000s as we find for Australia and the United Kingdom. She argues that it "can readily be attributed as due to the rising (over) indebtedness of private households in the US, i.e., interest payments to the rest of the world." (Düenhaupt 2012, p. 479)

Indeed, equation 2 above is omitting the ROW net interest payments, such that rising indebtedness to foreign financial institutions could be reflected in negative net interest income shares as in Australia and the United Kingdom for the household sector in Figure 3.3 panel (a). Furthermore, side-by-side with this "financial liberalization" process where households are increasingly indebted to foreign financial institutions, there was a dramatic structural change in the incidence of indebtedness too, as households in all countries went from being net lenders to net borrowers throughout this era of growing financialization.[37] That would probably also explain some of the decline in the net interest income share accruing to households vis-à-vis financial corporations as we can observe in panel (b) portraying the evolution of net interest income shares from households and financial corporations together. Panel (b) depicts plainly a net interest share evolution that mimics the behavior of gross interest shares and interest rates, namely, an increase in interest shares that peak in the 1980s and then a steady fall afterwards reaching very low and stable levels after the GFC. However, it is easy to observe that interest income data before the 1990s are only available for a few countries and, although the countries depict common trends in general, there are important differences in levels across them.

[37] Kearns, Major & Norman (2020) study the rise in household indebtedness in Australia going back to the 1980s. They underscore the fact that household indebtedness grew more rapidly compared to other industrialized countries due to a larger contribution of financial liberalization, a higher share of dwellings owned per person (where almost all the housing stock is owned by households, so that housing debt is virtually fully owed by the household sector), higher real incomes, and lower real interest rates. As to the importance and implication of this growing financialization as non-financial corporations were becoming net lenders as economies shifted to a regime of Minskian "money manager capitalism", see Seccareccia (2022).

Figure 3.3 Net Interest Income Shares: 1971-2021



NPISH: Non-Profit Institutions Serving Households
Source: Tables 1 & 14A, System of National Accounts (SNA), OECD.Stat

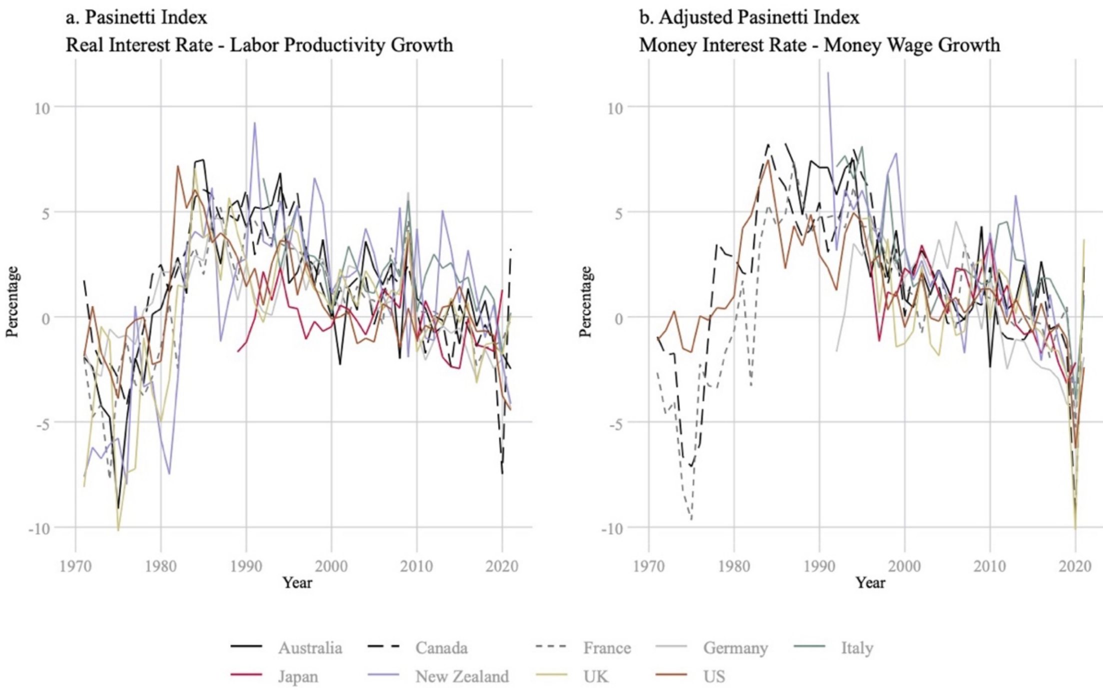
The limited availability of data to calculate rentier income shares might be a compelling reason to look for an alternative measure of rentier income that could be used for longer periods and a greater number of countries. This is one of the reasons why one of us (see Seccareccia (1988) and Lavoie and Seccareccia (1988)) came up with a simple measure that would be later called the Pasinetti Index (PI) since it is inspired by the concept of the "fair", "just" or "natural" rate of interest put forward by Luigi Pasinetti to refer to the interest rate that stabilizes income distribution between rentier and non-rentier income over time. This rate of interest must be equal to the sum of the rate of inflation and the rate of productivity growth. It is meant to be analogous to average real wages growing commensurate with average labor productivity ensuring a stability in the share of labor income vis-à-vis non labor income. Accordingly, the PI is nothing but the gap between the inflation-adjusted interest rate (or the real interest rate) and the rate of growth of average labor productivity. A PI close to zero would mean a roughly constant distribution between the rentier and non-rentier groups in the economy. A steady positive PI implies an income and wealth redistribution towards rentier groups, while a negative PI reveals a redistribution towards non-rentier groups.

Figure 3.4 panel (a) portrays the evolution of the PI for the period 1971-2021 for the same nine industrialized countries. The real interest rates are computed with long-term interest rates adjusted to CPI inflation to be more in line with the original definition of the rentier by Keynes. Also, labor productivity is measured as real GDP per hour worked. We again observe at least two different regimes in the evolution of PI: a low-PI regime of zero or negative PI values prevailing in the 1970s and after the GFC; and a high-PI regime with positive PI values starting in the 1980s and all the way until the GFC. However, we can also distinguish within the high-PI regime a period of very high PI values in the 1980s and 1990s, and a period of still significantly positive but lower PI values in the early 2000s.

As discussed in detail in Lavoie & Seccareccia (2019), we have also looked at the case that is much closer to the original preoccupation by Luigi Pasinetti, which was to ensure that rentier wealth would be preserved over time in terms of labor time, and which tied the real rate of interest to the growth rate of real wages in the economy. Despite some data limitations, panel (b) of Figure 3.4 depicts an adjusted PI that is computed replacing labor productivity with real hourly labor compensation. This adjustment was proposed and discussed in Lavoie and Seccareccia (2019), which attempted to measure the evolution of rentier income and wealth in labor time based on the original concern raised by Pasinetti (1981). Regardless of the series, both PI measures follow a very similar evolution so that we can also distinguish the low- and high-PI regimes. The adjusted PI remains stuck in negative values during the 1970s and after the GFC, and positive and high values during the 1980s and 1990s. Nevertheless, data are more limited for the adjusted PI, starting in 1986 and ending in 2017 for Australia; beginning in Germany and Italy in 1992, in 1996 in Japan (and 2021 is missing), in 1991 in New Zealand, and in 1995 in the UK.

By comparing the PI measures with the interest income shares of previous figures, we can safely say that they follow each other, when data are available. For instance, the Pearson correlation between the gross interest income share in Figure 3.2 panel (a) and the PI is 0.4, which is significant at the 1 percent level; and the correlation with the adjusted PI is 0.37 and significant at 1 percent level as well. In addition, the correlation of the net interest income share in Figure 3.3 panel (a) with the PI and the adjusted PI (Figure 3.4) are 0.36 and 0.4, respectively, which are significant at the 1 percent level too. So far, we could argue that the PI is a relevant proxy for the rentier income share.

Figure 3.4 Pasinetti Indexes: 1971-2021



Source: Key Economic Indicators (KEI) & Productivity and ULC - Annual, OECD.Stat

Overall, based on the stylized facts and rentier income measures, we believe there was a significant income redistribution towards the rentier groups during the 1980s all the way to the GFC. This long-term redistribution process is consistent with the implementation of a staunch 'inflation first' monetary policy that would be contributing to a 'rentier first' redistribution precisely through positive and high real interest rates commencing with the Volcker policies all the way to the 2000s. Conversely, the 1970s decade is characterized by a redistribution towards the non-rentier groups, thereby depicting significant negative PI values and low interest income shares (where data are available). Similarly, the post-GFC era depicts a modest redistribution process towards the non-rentier groups reflected in flat or slightly declining interest income shares, as well as PI values very close to the neutral zero line. In the next section, we look at the theory behind the Taylor rule and the specific mechanism of how it could have impacted income distribution in favor of the rentier class.

Finally, in the real world, we recognize that interest income payments are not the only driver of 'rentiers' in a broader definition as the social group who gets income from all types of financial assets or even real estate property (like in the traditional 18th or 19th Century view of rentiers as landlords from which this French expression, namely owners of landed property receiving *rentes* — a term which slipped into British usage as financial asset owners). It might be argued that the revenues from capital gains are a crucial driver of rentiers. Thus, at least in the short term, rentiers would be interested as well in lowering interest rates and keeping them low to raise asset prices and realize capital gains in the process. If so, what would be the dominant driver of the rentier class: raising interest rates and increasing the flow of interest income payments; or lowering interest rates and further realizing capital gains?

From a theorical perspective, Moore (1989) points out that Keynes's view was that the interest income motive would dominate the capital gains motive because, at least in case of reproducible assets, short-run capital gains would be compensated in the medium and long run by lower income payments in the future in the overall redistribution of income among social classes:

> "Keynes's interest rate redistribution argument overlooked the inverse effects of interest rate variation on wealth and so on income in the form of capital gains. As interest rates fall, the value of capital assets, as determined by the discounted value of their future income stream, necessarily increases, so that capital gains will occur in the process. While Keynes's explicit argument was that in the case of reproducible assets the future income streams would fall proportionately with interest rates, this would not be the case for land." (Moore 1989, p. 29)

Admittedly, although real estate owners collecting rent and financial asset holders are not unconnected nowadays because of the financialized nature, for instance, of the housing market in which investment firms place their funds in holding real estate, and so on, this chapter rather focuses on interest income payments by sticking to Keynes's analytical framework.

More importantly, from an empirical perspective, the recent literature on the effects of monetary policy on income distribution is in line with the argument by Keynes. Firstly, monetary policy is found to have significant effects on income distribution through both the direct changes in interest rate payments and the indirect changes in the level of employment (Kappes 2023). Secondly, the redistribution effects of monetary policy through changes in capital gains seem to be concentrated on within-class redistribution pertaining to the wealthiest households (McKay and Wolf 2023). In other words, changes in capital gains arising from purchases and sales of existing assets in the financial markets affect wealth distribution primarily within the rentier class and not so much between the rentier and the non-rentier income shares.

3.4 The Taylor Rule versus the Wicksell Rule

The Taylor rule reaction function has achieved a high level of acceptance historically in policy and academic circles. In fact, the Taylor rule, the Phillips curve, and the aggregate demand function — dependent on both the autonomous and the interest-elastic components of aggregate spending in relation to the real interest rate — are still all foundational relations upon which established New Keynesian DSGE models are built.[38] But what is precisely the Taylor rule equation that some politicians wish to impose on central banks? As it was depicted in equation 1 above, the generic version is one with the inflation gap and the output gap. In it, when the inflation rate is at the desired/target level and output is at its 'potential' level, the natural real rate ρ is merely the residual real policy rate $(i - \pi)$, such that:

$$i = \rho + \pi \qquad (3)$$

While ρ is an autonomous element totally independent of nominal values in the system, it can be argued that the desired nominal rate set by the central bank would have to be consistent with the value of the inflation target π^* (i.e., the usual 2 percent rate consensus among IT central bankers nowadays). But which 2 percent exactly? For instance, is it the broad CPI inflation or "core" inflation? Is the target a fixed numerical value, a flexible band, or a flexible "average inflation targeting" as, for example, the US Fed has now been pursuing since August 2020? If it is an average, over which period? There are a good number of varieties of IT regimes both existing or hypothetical potential ones which would offer different guidance for the monetary authorities and, more precisely, very different degrees of freedom in interest-rate setting. For instance, Levrero (2023) lists at least six such specifications of the Taylor rule reaction function studied by researchers since the 1990s, which describe a large family of such relations that even include a

[38] We refer to Lavoie (2004) and Setterfield (2004) for comprehensive and rigorous explanations of the New Keynesian three equation model (or the new consensus model) with a focus on the dynamic properties of the various forms of the Taylor rule, including post-Keynesian variants.

variable natural rate, ρ, as perhaps Wicksell himself believed. As we shall see, Wickell (1898) believed the natural rate was not some fixed/constant term derived from some linear regression.

Moreover, over what period does a central bank apply the rule, especially when knowing that inflation and unemployment can only be known monthly while real GDP would be quarterly or annual, depending on the country? A good example is the "Taylor Rule Utility" calculator available at the Atlanta Fed (see: Federal Reserve Bank of Atlanta (2023)) with its autoregressive formula for the so-called Taylor calculation that is somewhat different from the original Taylor formula in Taylor (1993). At the time, he was suggesting calculations of the inflation rates over four-quarters. All these even minor differences can lead to significant changes in real interest policy rates resulting from the application of the basic rule.

At the same time, the output gap is calculated using potential output, which is plagued with both technical and methodological problems. Potential output is historically dependent on past values of real GDP that are themselves the outcome of past macroeconomic policies (see, among others, Fontanari, Palumbo & Salvatori 2019). This is so particularly if the measure of potential output is indirectly derived from some estimate of either the Friedmanite natural rate of unemployment or the NAIRU, which, on a methodological level, the latter themselves can succumb to the same criticism as estimates of potential output. This makes the use of such a supposedly guiding compass in the reaction function highly problematic because these measures of the *ex-post* output gaps are internally generated by research departments at their own respective central banks where questions not only of methodology but also transparency can become critical when observers are monitoring central bank decisions from the outside.

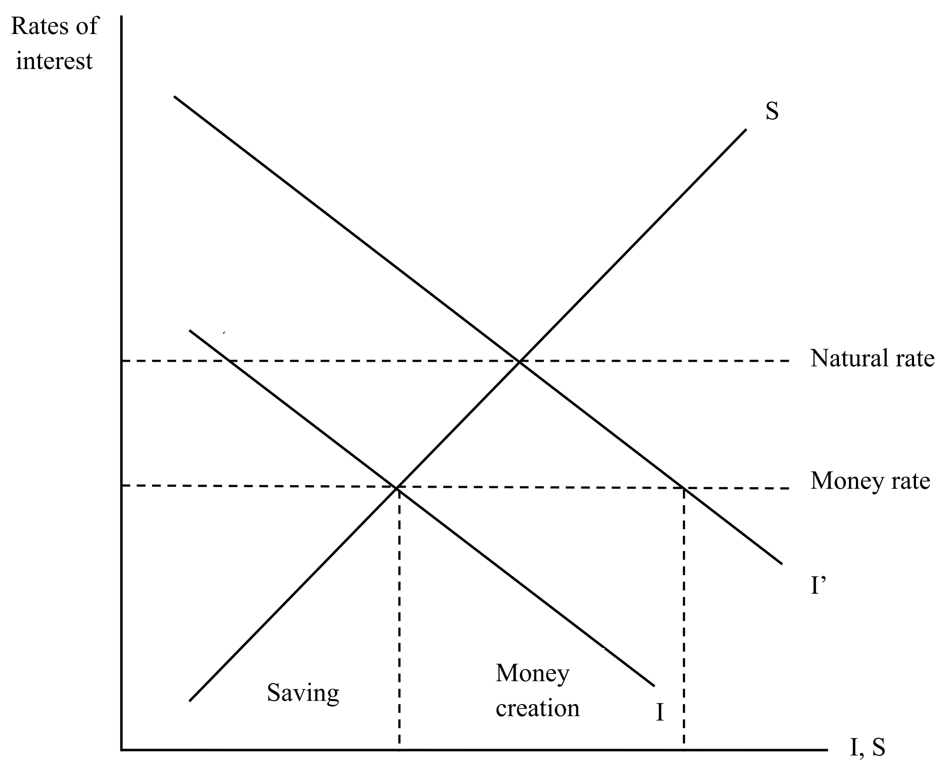
Furthermore, the output gap in the Taylor reaction function is also problematic because it rests on the Phillips curve, which has fallen into disrepute in recent decades to the point that even central bankers such as Janet Yellen and Jerome Powell have recognized it to be highly questionable because the curve has been deemed by many to be essentially flat empirically, at least for the usual relevant ranges of unemployment or output fluctuations as we have argued elsewhere (for a review, see in Seccareccia and Matamoros 2022b). If the Phillips curve is flat or largely unresponsive to the output gap, it can hardly be used as predictor of the future inflation rate within a Taylor rule reaction function. Hence, why should the Phillips curve still be there in the reaction function if the unique focus of central banks is to control inflation under IT regimes?

This important critique brings us to the whole question of the Wicksell rule versus the Taylor rule. As is well known, the Taylor relation is a key pillar of the New Keynesian/Neo-Wicksellian macroeconomics (as, for instance, in Woodford, 2003). As discussed in Seccareccia (1998), at the superficial level, the Wicksell rule differentiates itself from the broad Taylor rule for at least three reasons, thereby making the Taylor relation a lineal descendant of Knut Wicksell's theories from over a century ago. Firstly, Wicksell had made it very clear that what central banks are doing is setting the money rate of interest, i, in relation to price changes within a certain period and not the real rate as in the Taylor rule. The real rate ρ is merely the outcome of the setting of the money rate in relation to the inflation rate, which the central bank can only know *ex post*. Secondly, Wicksell ignored the output gap or, at least, it was implicitly considered that actual output was always tending towards potential output or full employment, thereby excluding the output gap from his reaction function. Thirdly, for Wicksell (1898) it can be said that the achievement of price stability meant that $\pi^* = 0$ and not the usual 2 percent target of central banks nowadays. The money interest rate setting and the exclusion of the output gap in the reaction function are both important differences because they lead to a crucial modification in the stabilization of actual *ex post* real interest rates and thus in the evolution of rentier income over time.

As is well known, Wicksell (1898) was acutely interested in central bank behavior within the context of a "pure credit" economy in which the quantity theory relation could not apply, since the money supply was endogenous, but whose outcome of his analysis would not be in fundamental opposition to the predictive outcome suggested by the quantity relation. To achieve this, he developed a theory of money supply growth and aggregate price formation based on a two-interest rate theory that was not very different from that of his modern disciples (see Woodford 2003). For Wicksell (1898, 1907), there were two broad classes of interest rates in an economy which, through their interaction with aggregate demand via the investment/saving process, impacted on the inflation rate. On one side, we have a set of rates of return emerging in the productive system proper arising *in natura* and determined by the real factors of "productivity and thrift", which, somehow in the aggregate, he defined as the "natural" rate of interest (*rho*), and which ought to be distinguished from the ρ term of the Taylor equation. Indeed, almost like did oracles in ancient times, the natural rate cannot be measured or known except through its manifestation via the movement of prices. On the other hand, there was a group of interest rates determined within the monetary system and regulated by the reaction function of the central bank — which he coined the "money" rate of interest (*i*).

It is the interaction between these two sets of interest rates which, according to Wicksell, explained the dynamics of inflation. Hence, if investment (*I*) is a function of *rho*, while saving (*S*) — and thus consumption *C* — is a function of *i*, any positive/negative gap between *rho* and *i*, would give rise to a positive/negative difference between entrepreneurial investment and desired household saving. This gap is then filled via endogenous monetary creation/destruction which, at a fixed potential output level, would be inflationary/deflationary.

Figure 3.5 Wicksellian Investment-Saving Relation



To understand the mechanism described in Figure 3.5, let us begin at an initial equilibrium point where prices are stable given by the intersection between *I* and *S*, where *rho* = *i*. Now suppose that there is an exogenous technical change which pushes the natural rate, *rho*, upward and, with it, investment in relation to saving so that *rho* > *i* and *I'* > *S* as in Figure 3.5. Unless the central bank raises *i*, the net money creation between *I'* and *S* will ultimately bring about an increase in prices.

This inflation will continue if the gap between *rho* and *i* persists, which is caused by unpredictable fluctuations in the natural rate.

To prevent price level instability, the central bank-determined money rate must continually be chasing the natural rate so that the gap between the two rates is eliminated — as, for instance, at the new higher intersection point between *I'* and *S* in Figure 3.5. Periods of inflationary/deflationary tendencies arise merely from the failure of central banks to act quickly in closing the gap between the two rates. It is the stickiness of the money rate due to the relative inertia in the actions of the monetary authorities that is the *causa causans* behind price level fluctuations. Because of the erratic behavior of the natural rate, would this mean that research departments in central banks would have to pool all their resources to monitor the fluctuations in *rho*, as many central banks are doing nowadays? Wicksell (1898) himself did not think that it would be necessary or even possible to monitor the movement of the natural rate. All that was needed was to observe the movement of the price level. As he points out:

> "This does not mean that the banks ought actually to ascertain the natural rate before fixing their own rates of interest. That would, of course, be impracticable, and would also be quite unnecessary. For the current level of commodity prices provides a reliable test of the agreement or diversion of the two rates. The procedure should rather be simply as follows: *So long as prices remain unaltered the banks' rate of interest is to remain unaltered. If prices rise, the rate of interest is to be raised; and if prices fall, the rate of interest is to be lowered; and the rate of interest is henceforth to be maintained at its new level until a further movement of prices calls for a further change in one direction or the other.*" (Emphasis in original; Wicksell 1898, p. 189).

While there may be some debate as to the precise bank reaction function to which Wicksell was subscribing, it has been argued elsewhere (see Seccareccia 1998, p. 186) that it could take the form of what we can describe as a nominal variant of the broad Taylor rule:

$$i = c + \alpha'(\pi - \pi^*) + \beta'(q - q^*) \qquad (4)$$

where *c* is a constant term not to be confused with the unknown natural rate *rho* in Wicksell. Instead, α' and β' are coefficients as previously discussed vis-à-vis the Taylor equation. However, since Wicksell had assumed that the target of monetary policy ought to be price stability, such that

$\pi^* = 0$, and since he had assumed a fully-employed economy with actual output being at its potential level ($q = q^*$), then the equation above is reduced to a much simpler reaction function:

$$i = c + \alpha'(\pi) \tag{5}$$

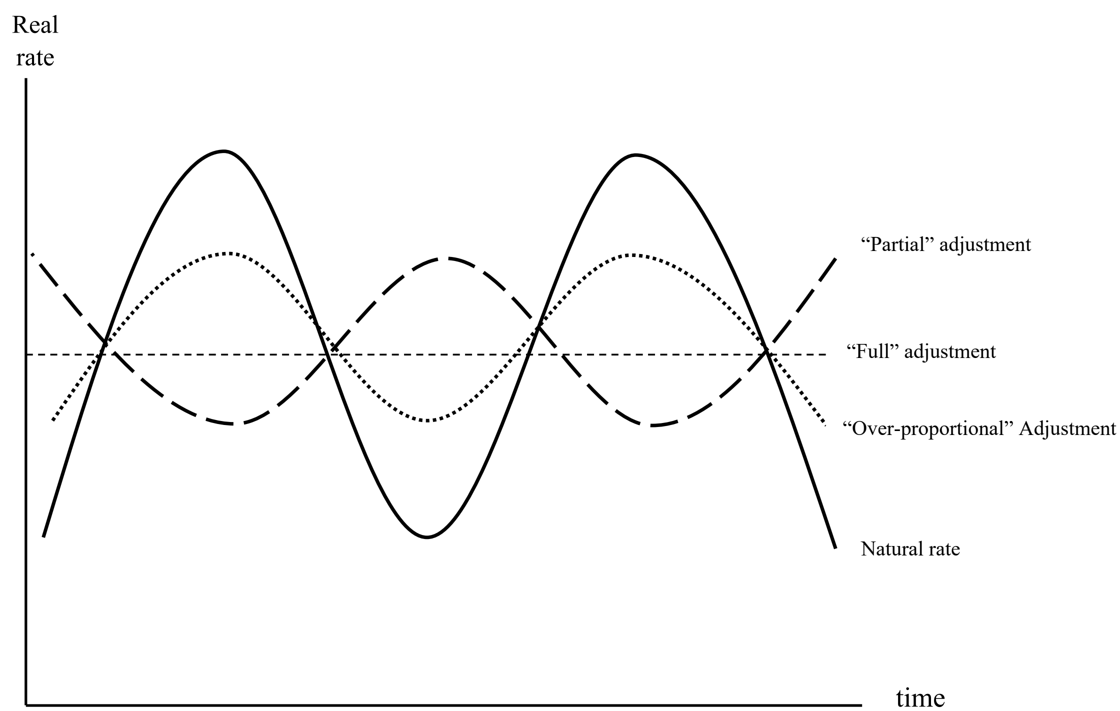
the properties of this Wicksellian reaction function are of some interest. When $\alpha' = 1$, this reaction function resembles a hybrid Fisher equation. However, unlike the Fisherian explanation, a stable real rate "*c*" is not the result of market forces compatible with inflation and output being at their steady-state desired levels (as we can perhaps interpret the constant real term ρ in the Taylor rule (equation 1) but rather it is merely the outcome of the policy decision of the central bank in seeking to stabilize the price level by raising the money rate in proportion to inflation, thereby stabilizing the benchmark real rate.

The value of α' could be greater or less than unity. Wicksell himself felt that the sluggishness in the behavior of the monetary authorities in adjusting the money rate to the inflation rate would suggest $\alpha' < 1$. The values of α' being greater or less than unity would merely indicate either an overzealous or a less committed central bank in combating inflation. It is important to notice, however, that the "natural rate" variable, *rho*, does not appear anywhere in the reaction function. Since Wicksell assumed that *rho* cannot itself be monitored, then what the central bank does in responding to changes in prices is presumably to bring the money rate closer to this unobservable natural rate. It could only know that *i* is getting closer to *rho ex post* because it sees the rate of inflation/deflation slowing down and that *rho* = *i* when the rate of inflation/deflation has come to a halt. As Wicksell (1898) had argued, it could only know that *rho* = *i* from logical inference, that is, by monitoring the time path of inflation. Hence, while postulating the existence of a natural rate, the latter plays no direct role in the central bank setting of interest rate other than to assume that, when the rate of inflation, π, is zero, the money rate must be equal to the unknown natural rate.

Already in the 1930s, there had been numerous critiques of the natural rate for having a weak or doubtful empirical basis. As discussed elsewhere (Seccareccia 1998, pp. 185-86), critics such as Williams (1931), Sraffa (1932), Myrdal (1939) and even Hayek (1941) questioned both the theoretical and empirical validity of such an elusive will-o'-the-wisp concept because of the circular reasoning but also because, as post-Keynesian writers were to show subsequently, the whole notion of the "natural rate" succumbs to the Cambridge critique of capital (see Rogers 1989, pp. 27-38; and Levrero 2021, pp. 19-20). Despite the long series of criticism that have been voiced historically, this concept has resurfaced in full force in the contemporary neo-Wicksellian literature on central banking, and the empirical implications of the above-mentioned Wicksellian reaction function are of some interest.

From the simple reaction function, we could infer that $(i - \alpha'\pi) = c$. With $\alpha' = 1$ (representing an instantaneous and equi-proportional adjustment of the money rate i to the rate of inflation π), fluctuations in the natural rate *rho* will be reflected in a complete *ex post* stability of the real rate, with $i - \pi$ equal to the constant c. On the other hand, with partial adjustment ($\alpha' < 1$) the real rate will be gravitating counter-cyclically around the value of c at the same time as the natural rate will be fluctuating because of, say, shocks to productivity growth. Such hypothetical time paths are depicted in Figure 3.6 below for partial adjustment ($\alpha' < 1$), proportional or "full" adjustment ($\alpha' = 1$), and "over-proportional" adjustment ($\alpha' > 1$) of i to π.

Figure 3.6 Ex Post Real Rate of Interest under the Wicksell Rule



Given the slow adjustment of the money rate (i) to changes in prices, Wicksell himself felt that the normal state was one where partial adjustment was the norm, thereby generating a negative (or countercyclical) statistical relation between real rates and the rate of inflation. However, even with partial adjustment of the money rate to changes in prices, the effect would still be to mitigate fluctuations in the real rate, when compared to some alternative monetary policy of, say, merely pegging the money rate. In the latter scenario, the *ex post* real rate would fluctuate more dramatically and in reverse proportion to the rate of inflation, as had occurred during the early post-World War II years.

The original Wicksellian monetary policy regime just described is merely one among an array of different monetary policy regimes that one can find historically. The most celebrated, of course, is the Taylor rule response mechanism, which closely resembles the Wicksellian reaction function, but with one important difference. As we had depicted the generic form of the Taylor reaction function in equation 1 above, there is the obvious recognition that the economy may not be at its potential output (and, therefore, that the central bank ought to take into consideration the output gap (q - q*) (or the unemployment gap, u*- u) not to act directly on the latter but to react pre-emptively to future inflation on the basis of the present gap. The Taylor-type reaction function postulates that the central bank should target a real rate of interest, whose effect would then be to impact on interest-sensitive aggregate real expenditures in the New Keynesian aggregate demand function. Abstracting from changes in the output gap, it is quite clear in this case that, whenever π is inching upwards in relation to π*, the central bank ought to react to the excessive inflation by raising the real rate, which would be compatible with the "over-proportional" adjustment of the Wicksellian framework.

Hence, unlike the previous Wicksellian hypothesis that, depending on the value of *rho*, the real rate of interest could be constant or could move counter-cyclically or pro-cyclically, in implementing the Taylor reaction function the central bank must raise the real rate, i - π, whenever $\pi > \pi$*. As stated above, this would entail a uniquely pro-cyclical movement of the *ex post* real rate of interest — unless offset by a sharp rise in the output gap (q - q*). This has clear empirical consequences that can easily be verified by simply analyzing if inflation and real rates are positively or negatively correlated in an economy in which the central bank is targeting inflation.

Before discussing the empirical ramifications of these distinct central bank reaction functions and the possible inferences on the evolution of rentier income, let us better distinguish between *rho* in Wicksell and ρ in the Taylor rule equation. Can ρ be equivalent to *rho* in the Wicksellian system?

For Wicksell, the natural rate is both unobservable and has a value which, by its very nature, is related to long-term factors pertaining to "productivity and thrift", that is, to technical change and intertemporal consumption/saving decisions. On the other hand, it cannot be a mere econometric outcome of the evolution of real rates over some given time horizon historically as originally interpreted (Taylor 1993) when the output gap is zero and inflation is on target, because such estimated constant term ρ can itself be an outcome of past monetary policy of which it is supposed to be independent. Because of this conceptual conundrum, researchers within this Taylor-type paradigm have tried all sorts of procedures especially in obtaining a time varying ρ based on the presumed determinants of the natural rate. This research has taken different forms (for an extensive review see, for example, Giammarioli and Valla (2004), and Laubach and Williams (2015), but also Lavoie and Seccareccia (2019) and Levrero (2021)). In fact, almost a mini-industry has developed to estimate the natural rate, where numerous research departments within central banks internationally now continually grind out estimates of these so-called "neutral" rates of interest that would be compatible with zero inflation gaps and zero output gaps.

Regardless of the existence of this elusive driver of either ρ or *rho* behind central bank decisions to set interest rates, the question that we would like to address is: what has been the actual evolution of these *ex post* real rates during this whole era since the 1970s and 1980s when this 'inflation first' policy perspective took hold and when central banks began to use either implicitly or explicitly the interest rate lever to combat inflation and stabilize the inflation rate at a desired level? Which pattern of behavior do they follow? Is it a Wicksell rule, or a Taylor rule and which of these behaviors are best compatible with the stylized facts on rentier income that were previously presented? This will be the focus of the following section.

3.5 Evidence on Monetary Policy Rules

a. Reaction Function Specifications

This section provides estimates of the parameters of the central bank's reaction function of a group of industrialized countries to assess the interest rate policy in relation to its potential effect on income distribution and the rentier income share. Ultimately, the estimation of the reaction function would depend on the assumptions on the relationship between the variables of interest. Specifically, although the validity of the estimates depends on the econometric technique and the data utilized, the regression specification depends on the variables assumed either endogenous or exogenous in the reaction function, which is based on the macroeconomic theory adopted. Traditionally, estimations of the reaction function are framed within the New Keynesian framework, whose benchmark three-equation New Keynesian model is composed of the dynamic IS curve, the Phillips curve, and the Taylor rule (see Carvalho et al. 2021; Seccareccia and Matamoros 2023a). In the basic New Keynesian model, the Taylor rule adopts the form:

$$i_t = \rho_t + \pi_t + \alpha(\pi_t - \pi_t^*) + \beta(q_t - q_t^*) + v_t \qquad (6)$$

which is analogous to equation (1) above, but it includes an innovation (v_t) accounting for monetary policy shocks that are assumed exogenous, that is, these shocks are independent of changes in current and past values of inflation and output, provided they are short-lived. In other words, monetary policy shocks directly affect the money interest rate through unexpected changes in money demand that the central bank is only able to accommodate with a lag. Presumably, the temporal imbalances of money supply and money demand would affect the money interest rate independently of interest rate policy. Clarida et al. (1998, p. 1039) explain it as follows:

> "The specification also includes an exogenous random shock to the interest rate, v_t. Importantly, we assume that v_t is i.i.d. Several interpretations are possible. First, v_t could reflect a pure random component to policy, of the type stressed in the recent identified VAR literature on monetary policy. Second, it could arise because the central bank imperfectly forecasts idiosyncratic reserve demand and, for some reason, does not instantly supply reserves to offset the shock. Under this scenario, the interest rate jumps in response to unexpected movements in reserve demand that are orthogonal to movements in inflation and output."

In the New Keynesian framework, changes in the money interest rate are partly exogenous (because of the direct impact of monetary policy shocks) and partly endogenous (determined by central bank's response to inflation and output deviations). The fact that monetary policy shocks are always assumed nominal shocks, in the sense that they directly impact the money interest rate, and not the 'natural' interest rate contained in the dynamic IS equation (which is only affected by ‘real’ factors), implies that the central bank is effectively targeting the real interest rate (Taylor 1999). In other words, New Keynesians are primarily concerned about the value of the natural interest rate because, according to them, it is the rate that guarantees price and output stability over time. It is considered the long-term anchor for monetary policy, as has been argued in the April 2023 IMF World Economic Outlook, where a whole chapter (Ch. 2) is dedicated to the natural interest rate:

> “Macroeconomists call this reference interest rate the “real natural rate of interest.” The “natural” part means that this is the real interest rate that is neither stimulatory nor contractionary and is consistent with output at potential and stable inflation. Lowering the real rate below the natural rate is akin to stepping on the macroeconomic accelerator; raising it above is like hitting the brake. The natural rate is usually thought of as independent of monetary policy and instead driven by real phenomena such as, for instance, technological progress, demographics, inequality, or preference shifts for safe and liquid assets.” (IMF 2023, pp. 45-46)

Furthermore, within the New Keynesian framework, the Taylor principle postulates that the slope coefficient of inflation should be greater than one ($1 + \alpha > 1$) to maintain a stable inflation path. Otherwise, if $\alpha < 0$, “the real interest rate would fall rather than rise when inflation rose. As a result, inflation could be highly volatile” (Taylor 1999, p. 326), since the central bank is persistently allowing the real rate of interest to fall as inflation goes up and this reinforces higher inflation expectations that are materialized. The Taylor principle, as Asso et al. (2007, p. 22) claim, is a key part of an ‘inflation first’ monetary policy:

> “[…] the “Taylor Principle” embedded in Taylor’s Rule requires that the real federal funds rate be increased when inflation is above the inflation objective. In other words, the nominal funds rate should rise more than one-for-one with an increase in inflation above objective. This principle is also intuitive as a device for ensuring inflation remains anchored over time at its objective.
>
> The Taylor Rule appeared to satisfy the dual mandate. However, the Taylor Principle emerges by reorganizing Taylor’s equation; and interpreting y as a harbinger of future inflationary pressures leads to single mandate inflation targeting.”

In contrast, the Wicksell rule takes a very different approach to monetary policy shocks that we think is more meaningful compared to the Taylor rule. First, it is based on an endogenous demand-led money framework in which the central bank can set the base money interest rate and money supply adjusts automatically to money demand. Second, shocks do not affect the nominal interest rate; they are rather real shocks that impact directly the unobservable 'natural' interest rate. In other words, shocks do not impact the money interest rate exogenously as in the Taylor rule, they only impact the money rate endogenously through changes in the inflation and output gaps within the central bank's reaction function. In short, the Wicksell rule assumes that there cannot be exogenous changes in money rates that are unintended by the central bank. In this sense the Wicksell rule is a nominal interest rate rule that does not try to stabilize the real interest rate but instead reacts to changes in the policy variables to stabilize the inflation rate. Conversely, the Taylor rule might be considered a real interest rate rule that tries to accommodate monetary policy shocks as best as possible to maintain a stable real interest rate. As such, the Wicksell rule is specified as equation (4) above, in which there is no innovation term (v_t) at all.

The differences in specification of the Taylor and Wicksell rules as to being nominal or real rate rules and the treatment of the shocks have important implications for the estimation of the reaction function. On the one hand, a Taylor rule specification must account for the endogeneity of the policy variables in the reaction function, or else the response parameters estimators, $\hat{\alpha}$ and $\hat{\beta}$, would be potentially biased. In particular, the direction of the bias of $\hat{\alpha}$ would depend on whether the Taylor principle holds (i.e., if $\alpha > 0$). As explained by Carvalho et al. (2021), assuming the Taylor principle holds, an OLS estimation would potentially yield a negative bias in $\hat{\alpha}$ (meaning $\hat{\alpha} < \alpha$) because the monetary policy shock always impacts the money interest rate in opposite direction to the endogenous policy response in the Taylor rule (equation 6). For instance, a negative shock on v_t (e.g., caused by a sudden increase in money demand) decreases i_t directly and raises π_t such that it induces the central bank to raise i_t as a policy response to higher inflation. Thus, an OLS estimation of $\hat{\alpha}$ would potentially portray the central bank less reactive to changes in inflation because it fails to disentangle the monetary policy shock from the endogenous policy response.

Nevertheless, Carvalho et al. (2021) argue that if shocks explain only a small fraction of the variance of the endogenous response variables, such as the inflation rate and output (or employment), then the OLS estimation bias would be "economically irrelevant". In other words, if the correlation between the error term and the regressors is small, the OLS bias would be also small, such that OLS estimation and instrumental variables (IV) estimation would produce very similar estimators. In fact, Carvalho et al. (2021) provide ample evidence through both simulations and regressions pointing that the OLS bias is indeed small and of little practical importance. As a matter of fact, initially John Taylor (1999) estimated the reaction function of the US Fed for different historical periods using OLS and he obtained results that are very similar to subsequent estimations utilizing other methods (see Woodford 2003, p. 41).

In contrast, the estimation of the Wicksell rule by OLS would be unbiased because, in principle, there is no potential source of bias. The error term is assumed independent to the regressors, such that monetary policy shocks only impact the money interest rate through the endogenous response variables. An OLS estimation would suffice to provide reliable estimates of the policy parameters in the reaction function. Importantly, adopting an endogenous and demand-led money framework, as we do here, would lead to unbiased OLS estimates, then it would not be necessary to use IV or other method to disentangle endogenous from exogenous impacts on money interest rates. Nevertheless, we decided to display IV estimates as well to address potential concerns coming from economists adopting a New Keynesian money framework.

In what follows we estimate the Taylor and Wicksell rules by both OLS and IV to compare the different estimates for the average reaction function of 9 industrialized countries for the period 1973-2022 both in quarterly and annual data.[39] The objective is shedding light on the reaction function that central banks in major industrialized countries have been pursuing i.e., whether central banks have been following a real interest rate rule along the Taylor framework or a nominal interest rate rule of the Wicksell type. We also compute the reaction function of the post-GFC period, 2008-2022, to account for a potential regime shift in monetary policy after the crisis.

b. POLS and IV regressions

---

[39] Alternatively, the Hausman test could be carried out to shed light on which would be the most accurate method to estimate the central bank's reaction function. However, in this case it might not be very useful because we would be comparing our POLS estimates to our IV estimates assuming that our instruments are valid, which might not be the case if sticking to post-Keyensian economics that postulates that there are no exogenous monetary shocks affecting the nominal interest rate, such that money supply is endogenous and demand-led and the interest rate is always administered by the monetary authority.

We stick to Carvalho et al. (2021) in defining a contemporaneous specification for the reaction function of the central bank, except that we replace the output gap with the unemployment rate for two reasons: first, because of the difficulty of obtaining output gap data for long historical periods going back to the 1970s for the nine countries in our sample; and, second, considering the caveats pertaining to the utilization of a measure of potential output that we raised above. [40] That said, our specification for a quarterly frequency regression is as follows:

$$i_t = c + \hat{\rho}_1 i_{t-1} + \hat{\rho}_2 i_{t-2} + \hat{\alpha}\pi_t + \hat{\beta}u_t + \varepsilon_t \qquad (7)$$

in which i is the short-term nominal interest rate, π is the CPI inflation rate, u is the unemployment rate, and the inflation and unemployment response parameters are computed as: $\alpha = \frac{\hat{\alpha}}{1-\rho}$ and $\beta = \frac{\hat{\beta}}{1-\rho}$, respectively, where $\rho = \hat{\rho}_1 + \hat{\rho}_2$. Again, we estimate equation 7 with two different models, a POLS and an IV (estimated through GMM) for the nine industrialized countries for the quarterly data period 1973q1-2022q4, since reaction functions are usually estimated in quarterly frequency (see Woodford 2003). For the Wicksell rule estimation, we estimate equation 7, which has the nominal interest rate as the dependent variable, whereas we just replace i for the real interest rate — the short-term nominal interest rate adjusted with CPI inflation — for the Taylor rule estimation. As usual in an IV approach, we use as instruments four lags of inflation, unemployment rate, the gap between the long-term and the short-term interest rates, the energy CPI component, and lags three and four of the short-term nominal interest rate for the Wicksell rule estimation and the real interest rate (adjusted with CPI inflation) for the Taylor rule estimation.[41]

Results for the Wicksell and Taylor rules' estimations are depicted in Table 3.1 for two periods: 1973q1-2022q4. The period starting in 1973q1 until 2022q4 covers since the first oil price shock until the recent 2021-22 inflationary surge. Although we must clarify that data for the complete 9

[40] Not to mention the problem of calculating an ex-post potential output measure to obtain an output gap, which would likely differ from the ex-ante output gap that central bankers could have obtained to conduct interest rate policy. Notably, using the unemployment rate does not suffer from this and other problems.

[41] We included the energy CPI component as a proxy for a country-specific commodity price index, which is the one used in single-country estimations. A measure of money growth is also sometimes included as instrument, such as M2 or M3, but here we omit it due to the lack of data of such measure for France, Germany, and Italy for the whole period.

industrialized countries is only available starting in the 1980s, since Japan data start in 2002q3, France in 1983q1, New Zealand in 1986q1 (while Japan data end in 2021q2). The second period covers series since the GFC because we are trying to shed light on a possible reweighting in the reaction function of central banks following the 2008 crisis that could have implied tilting the weights more on the unemployment variable and less on the inflation variable.

Columns 1 and 2 of Table 3.1 display results for the Wicksell rule regressions for the two mentioned periods. By observing column 1, the inflation response parameter (α) is significantly greater than unity for the period 1973q1-2022q4 in both POLS and IV estimations, suggesting that central banks have been adjusting money interest rates over-proportionally to changes in the inflation rate, on average. This over-proportional adjustment, to use Wicksell's terminology (meaning that the Taylor principle holds), is comparable to other findings for single-country estimations (see, for instance, Carvalho et al. 2021; Clarida et al. 1998; Woodford 2003). However, the size of the POLS downward bias in Table 3.1 is significantly larger than in Carvalho et al. (2021), implying that the estimation method could lead to substantially different central bank behavior. On the other hand, the unemployment rate response parameter (β) is not significant for both POLS and IV in this period, pointing out that interest rate policy has not reacted as much to changes in the unemployment rate on average. This is consistent with the Wicksell rule formulation that monetary policy should focus solely on movements in the inflation rate and responding accordingly, although it is also in line with Taylor's view that the output gap only matters so long as it provides a guidance for future inflation.

Table 3.1 POLS and IV Regressions

Estimates of Central Banks' Reaction Function: 9 Countries

	Wicksell rule (money interest rate)		Taylor rule (real interest rate)	
Periods	1973q1-2022q4	2008q1-2022q4	1973q1-2022q4	2008q1-2022q4
	(1)	(2)	(3)	(4)
		POLS estimates		
α	1.2 ***	0.75 ***	-0.15	-1.02 ***
	(0.261)	(0.149)	(0.436)	(0.188)
β	-0.16	-0.12 ***	0.35	-0.15 **
	(0.148)	(0.049)	(0.254)	(0.066)
ρ	0.94 ***	0.9 ***	0.95 ***	0.85 ***
	(0.009)	(.015)	(0.011)	(0.021)
N	1,417	534	1,417	534
R^2	0.97	0.96	0.9	0.9
		IV estimates		
α	1.54 ***	1.3 ***	1.6 ***	1.78
	(0.324)	(0.293)	(0.536)	(2.178)
β	-0.06	-0.08 *	0.02	0.1
	(0.161)	(0.051)	(0.218)	(0.361)
ρ	0.95 ***	0.94 ***	0.95 ***	0.96 ***
	(0.008)	(0.011)	(0.011)	(0.024)
N	1,363	534	1,363	534
R^2	0.96	0.96	0.89	0.87

Note: The table reports estimates of equation 7 by POLS and IV. The set of instruments includes four lags of CPI inflation, unemployment rate, the gap between long- and short-term interest rates, energy CPI inflation, and lags three and four of short-term nominal interest rates for the Wicksell rule or real short-term interest rates for the Taylor rule. Statistical significance at the 90/95/99 % confidence level indicated with */**/***, respectively. Robust standard errors are reported in parenthesis.

Column 2 suggests a reweighting of the inflation and unemployment response coefficients for the period 2008q1-2022q4. Not only the α value is significantly lower for both the POLS and the IV estimates, but also the β value is now negative and significant, implying that increases in the unemployment rate are associated with reductions in the money interest rate. Therefore, following the GFC, central banks have reduced their response to changes in the inflation rate while significantly increased their response to changes in the unemployment rate. This is compatible with the argument that, due to the fears of deflation and secular stagnation after the GFC, central banks in major industrialized countries have adopted a more Keynesian interest rate policy that was officialised in the adoption of flexible IT regimes.

Columns 3 and 4 show estimates of the Taylor reaction function i.e., where the real short-term interest rate is the dependent variable, for the same two periods. Column 3 displays mixed results since the α value is greater than unity and significant for the IV estimation, whereas it is not significant in POLS estimates. Thus, these results are, to some extent, consistent with central banks adjusting over-proportionally the money interest rate to keep or increase the real interest rate in the presence of changes in the inflation rate. The β is again not statistically significant for this longer period. Column 4, however, shows that α and β are negative and significant in the POLS estimation for the post-GFC period, in line with a significant recalibration of the reaction function. This points a regime shift towards a partial adjustment of interest rates to changes in the inflation rate and a greater importance of changes in the unemployment rate. Nevertheless, the IV estimates do not corroborate the POLS findings and instead portray no significant coefficients of α and β during this period.

Overall, we think that the Wicksell and Taylor rules estimations do not contradict each other in the sense that they both show what seems to be an over-compensating behavior of interest rate policy towards changes in the inflation rate, on average, during the whole period of 1973q1-2022q4, also implying that the Taylor principle holds for the entire period. On the other hand, there is evidence as well pointing to a significant regime change in central bank behavior after the GFC, thus suggesting a reweighting of the policy parameters towards a more Keynesian reaction function that tries to balance for both changes in the inflation and the unemployment rates together. This recalibration in the policy response parameters, however, did not mean that central banks changed to a partial-adjustment or that they consistently violated the Taylor principle. It just implied less over-compensation in interest rate policy and a greater concern over changes in the unemployment rate. Therefore, our findings would be averse to the claims of some influential economists — such as Bordo and Levy (2023), and Carstens (2023) — arguing that a policy of "too low for too long" interest rates and a presumed systematic violation of the Taylor principle prevailing in the several years prior to the 2021-2022 inflation surge, are part of the structural causes of high and sustained inflation and financial instability in the post-pandemic world.[42]

Finally, the reader would probably notice that the IV regressions for the 1973q1-2022q4 period display less observations compared to the POLS regressions. The reason is that some instruments are missing observations at the beginning of the period for some countries (that is also why for the second period N is equal in POLS and IV regressions). Also, regarding interest rates, data were extracted from the Monthly Monetary and Financial Statistics (MEI), unemployment rates were pulled out from the Key Economic Indicators (KEI) database, where unemployment rates are harmonized to be comparable among countries, and the series of consumer price index (CPI) were extracted from KEI database as well, that is, all data were found in the OECD Statistics website. As a sort of robustness check to assess our findings in Table 3.1, we present the same regressions in Table 3.2 but using annual data that, in principle, would filter very short-term variations and reduce potential noise in the estimations.

Table 3.2 presents annual data for the 9 industrialized countries for the two different periods. Since we use annual data, the estimation of equation (7) only includes one lag of the interest rate as regressor, and the IV estimation includes only two lags of the instrument set (and lag two of interest rates). The results are, in general, consistent with the findings using quarterly data. On the one hand, Wicksell rule estimates for the period 1973-2022 display an α greater than unity for both POLS and IV regressions (column 1), whereas β is not statistically significant. This points to a central bank behavior that, on average, follows an 'inflation first' strategy aligned with an over-proportional adjustment of interest rate changes for the whole period of study. On the other hand, for the post-GFC period (column 2), the Wicksell rule estimates suggest a significant behavior change by central banks, where the inflation response parameter is less important in the reaction function, and, at the same time, the unemployment rate response parameter takes some relevance

[42] Additionally, it can be argued why the three countries in our sample that are part of the Eurozone since 1999 —France, Germany, and Italy— are treated separately (and not as, say, a Eurozone aggregate), given that they share a single currency, and the ECB determines the benchmark interest rate for all these countries together? Although we consider this question legitimate, we think that this fact does not change the results significantly, not to mention that each Eurozone country has its own rate of inflation and unemployment rate. In fact, we re-estimated Table 3.1 but dropping these three countries and overall results are not statistically different, such that our findings are unaffected.

in the POLS regression, suggesting that increases in the unemployment rate are associated with a reduction in the money interest rate.

As to the Taylor rule estimation for the period 1973-2022 (column 3), the POLS regression depicts no significant policy parameters, α and β, while the IV regression points that the inflation response parameter is significant and greater than unity, which coincides with Table 3. This time, however, the β parameter is positive and significant at 90 percent level in the IV regression, which is puzzling and different from the findings in Table 3.1. One possible reason is that, since the data is annual, it might be the case that there is a reflection problem and higher real interest rates were generating higher unemployment rates, although it is revealing that this issue is not displayed in the POLS regression. Furthermore, for the post-GFC period (2008-2022), column 4 suggests a change as well in central bank behavior, on average, for the POLS and IV regressions, whereby increases in the inflation rate are associated with significant reductions in real interest rates. In other words, during this 2008-2022 period, central banks displayed what Wicksell described as partial adjustment in interest rates, implying money interest rates failing to catch up with increases in inflation that were reflected in declining real rates.

Table 3.2 POLS and IV Regressions

Estimates of central banks' reaction function: 9 countries

	Wicksell rule (nominal interest rate)		Taylor rule (real interest rate)	
Periods	1973-2022	2008-2022	1973-2022	2008-2022
	(1)	(2)	(3)	(4)
		POLS estimates		
α	1.37 ***	0.69 ***	0.05	-1.88 ***
	(0.539)	(0.182)	(0.362)	(0.407)
β	-0.19	-0.2 ***	0.27	-0.16
	(0.162)	(0.064)	(0.366)	(0.103)
ρ	0.78 ***	0.66 ***	0.9 ***	0.69
	(0.026)	(.067)	(0.039)	(0.061)
N	361	131	361	131
R^2	0.9	0.77	0.74	0.76
		IV estimates		
α	1.52 ***	0.018	1.55 ***	-1.03 ***
	(0.278)	(0.35)	(0.539)	(0.267)
β	-0.1	-0.09	0.56 *	0.01
	(0.231)	(0.074)	(0.31)	(0.111)
ρ	0.84 ***	0.74 ***	0.86 ***	0.68 ***
	(0.034)	(0.06)	(0.038)	(0.058)
N	341	131	341	131
R^2	0.89	0.7	0.68	0.71

Note: The table reports estimates of equation 7 by OLS and IV. The set of instruments includes two lags of CPI inflation, unemployment rate, the gap between long- and short-term interest rates, energy CPI inflation, and lag two of short-term nominal interest rates for the Wicksell rule or real short-term interest rates for the Taylor rule. Statistical significance at the 90/95/99 % confidence level indicated with */**/***, respectively. Robust standard errors are reported in parenthesis.

Broadly speaking, Tables 3.1 and 3.2 are consistent in the results both across periods and regression methods. On the one hand, both POLS and IV estimates suggest that during the whole period of 1973-2022, on average, the over-adjustment of interest rate policy seems to prevail, in which the inflation response coefficient α has been greater than unity (also achieving the Taylor principle of $1 < \alpha$). At the same time, the non-significant β reflects that concerns about the unemployment rate do not appear relevant in the reaction function of central banks in this period. Both features in the estimated reaction function suggest the dominance of an 'inflation first' strategy during this five-decades period on average. On the other hand, there is also some evidence that central banks, so to speak, tilted the weights of their policy response parameters to give less importance to changes in the inflation rate and greater importance to changes in the unemployment rate after the GFC. Nevertheless, only in some cases, this reweighting implied a complete switch from over-proportional to partial adjustment in interest rate policy (i.e., a $\alpha < 1$) and a negative and significant β. Instead, the post-GFC recalibration in the response policy parameters suggests a step towards a more balanced approach in treating changes in the inflation and unemployment rates in line with a more Keynesian dual mandate approach that assumes inflation and unemployment policy parameters as independent.

Conversely, a New Keynesian perspective would interpret the post-GFC reweighting in monetary policy parameters as asymmetrical because the unemployment response coefficient is only useful as an indicator of future inflation and not as an independent policy objective. For instance, Bordo and Levy (2023) concur with us that there was a significant change in central bank behavior at the turn of the twenty-first century (reinforced after the GFC) but their interpretation is totally different. For example, when referring to the recent Fed behavior, Bordo and Levy (2023, pp. 170-171) argue:

> "The Greenspan-led Fed's concerns about deflation and its perception that the risks of deflation and the stagnation that would result were a far bigger concern than the risks of high inflation, became influential. This new asymmetric view of risks around inflation resulted in the Fed's delayed exit from its 2001–2 countercyclical easing that proved costly for economic performance and financial stability. This asymmetric concern re-emerged as a dominant theme in the decade following the GFC.
>
> […] "The new strategic framework institutionalized the Fed's asymmetries, including prioritization of its enhanced maximum employment mandate and flexible average inflation targeting that favored inflation above 2%."

Finally, a couple of annotations must be added. Here again, the number of observations in the IV regressions for the period 1973-2022 are less than in POLS because there is some missing data on the instrument set at the beginning of the period for some countries. Also, data on unemployment rate start in 1982 for France, 1991 for Germany, 1983 for Italy. New Zealand and United Kingdom are missing the 2022 observation. Also, data on short-term interest rates begin in 2003 in Japan, 1974 in New Zealand, and 1986 in the United Kingdom. As a result, although the regression involves the period 1973-2022, in fact only Canada, New Zealand and the United States have data starting in 1973-74. Data for France, Italy and the United Kingdom begin in the 1980s, and Germany and Japan afterwards. This is to pinpoint that the period 1973-2022 involves, in practice, the 1980s onwards for the majority of the sample of nine industrialized countries, during which there was a broad monetary policy consensus that 'inflation first' strategies dominated.

3.6 Conclusions

The theory and the evidenced-based arguments that we put forward in this chapter underscore that the 'inflation first' monetary policy might have determined the trends in the rentier income share in the last few decades in several industrialized countries. On the one hand, the regression analysis provides evidence that central banks have been pursuing an over-proportional adjustment in interest rate policy, at least before the GFC, where money interest rates have been over-adjusted to more than offset changes in the inflation rate, reflecting an overzealous behavior towards price inflation and, at the same time, little or no concern whatsoever over changes in unemployment rates. Now, despite this behavior of prioritizing inflation deviations being coherent with both the Wicksell and Taylor rules, the complete relegation of unemployment or output deviations is more consistent with a Wicksellian single-goal framework. Seemingly, from the empirical evidence, what central banks were implementing was a simpler Wicksell rule that, as it had slowly been put in place after the monetarist fiasco of the early 1980s, led to historically high, positive, but more stable and eventually slowly-declining real rates to combat the decelerating inflation until after the GFC when central banks redefined their priorities.

On the other hand, the historical/stylized facts point to the distributional consequence of this inflation first monetary policy, particularly during the era between the 1980s and the GFC, namely a significant income and wealth redistribution towards the rentier groups in the economy. Although more research is needed for the calculation of rentier income measures due to the lack of accessible and long-term data series, the conventional measures that we were able to collect are very much consistent with the PI measures as indirect but effective indicators of rentier income trends. We were able to distinguish a regime of high rentier income shares during the 1980s all the way to the

GFC, reflected in high interest income shares and PI values, which is in line with a staunch 'rentier first' monetary policy of responding aggressively to increases in the inflation rate. But at the same time, we identify a regime of low rentier income shares during the oil-price shock era of the 1970s and then after the GFC, when the fears of deflation and secular stagnation came to prevail, and the adoption of "flexible" inflation targeting — that would be a bit more consistent with a genuine dual mandate of low inflation and full employment — rendered an overall redistribution towards the non-rentier groups in the economy.

Admittedly, particularly in regards to a dual mandate, what has been occurring since the GFC in some industrialized countries is that a variant of the Taylor rule — due to its inclusion of an output and unemployment objective as in the so-called Yellen rule — can open the door to be interpreted in a Keynesian framework where not only the two variables (inflation and unemployment) are interpreted as independent targets to pursue, but where fiscal policy can be coordinated with monetary policy ultimately to tackle two goals with two instruments. Lastly, we do recognize that some ideas raised in this chapter are not developed in depth given either the lack of space or the absence of data. For instance, there is an important line of research on the evolution of rentier income that should be further explored, particularly considering the structural transformation of the rentier groups following the 1980s crisis where households became the "new" debtors, and the nonfinancial business sector became net lenders and money managers within an increasingly financialized macroeconomy. Also, despite its methodological difficulties, it would be interesting to come up with more concrete estimates of the impact of the 'inflation first' monetary policy on the transfer of income and wealth to rentiers. These and other issues are left for future research.

Appendix 3 Descriptive Statistics

Table 3A Descriptive Statistics: Pool of Selected Countries

Variable	Short-term interest rate	CPI inflation	Unemployment rate
		Annual Data: 1973-2022	
Mean	5.6	4.3	6.7
Standard Deviation	4.8	4.4	2.7
Min	-0.5	-1.3	0.1
Max	23.3	24.2	12.8
Observations	400	448	400
		Quarterly Data: 1973q1-2022q4	
Mean	5.6	4.3	6.8
Standard Deviation	4.9	4.5	2.6
Min	-0.5	-2.2	1.1
Max	25.7	26.5	13.3
Observations	1599	1785	1552

Note: Countries are Australia, Canada, France, Germany, Japan, Italy, New Zealand, United Kingdom, United States

Source: OECD Statistics

GENERAL CONCLUSION

This dissertation contributes significantly to post-Keynesian economics on the interplay between monetary policy, inflation, and income distribution. This exploration is conducted through a theoretical and empirical analysis of the three post-Keynesian income-class categories: one, the effect of monetary policy on the income share of workers; two, the study of firms' markup and inflation as a distributive phenomenon; and three, the assessment of the Taylor-type framework for monetary policy with respect to its implications on the income share of rentiers.

The first chapter uncovers the relevant contributions of post-Keynesian economics to the understanding of monetary policy and functional income distribution. The empirical findings emphasize the nuanced relationship between changes in interest rates and the income share of workers at the industry level, corroborating the assertion of significant and enduring impacts.

The investigation of markup inflation during the 2021-22 inflation surge in the second chapter provides interesting insights. Notably, it finds significant evidence of markup inflation using historical comparisons and econometric methods, but the study acknowledges the need for further research, given that the evidence depends on the measure of material cost. Above all, the empirical analysis of markups, incorporating material cost contributions and changes in capacity utilization over time, represents an important scholarly contribution.

Finally, the third chapter reveals a historic and theoretical examination of the Taylor rule framework in the conduct of monetary policy. The findings suggest that the reaction function of central banks have been biased towards the income share of rentiers. However, there has been a notable shift in the behavior of central banks to focus more on the unemployment rate for the post-2008-2009 Global Financial Crisis. Moreover, it frames the discussion of the Taylor rule within a broader Wicksellian tradition of nominal interest rate rules and endogenous money.

Overall, this dissertation enhances our understanding of the complex dynamics of monetary policy, inflation, and income distribution. It demonstrates the necessity for continuous exploration of these interdependencies, especially considering the current economic and political challenges faced by central banks. By maintaining a post-Keynesian class-analysis perspective where institutional factors play a critical role in explaining the evolution of income distribution, this research contributes to the existing body of knowledge and highlights future avenues of exploration.

Bibliography

Abrigo, M., and I. Love (2016). "Estimation of panel vector autoregression in Stata", *The Stata Journal* 16, no. 3, pp. 778-804.

Alvarez, J., J. Bluedorn, N. Hansen, Y. Huang, E. Pugacheva, and A. Sollaci (2022). "Wage-Price Spirals: What is the Historical Evidence?" *IMF Working Paper 22/221*, International Monetary Fund, Washington, DC.

Ambler, S., and J. Kronick (2022). "Money Talks: The Old, New Tool for Predicting Inflation". Commentary No. 623. July. Toronto: C.D. Howe Institute.

Asso, P. F., G. A. Kahn, and R. Leeson (2007). "The Taylor Rule and the Transformation of Monetary Policy", *Research Working Paper* RWP 07-11, Federal Reserve Bank of Kansas City. https://www.kansascityfed.org/documents/541/pdf-rwp07-11.pdf

Aujac, Henri (1950). "Une hypothèse de travail: l'inflation, conséquence monétaire du comportement des groupes sociaux" *Économie appliquée*, 3(2) (avril/juin), pp. 279-300.

Bernanke, B. S., and F. S. Mishkin (1997). "Inflation Targeting: A New Framework for Monetary Policy?" *Journal of Economic Perspectives*, 11 (2), pp. 97-116.

Bernanke, B., and O. Blanchard (2023) "What Caused the U.S. Pandemic-Era Inflation?", *Hutchins Center on Fiscal and Monetary Policy at the Brookings Institution*, Conference Draft, May 23, 2023. https://www.brookings.edu/wp-content/uploads/2023/04/Bernanke-Blanchard-conference-draft_5.23.23.pdf

Bhandari, A., D. Evans, M. Golosov, and T. Sargent (2021) "Inequality, Business Cycles, and Monetary-Fiscal Policy", *Econometrica* 89 (6), pp. 2559-2599.

BIS (2022). "BIS Annual Economic Report 2022", *Bank of International Settlements*, June.

Bivens, J. (2022a, February 11). "Profits, wages, and inflation: What's really going on". *Economic Policy Institute*. Retrieved June 2, 2022, from https://www.epi.org/blog/profits-wages-and-inflation-whats-really-going-on/

Bivens, J. (2022b, April 21). "Corporate profits have contributed disproportionately to inflation. How should policymakers respond?" *Economic Policy Institute*. Retrieved June 2, 2022, from https://www.epi.org/blog/corporate-profits-have-contributed-disproportionately-to-inflation-how-should-policymakers-respond/

Blanchard, O. (1986). "The Wage Price Spiral" *The Quarterly Journal of Economics*, Volume 101, Issue 3, August, pp. 543–565.

Blanchard, O., A. Domash, and L. H. Summers (2022) "Bad News for the Fed from the Beveridge Space." *Peterson Institute for International Economics*, Policy Brief 22-7, July 2022, pp. 2-16, from https://www.piie.com/sites/default/files/documents/pb22-7.pdf

Blecker, R. A., and M. Seccareccia. (2014). "Would a North American monetary union protect Canada and Mexico against the ravages of "Dutch disease"? A post-financial crisis perspective." In *Banking, Monetary Policy and the Political Economy of Financial Regulation*, ed. by G. A. Epstein, T. Schlesinger, and M. Vernengo, Cheltenham, UK: Edward Elgar, pp. 171–202.

Blecker, R. A., and M. Setterfield (2019). *Heterodox Macroeconomics: Models of Demand, Distribution and Growth.* Cheltenham, UK Northampton, MA, USA: Edward Elgar Publishing.

Blinder, A. S. (1997). "Distinguished Lecture on Economics in Government: What Central Bankers Could Learn from Academics—And Vice Versa." *Journal of Economic Perspectives*, 11 (2), pp. 3-19.

Boissay, F., F. De Fiore, D. Igan, A. Pierres-Tejada, and D. Rees (2022). "Are Major Advanced Economies on the Verge of a Wage-Price Spiral?" *BIS Bulletin* No. 53. Bank for International Settlements, May 4.

Bolhuis, M. A., J. N. L. Cramer, & L. H. Summers (2022). "Comparing Past and Present Inflation" *National Bureau of Economic Research Working Paper Series*, 30116, June.

Bordo, M. D. and M. D. Levy (2023). "The Fed's Monetary Policy Exit Once Again Behind the Curve." In *How Monetary Policy Got Behind the Curve—and How to Get Back*, ed. by Bordo, M. D., J. B. Taylor, and J. H. Cochrane. Hoover Press.

Câmara, A. and M. Vernengo (2004). "Allied, German and Latin Perspectives on Inflation." In *Contemporary Post Keynesian Analysis*, pp. 172–84. Cheltenham, UK: Edward Elgar.

Carstens, A. (2023). "Monetary and fiscal policies as anchors of trust and stability." *Speech by the General Manager of the BIS, at Columbia University*, New York, 17 April 2023. https://www.bis.org/speeches/sp230417.htm

Carvalho, C., F. Nechio, and T. Tristão (2021), "Taylor Rule Estimation by OLS", *Journal of Monetary Economics* 124, pp. 140–154.

Clarida, R., J. Galí, and M. Gertler (1998). "Monetary Policy Rules in Practice: Some International Evidence." *European Economic Review* 42(6), pp. 1033-1067.

CMA (2022). "The State of UK Competition." Competition and Markets Authority, 158, April. Retrieved August 4, 2022, from https://www.gov.uk/government/publications/state-of-uk-competition-report-2022

Cochrane, D. T. (2022, April). "The Rise of Corporate Profits in the Time of Covid." *Canadians for Tax Fairness*.

Colciago, A., A. Samarina, and J. Haan (2019). "Central bank policies and income and wealth inequality: A survey". *Journal of Economic Surveys*, 33(4), pp. 1199-1231.

Costantini, O., and M. Seccareccia (2020). "Income Distribution, Household Debt and Growth in Modern Financialized Economies." *Journal of Economic Issues* 54, no. 2 (June), pp. 444–53.

Danby, C. (2005). "Noyola's Institutional Approach to Inflation." *Journal of the History of Economic Thought*, 27(2), pp. 161-178.

Davidson, K. (2022), "GOP to Powell: Play by the Rules", *Politico* (June 23); https://www.politico.com/newsletters/morning-money/2022/06/23/gop-to-powell-play-by-the-rules-00041638.

De Long, J.B. (2000), "The Triumph of Monetarism?" *Journal of Economic Perspectives*, 14(1) (Winter), pp. 83–94.

Dehejia, V. (2022a, March 24). "Opinion: The Bank of Canada needs to get serious about inflation." *Financial Post*. Retrieved June 6, 2022, from https://financialpost.com/opinion/the-bank-of-canada-needs-to-get-serious-about-inflation

Dehejia, V. (2022b, May 24). "Witness Testimony, Opening Remarks, House of Commons Standing Committee on Finance." *Vivek's Newsletter*. Retrieved June 6, 2022, from https://vivekdehejia.substack.com/p/witness-testimony-opening-remarks?s=r

Düenhaupt, P. (2012), "Financialization and the Rentier Income Share — Evidence from the USA and Germany", *International Review of Applied Economics*, 26(4) (July), pp. 465-87.

Dutt, A. K. (1987). "Alternative Closures Again: A Comment on 'Growth, Distribution and Inflation.'" *Cambridge Journal of Economics* 11, no. 1 (March), pp. 75–82.

Eichner, A. S. (1987). *The Macrodynamics of Advanced Market Economies,* Armonk, NY: M.E. Sharpe.

Eichner, A.S. (1976). *The Megacorp and Oligopoly: Micro Foundations of Macro Dynamics: Micro Foundations of Macro Dynamics* (1st ed.). New York: Routledge, 1981.

Federal Reserve Bank of Atlanta (2023), "Taylor Rule Utility", Center for Quantitative Economic Research; https://www.atlantafed.org/cqer/research/taylor-rule?panel=2

Fontanari, C., A. Palumbo, and C. Salvatori (2019), "Why We Need New Measures of Potential Output — and What They Tell Us", *INET Blog* (May 16); https://www.ineteconomics.org/perspectives/blog/why-we-need-new-measures-of-potential-output-and-what-they-tell-us

Galbraith, J. (1998). *Created Unequal: The Crisis in American Pay*, New York: The Free Press.

Galbraith, J. (2022). "The Fed's Target Is Workers." *Project Syndicate*. (January 31); https://www.project-syndicate.org/commentary/fed-interest-rate-policy-will-cut-into-wages-by-james-k-galbraith-2022-01

Galí, J. (2015). *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework and Its Applications*. Second edition. Oxford: Princeton University Press.

Galí, J. (2018). "The State of New Keynesian Economics: A Partial Assessment." *Journal of Economic Perspectives* 32(3) (August 1), pp. 87–112.

Giammarioli, N., and N. Valla (2004), "The Natural Real Interest Rate and Monetary Policy: A Review", *Journal of Policy Modeling*, 26(5), pp. 641–60.

Gordon, S. (2021). "Discussion". In Lavoie, M. and M. Seccareccia, *Going Beyond the Inflation-Targeting Mantra: A Dual Mandate*, Max Bell School for Public Policy, McGill University (April 23), pp. 41-48.

Greenwood, J., and S. H. Hanke (2021). "On Monetary Growth and Inflation in Leading Economies, 2021-2022: Relative Prices and the Overall Price Level." *Journal of Applied Corporate Finance* 33, no. 4 (Fall 2021), pp. 39-51.

Guschanski, A., and Ö. Onaran (2021). "The Decline in the Wage Share: Falling Bargaining Power of Labour or Technological Progress? Industry-Level Evidence from the OECD." *Socio-Economic Review*, March, pp. 1–34.

Hansen, N., F. Toscani, J. Zhou. (2023). "The Role of Import Prices, Profits and Wages in the Current Inflation Episode in the Euro Area" *IMF Working Paper 23/131*, International Monetary Fund, Washington, DC.

Hayek, F.A. (1941), *The Pure Theory of Capital*, Chicago: University of Chicago Press.

ILO-OECD (2015). "The Labour Share in G20 Economies." Report prepared for the G20 Employment Working Group. Turkey: International Labour Organization-Organisation for Economic Co-operation and Development.

IMF (2022). *World Economic Outlook: Countering the Cost-of-Living Crisis*. International Monetary Fund: Washington, DC. October.

IMF (2023). *World Economic Outlook: A Rocky Recovery*. International Monetary Fund: Washington, DC. April.

Kaldor, N. (1961). "Capital Accumulation and Economic Growth", in *The Theory of Capital*, ed. by D. C. Hague, New York: Stockton Press, pp. 177-222.

Kalecki, M. (2003). *Theory of Economic Dynamics* (1st ed.). London: Routledge.

Kappes, S. A. (2023) "Monetary Policy and Personal Income Distribution: A Survey of the Empirical Literature", *Review of Political Economy*, 35:1, pp. 211-230.

Kearns, J., M. Major, and D. Norman (2020), "How Risky is Australian Household Debt?", *Research Discussion Paper 2020-05*, August, Reserve Bank of Australia. ISSN 1448-5109

Keynes, J. M. (2013 [1923]). *A Tract on Monetary Reform*. Vol. IV, *The Collected Writings of John Maynard Keynes*, ed. by A. Robinson and D. Moggridge, Cambridge, UK: Cambridge University Press.

Keynes, J. M. (2018 [1936]). *The General Theory of Employment, Interest and Money*. Cambridge, UK: Palgrave Macmillan. (Original work published in 1936).

Keynes, J. M. (2019 [1919]). *The Economic Consequences of the Peace*. Cambridge, UK: Palgrave Macmillan.

Konczal, M., and N. Lusiani (2022). "Prices, Profits, and Power: An Analysis of 2021 Firm-Level Markups." Working Paper. *Roosevelt Institute*. June 21.

Laubach, T., and J.C. Williams (2015), "Measuring the Natural Rate of Interest Redux", Federal Reserve Bank of San Francisco Working Paper 2015-16. http://www.frbsf.org/economic-research/publications/working-papers/wp2015-16.pdf .

Lavoie, M. (1995). "Interest Rates in Post-Keynesian Models of Growth and Distribution." *Metroeconomica,* 46, pp. 146-177.

Lavoie, M. (1996). "Monetary Policy in an Economy with Endogenous Credit Money", in *Money in Motion: The Post Keynesian and Circulation Approaches*, ed. by G. Deleplace and E. J. Nell, London: Macmillan, pp. 532-545.

Lavoie, M. (2004). "The New Consensus on Monetary Policy Seen from a post-Keynesian Perspective" in M. Lavoie, and M. Seccareccia (eds.), *Central Banking in the Modern World*, chapter 1, pp. 15-34, Edward Elgar Publishing.

Lavoie, M. (2009). *Introduction to Post-Keynesian Economics*, Hampshire, UK: Palgrave Macmillan.

Lavoie, M. (2014). *Post-Keynesian Economics: New Foundations*. Cheltenham, UK: Edward Elgar.

Lavoie, M. (2022). *Post-Keynesian Economics: New Foundations*. 2nd ed. Cheltenham, UK: Edward Elgar Publishing.

Lavoie, M. (2023a), "Some controversies in the causes of post-pandemic inflation", *Monetary Policy Institute blog* #77, May 14, 2023. Retrieved June 9, 2023, from https://medium.com/@monetarypolicyinstitute/some-controversies-in-the-causes-of-the-post-pandemic-inflation-1480a7a08eb7

Lavoie, M. (2023b) "Profit Inflation and Markups Once Again", *INET*, June 15, 2023. Retrieved July 5, 2023, from https://www.ineteconomics.org/perspectives/blog/profit-inflation-and-markups-once-again

Lavoie, M., and L.-P. Rochon (2022). "Olivier Blanchard and Inflation". *Monetary Policy Institute Blog*. Retrieved January 18, 2023, from https://medium.com/@monetarypolicyinstitute/olivier-blanchard-and-inflation-219f195125fe

Lavoie, M., and M. Seccareccia (1988). "Money, Interest and Rentiers: The Twilight of Rentier Capitalism in Keynes's *General Theory*", in *Keynes and Public Policy After Fifty Years*, vol. 2, ed. by O. Hamouda and J.N. Smithin, Aldershot: Edward Elgar, pp. 145-58.

Lavoie, M., and M. Seccareccia (2013), "Reciprocal Influences: A Tale of Two Central Banks on the North American Continent", *International Journal of Political Economy*, 42(3) (Fall), pp. 63-84.

Lavoie, M., and M. Seccareccia (2019). "Macroeconomics and Natural Rates: Some Reflections on Pasinetti's Fair Rate of Interest", *Bulletin of Political Economy*, 13(2), pp. 85-111.

Lavoie, M., and M. Seccareccia (2021). *Going Beyond the Inflation-Targeting Mantra: A Dual Mandate*, Max Bell School for Public Policy, McGill University (April 23), pp. 5-40.

Levrero, E. S. (2021), "Estimates of the Natural Rate of Interest and the Stance of Monetary Policies: A Critical Assessment", *International Journal of Political Economy*, 50(1) (Spring), pp. 5-27.

Levrero, E. S. (2023), "The Taylor Rule and its Aftermath: Elements for an Interpretation along Classical-Keynesian Lines", *Review of Political Economy*, (forthcoming); https://www.tandfonline.com/doi/full/10.1080/09538259.2023.2166729

Lofaro, A., G. Matamoros, and L. P. Rochon (2023) "Monetary Policy and Income Distribution: The post-Keynesian and Sraffian perspectives", *Review of Political Economy*, (forthcoming).

Matamoros, G. (2023a) "Once again on profit inflation: a follow-up on Marc Lavoie's blog", *Monetary Policy Institute blog*, 82, June 5, 2023. Retrieved July 3, 2023, from https://medium.com/@monetarypolicyinstitute/once-again-on-profit-inflation-a-follow-up-on-marc-lavoies-blog-78f2986e3a39

Matamoros, G. (2023b) "Are Firm Markups Boosting Inflation? A Post-Keynesian Institutionalist Approach to Markup Inflation in Select Industrialized Countries", *Review of Political Economy,* pp. 1-22.

McKay, A. and C. K. Wolf (2023) "Monetary Policy and Inequality", *Journal of Economic Perspectives* 37(1), Winter, pp. 121-144.

Menezes, F. M. and J. Quiggin (2022) "Market power amplifies the price effects of demand shocks", *Economic Letters*, 221(110908), December, pp. 2-4.

Mintz, J. M. (2022, June 10). "Jack Mintz: Blaming inflation on big corporations is "science denial."" *Financial Post*. Retrieved June 10, 2022, from https://financialpost.com/opinion/jack-m-mintz-blaming-inflation-on-big-corporations-is-science-denial/wcm/7fd6e6be-30fb-4e8a-a70c-debf780b7d7a/amp/?utm_source=pocket_mylist

Moore, B. J. (1989). "The Effects of Monetary Policy on Income Distribution". In Paul Davidson and Jan Kregel (eds.), *Macroeconomic Problems and Policies of Income Distribution*. Aldershot, UK: Edward Elgar, pp. 18-41.

Myrdal, G. (1939), *Monetary Equilibrium*, London: Hodge.

Nersisyan, Y., & Wray, L. R. (2022). "What's Causing Accelerating Inflation: Pandemic or Policy Response?" *The Levy Economics Institute Working Paper Collection*, 1003, March 4.

Niggle, C. J. (1989). "Monetary Policy and Changes in Income Distribution", *Journal of Economic Issues* 23, no. 3 (September), pp. 809-822.

Nikiforos, M. and S. Grothe (2023) "Markups, Profit Shares, and Cost-Push-Profit-Led Inflation", INET, June 6, 2023. Retrieved July 5, 2023, from https://www.ineteconomics.org/perspectives/blog/markups-profit-shares-and-cost-push-profit-led-inflation

Nikolsko-Rzhevskyy, A., D. H. Papel, and R. Prodan (2017), "The Yellen Rules", *Journal of Macroeconomics* 54, pp. 59-71.

Noyola, J. F. (1956). "El Desarrollo Económico y La Inflación En México y Otros Países Latinoamericanos.*" Investigación Económica* 16(4), pp. 603–48.

OECD (2018). "Decoupling of wages from productivity: What implications for public policies?" *OECD Economic Outlook*, Chapter 2, Vol. 2018, issue 2.

Osberg, L. (2008) *A Quarter Century of Economic Inequality in Canada: 1981-2006*. Toronto: Canadian Centre for Policy Alternatives.

Panico, C. (1985). "Market Forces and the Relation Between the Rates of Interest and Profits", *Contributions to Political Economy* 4 (1), pp. 37–60.

Parguez, A. (1996). "Financial Markets, Unemployment and Inflation Within a Circuitist Framework", *Economies et Societés*, Monnaie et production, série M.P., no. 10, 2-3, pp. 163-192.

Pasinetti, L. (1981). *Structural Change and Economic Growth*, Cambridge: Cambridge University Press.

Pasinetti, L. (2002). "An analytical approach to the "just" rate of interest: the priority of labour over capital", *Rivista Internazionale di Scienze Sociali* 110 (3), pp. 323-329.

Perkins, T. (2022, April 29). "Revealed: top US corporations raising prices on Americans even as profits surge." *The Guardian*. Retrieved June 2, 2022, from https://www.theguardian.com/business/2022/apr/27/inflation-corporate-america-increased-prices-profits

Piketty, T. (2014). *Capital in the Twenty-First Century*, Cambridge, MA: Harvard University Press.

Pivetti, M. (1985). "On the Monetary Explanation of Distribution." *Political Economy* 1 (2), pp. 73–103. http://www.centrosraffa.org/pe/1,2/4.%201,2_Pivetti.pdf.

Politano, J. (2022, January 1). "Are Rising Corporate Profit Margins Causing Inflation?" *Apricitas Economics*. Retrieved June 2, 2022, from https://apricitas.substack.com/p/are-rising-corporate-profit-margins?s=r

Pressman, S. (2023). "Covid and the Causes of Inflation", *Monetary Policy Institute blog*, 79, May 18, 2023. Retrieved July 31, 2023, from https://medium.com/@monetarypolicyinstitute/covid-and-the-causes-of-inflation-c78d7f66635e9

Ratner, D., and J. Sim (2022). "Who Killed the Phillips Curve? A Murder Mystery." *Finance and Economics Discussion Series 2022-028*. Washington: Board of Governors of the Federal Reserve System.

Robinson, J. (2013). *The Accumulation of Capital*. Third Edition. Hampshire, UK: Palgrave Macmillan. (First edition 1956)

Rochon, L. P. (2010). "Inflation Targeting: From Misconception to Misguided Policies". In Hassan Bougrine and Mario Seccareccia (eds.), *Introducing Macroeconomic Analysis: Issues, Questions, and Competing Views*, Toronto, CA: Emond Montgomery Publications, pp. 188-196.

Rochon, L. P., and M. Seccareccia (2023). "Chapter 1: A primer on monetary policy and its effect on income distribution: a heterodox perspective." In *Central Banking, Monetary Policy and Income Distribution*, Edward Elgar Publishing, pp. 20-34.

Rochon, L. P., and M. Setterfield (2007). "Interest Rates, Income Distribution, and Monetary Policy Dominance: Post Keynesians and the "Fair Rate" of Interest". *Journal of Post Keynesian Economics* 30, no. 1 (Fall), pp. 13-42.

Roncaglia, A. (1978). *Sraffa and the Theory of Prices*. New York: John Wiley & Sons.

Russell, J. (2021). *Canada, A Working History*. Canada: Dundurn Press.

Schnabel, I. (2022). "The Globalisation of Inflation." In *Conference organized by Österreichische Vereinigung für Finanzanalyse und Asset Management*, 11 May 2022, Vienna, https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220511_1~e9ba02e127.en.html

Seccareccia, M. (1984). "The Fundamental Macroeconomic Link between Investment Activity, the Structure of Employment and Price Changes: A Theoretical and Empirical Analysis", *Économies et Sociétés*. Cahiers de l'I.S.M.E.A 18(4), pp. 165–219.

Seccareccia, M. (1988), "Systemic Viability and Credit Crunches: An Examination of Recent Canadian Cyclical Fluctuations." *Journal of Economic Issues*, 22(1) (March), pp. 49-77.

Seccareccia, M. (1998), “Wicksellian Norm, Central Bank Real Interest Rate Targeting and Macroeconomic Performance.” In *The Political Economy of Central Banking*, ed. by P. Arestis and M.C. Sawyer, Cheltenham, UK: Edward Elgar Publishing, pp. 180-98.

Seccareccia, M. (2004). “Aspects of a New Conceptual Integration of Keynes’s *Treatise on Money* and the *General Theory*: Logical Time Units and Macroeconomic Price Formation.” In *Money Credit and the Role of the State*, ed. by R. Arena, and N. Salvadori, Burlington, VT: Ashgate, pp. 283-308.

Seccareccia, M. (2014). “Were the original Canada–US Free Trade Agreement (CUSFTA) and the North American Free Trade Agreement (NAFTA) significant policy turning points? Understanding the evolution of macroeconomic policy from the pre- to the post-NAFTA era in North America.” *Review of Keynesian Economics* 2, no. 4 (Winter), pp. 414-428.

Seccareccia, M. (2015). “Pricing and Financing of Investment: Is There a Macroeconomic Basis for Eichnerian Microeconomic Analysis?” In *Money and Macrodynamics: Alfred Eichner and Post-Keynesian Economics*, New York: Routledge, pp. 59-80.

Seccareccia, M. (2019). “From the Age of Rentier Tranquility to the New Age of Deep Uncertainty: The Metamorphosis of Central Bank Policy in Modern Financialized Economies”, *Journal of Economic Issues* 53, no. 2 (June), pp. 478-487.

Seccareccia, M. (2022), “Crisis del Covid-19 y el resurgimiento de la política fiscal activista. ¿Cuáles son las perspectivas de la macrodesfinanciarización?” [The Covid-19 Crisis and the Revival of Activist Fiscal Policy: What Are the Prospects for Macro De-Financialization?]. In *Política Fiscal y Política Monetaria: Confinamiento, Pandemia y Recuperación Inestable*, ed. by A. Girón, Mexico City: Instituto de Investigaciones Económicas-UNAM, pp. 183-98.

Seccareccia, M., and G. Matamoros (2022a), “Is There an Appropriate Monetary Policy Framework to Achieve a More Equitable Income Distribution or Do Central Bank Mandates Really Matter? Interest-Rate Rules versus a Full-Employment Policy”, *Journal of Economic Issues*, 56 (2) (June), pp. 498-507.

Seccareccia, M., and G. Matamoros (2022b), “The Fed Tackles Kalecki”, *INET Blog* (June 30); https://www.ineteconomics.org/perspectives/blog/the-fed-tackles-kalecki

Seccareccia, M., and G. Matamoros (2023a). "Chapter 8: Why central bank policy is not income-distribution 'neutral': history, theory and practice". In *Central Banking, Monetary Policy and Income Distribution*, Cheltenham, UK: Edward Elgar Publishing, pp. 164-189.

Seccareccia, M., and Matamoros, G. (2023b). “Is ‘Inflation First’ Really ‘Rentiers First’? The Taylor Rule and Rentier Income in Industrialized Countries.” *Institute for New Economic Thinking Working Paper Series*, (209).

Seccareccia, M., and M. Lavoie (2010). "Inflation Targeting in Canada: Myth versus Reality." In *Macroeconomics, Finance and Money: Essays in Honour of Philip Arestis*, ed. by G. Fontana, John McCombie, and Malcolm Sawyer. New York: Palgrave Macmillan.

Seccareccia, M., and M. Lavoie (2016), "Income Distribution, Rentiers, and their Role in the Capitalist Economy", *International Journal of Political Economy*, 45(3) (Fall), pp. 200-223.

Seccareccia, M., and N. Kahn (2019), "The Illusion of Inflation Targeting: Have Central Banks Figured Out What They Are Actually Doing Since the Global Financial Crisis? An Alternative to the Mainstream Perspective", *International Journal of Political Economy*, 48(4) (Winter), pp. 364–380.

Serrano, F. (2012, March 28). "Gravitation, Full Cost Pricing and Prices of Production." *Naked Keynesianism* (blog). Retreived June 16, 2022, from http://nakedkeynesianism.blogspot.com/2012/03/gravitation-full-cost-pricing-and.html

Setterfield, M. (2004). "Central Banking, Stability and Macroeconomic Outcomes: A Comparison of New Consensus and Post-Keynesian Monetary Macroeconomics" in M. Lavoie, and M. Seccareccia (eds.), *Central Banking in the Modern World*, chapter 2, pp. 35-56, Edward Elgar Publishing.

Setterfield, M. (2022). "Inflation and Distribution during the Post-Covid Recovery: A Kaleckian Approach". *FMM Working Paper 82*, October, Hans-Böckler-Stiftung.

Sharpe, A., P. Harrison, and J.-F. Arsenault (2008). "The relationship between labour productivity and real wage growth in Canada and OECD countries." Research Report No. 2008-8, Center for the Study of Living Standards.

Smithin, J. (1996), *Macroeconomic Policy and the Future of Capitalism: The Revenge of the Rentiers and the Threat to Prosperity*, Cheltenham: Edward Elgar.

Sraffa, P. (1932), "Dr. Hayek on Money and Capital", *Economic Journal*, 42(165), pp. 42–53.

St-Pierre, M. (2023) "On market power and inflation", *Economic Letters*, 226(111074), May, pp. 1-4.

Stanford, J. (2022). "A Cure Worse than the Disease? Toward a More Balanced Understanding of Inflation and What to Do About It." *Centre for Future Work and Canadian Labour Congress*, October 2022.

Storm, S (2022). "Inflation in the Time of Corona and War." *Institute for New Economic Thinking Working Paper Series,* 185, May 30.

Summers, L. (2022). "Three Key Issues for Post-pandemic Monetary Policy", *Cato Institute Policy Forum*, USA. Retrieved on June 8, 2023 from https://policycommons.net/artifacts/3365178/three-key-issues-for-post-pandemic-monetary-policy/4163843/

Sylos-Labini, P. (1979) “Prices and Income Distribution in Manufacturing Industry”, *Journal of Post Keynesian Economics*, 2:1, pp. 3-25.

Taylor, J. B. (1993). “Discretion versus Policy Rules in Practice”, *Carnegie-Rochester Conference Series on Public Policy*, 39(1) (December), pp. 195-214.

Taylor, J. B. (1999). “A Historical Analysis of Monetary Policy Rules.” In *Monetary Policy Rules*, ed. by J.B. Taylor, Chicago: University of Chicago Press, pp. 319-340.

Taylor, J. B. (2011). “Legislating a Rule for Monetary Policy”, *Cato Journal* 31 (3) (Fall), pp. 407–415.

Taylor, J. B. (2012). *First Principles. Five Keys to Restoring America's Prosperity*, New York: W.W. Norton & Company.

Taylor, L. (1989). *Stabilization and Growth in Developing Countries: A Structuralist Approach* (1st ed.). Taylor & Francis.

Taylor, L., and N. H. Barbosa-Filho (2021). “Inflation? It's Import Prices and the Labor Share!” *International Journal of Political Economy* 50, no. 2, pp. 116–42.

Thorbecke, W. (2001). “Estimating the effects of disinflationary monetary policy on minorities”, *Journal of Policy Modeling* 23 (1) (January), pp. 51-66.

Tymoigne, E. (2023), “The Volcker Myths”, *Monetary Policy Institute Blog* (February 20); https://medium.com/@monetarypolicyinstitute/the-volcker-myths-8579cea33b95

United Nations et al. (2009), *System of National Accounts 2008*, New York: European Commission-IMF -OECD-United Nations-World Bank. ISBN 978-92-1-161522-7

Vague, R. (2017). “Rapid Money Supply Growth Does Not Cause Inflation”. *Evonomics*. Retreived October 31, 2022, from https://evonomics.com/moneysupply/

Vernengo, M. (2022). “The Inflationary Puzzle.” *Catalyst: A Journal of Theory & Strategy*, 5(4), pp. 88–113.

Vernengo, M., and Caldentey, E. P. (2023). “Price and prejudice: reflections on the return of inflation and ideology”, *Review of Keynesian Economics*, 11(2), pp. 129-146.

Visco, I. (2023), “Inflation, Monetary Policy and Inequalities. Some Thoughts”, *IARIW-Bank of Italy Conference on Central Banks, Financial Markets and Inequality*, March 31, Naples; https://www.bancaditalia.it/media/notizia/intervento-del-governatore-ignazio-visco-alla-conferenza-iariw-banca-d-italia-su-banche-centrali-mercati-finanziari-e-disuguaglianze/

Weber, I. M., and E. Wasner (2023). “Sellers' inflation, profits and conflict: why can large firms hike prices in an emergency?”, *Review of Keynesian Economics*, 11(2), pp. 183-213.

Wicksell, K. (1898 [1936]), *Interest and Prices*, London: Macmillan.

Wicksell, K. (1907), “The Influence of the Rate of Interest on Prices”, *Economic Journal*, 17(66) (June), pp. 213-220.

Williams, J.H. (1931), “The Monetary Doctrines of J.M. Keynes”, *Quarterly Journal of Economics* 45(4) (August), pp. 547-587.

Woodford, M. (2003), *Interest and Prices*, Princeton, N.J.: Princeton University Press.

Yellen, J. (2016), “The Federal Reserve's Monetary Policy Toolkit: Past, Present, and Future.” A speech at *Designing Resilient Monetary Policy Frameworks for the Future*, a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, (August 26); https://www.federalreserve.gov/newsevents/speech/yellen20160826a.htm

Zolea, R. (2022). “A History of the Relationship Between Interest Rate and Profit Rate in Heterodox Approaches”, *International Journal of Political Economy* 51 (2), pp. 121-136.