Is "Inflation First" Synonymous with "Rentiers First" in the Pursuit of Monetary Policy? The Dominance of the Taylor Rule and the Rentier Income Share in Industrialized Countries

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Introduction

The purpose of our research is broadly to analyze the effect of monetary policy on the functional distribution of income by adopting an alternative Keynesian socioeconomic class analysis that was fashionable historically, and which still 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 & Matamoros Romero 2022a, 2023). The latter approach differs methodologically from what is currently in vogue within mainstream macroeconomics, namely the use of a representative agent and/or heterogeneous agent-based modeling, with the latter having proliferated within the mainstream literature since the Great Financial Crisis (GFC) and which has become particularly popular among New-Keynesian economists. Instead, inspired by Keynes's original class analysis that can be traced back a century to *A Tract on Monetary Reform* (1923) and then the *General Theory* (1936), we consider how monetary policy impacts on the income dynamics of three broad socioeconomic classes not because of their heterogeneity, as in the usual binary classification of rich or poor households, for instance, in the two-agent New-Keynesian (TANK) models, but because of these groups' special social class interests *qua* wage earners, profit earners and interest-income earners (the latter constituting Keynes's "rentier class").

Although framing our analysis within this original Keynesian and post-Keynesian tradition, this paper 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 "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.

While this will not be addressed further in our analysis, we do wish also to recognize, however, that, throughout that whole era of this emerging "inflation first" policy framework within national economies, all of this monetary policy *tâtonnement* was occurring under the added post-Bretton Woods international pressures whereby world trade and financial markets were becoming ever more liberalized and, especially, more globalized. Therefore, quite parallel and complementary to the "inflation first" policy dominance, there was evolving a concomitant global trade and financial system. This emerging global system served as a *toile de fond* in spreading what was also 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) and which only witnessed a substantial reversal (that is, a sort of unintended deglobalization consequence) during the latter years of the COVID-19 crisis of 2021-2022 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 war in Ukraine.

Together with this broad Keynesian social class perspective in mind, we wish to draw particular attention to the ongoing debate over the Taylor rule, which is usually presented superficially in the context of the perennial debate over "rules versus discretion" in the conduct of monetary policy. In this case, as we shall show, through an analysis of its operating instrument and response function, how the latter 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 Global 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. For instance, 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 it 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 spaces, the object of our paper is to analyze how the widespread popularity of the Taylor rule (or its variants) within both official and implicit IT regimes had very specific consequences on income distribution between rentier and non-rentier income earners, especially in industrial countries. To do this, we have divided our paper into three broad sections that try to cover broad history, theory, and evidence on the subject-matter.

We begin below with a study of what is 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, especially with pressure coming particularly from the financial sector to combat inflation, 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 in 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 Bretton Woods system as pro-rentier/monetarist ideas took hold of macroeconomic policy in most Western countries. We observe and analyze both traditional measures of rentier income shares as well as heterodox measures such as variants of what has sometimes been defined as the Pasinetti index. We then explore more rigorously the theory behind the Taylor rule in relation to its potential consequences on rentier income share. In doing so, some of the questions being addressed are: Are there crucial differences between the Taylor rule and the Wicksell rule with regards to the implications on interest rate policy and on income distribution among socioeconomic groups? 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), in some ways, still very much dominates the debate over the conduct of monetary policy in major industrial countries. To analyze this, we explore conventional pooled and panel data 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 these older Keynesian and current post-Keynesian ideas to understanding the political economy link between monetary policy and the functional distribution of income along the lines of what we have elaborated recently in Seccareccia & Matamoros Romero (2023).

The Taylor Rule and All That: A Historical Perspective

The so-called Taylor rule was officially put forth as a possible systematized framework to conduct monetary policy only in the early 1990s (see Taylor 1993). Yet, it synthesized a framework that appeared following the almost complete 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 interpretation of the traditional 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 with the stylized facts on interest income shares, the 1970s was a difficult decade for rentier income earners as double-digit 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, indeed, attaining even lower levels than the negative values reached during the recent bout of inflation during the 2021-2023 pandemic period. 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 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 the 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.

A new neo-Wicksellian veneer of the reaction function slowly came to cover and eventually replace the tattered 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, 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.

This neo-Wicksellian logic quickly opened the door to the Taylor rule approach to monetary policy formulation. Since, as we shall see, the focus of the Taylor rule was to frame monetary policy decisions, by relying seemingly on the knowledge of just two key measurable variables and one implicit estimated parameter, the stage was set for the popularity of this policy framework, especially within the newly-emerging IT monetary policy 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) this new central bank framework and its attendant rule was in reality the direct lineal descendant of an old Wicksellian loanable funds approach. Notwithstanding some limited popularity in the early twentieth century among theorists of central banking, particularly during the interwar era before the Great Depression, this Wicksellian theory never found much favor among macroeconomic policymakers until the 1980s and 1990s as fiscal policy became downgraded to running balanced budgets and monetary policy upgraded to becoming the exclusive instrument to achieve macroeconomic stabilization through direct interest-rate setting.

With the collapse and then subsequent abandonment of the now discredited monetarism, the conditions were in place for the widespread adoption of this broad hybrid Wicksellian policy framework because of at least three reasons to be discussed briefly below. 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 particular central bank reaction function represented by equation [1] (or its *alter ego* [1']) is important to highlight. Firstly, the policy framework fits unequivocally 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 preemptively 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 (by responding to the current inflation vis-à-vis target inflation) or the second term (which is communicating to the decision maker how preemptively to impact on future inflation based on some accelerationist reading of the traditional Friedmanite Phillips curve).

The logic of the Taylor rule reaction function, therefore, 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 are sometimes referred to as the Yellen rules that 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 dual mandate case rather than one whose sole mandate is to achieve present and future inflation rates consistent with an inflation target alone, as was the case for most IT regimes, where unemployment is not officially a concern in their mandates (see, for instance, Yellen (2016), and Nikolsko-Rzhevskyy, Papel & Prodan (2017)).

Secondly, while central banks were no longer focusing on the evolution of 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 (as previously discussed) 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 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 real natural rate of interest (namely the estimated ρ term – the so-called natural rate – 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.

Thirdly, and 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 first component of the Taylor equation) *and* full employment (which could be considered consistent with a particular monetarist interpretation of the second component of the Taylor equation).

In the traditional Keynesian framework 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 so as 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 & Seccareccia 2021, and Seccareccia & Matamoros Romero 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 argument as an independent objective in its reaction function. However, as we have argued, this is not the way the Taylor equation was framed and ought to be interpreted in this hybrid neo-Wicksellian universe. With the needed budgetary "neutrality" of the fiscal authorities constrained to running only government budget balances, the two principal components of the Taylor equation would be recognized by the monetary authorities as a mere information set whose ultimate objective is single-handedly 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. This is undoubtedly why, over the last year, as inflation fighting has now been reprioritized, central bankers are under enormous political pressure to get back to the orthodox 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 very much on their minds and being used as a political tool whose purpose is to suppress what many of us believe is the actual spirit of the US Fed's dual mandate resting on a Keynesian interpretation of it. Indeed, not unlike the 1970s and 1980s, under political pressure, the Taylor rule has become a policy hot potato in recent years, especially in times of crisis, 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.

Some Stylized Facts on the Rentier Income Share

This section tries to put forward some of the trends in the functional distribution of income along Keynesian lines, with a focus on rentier income, since the dominance of an "inflation first" monetary policy in major industrialized countries. We show data on the conventional rentier income share using national accounting measures, but we also present data on alternative measures of the 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.

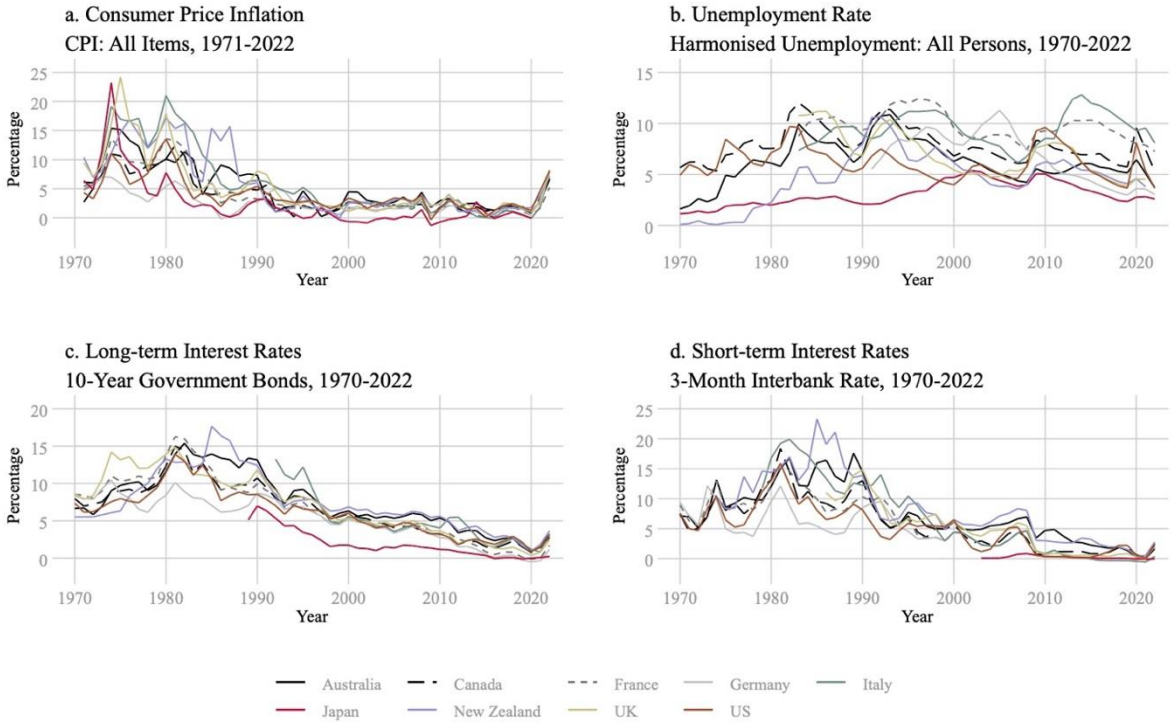
However, before digging into rentier income measures and their trends, we would first like to show the evolution of a few macroeconomic variables that are crucial for the understanding of monetary policy over time. For starters, panel (a) in Figure 1 shows CPI inflation for nine industrialized countries – 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 2021-2022 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 in the period of 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 shocks and the inflationary surge. Moreover, interest rates very slowly decreased from their peak in the 1980s, but only after the GFC of 2008-09 interest rates reached levels below 5 percent, whereas inflation rates were systematically below 5 percent since the 1990s. Given this similar but lagged evolution between interest rates and 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 (1980s to 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 1. Evolution of Selected Macroeconomic Variables, Nine Countries, Annual Observations



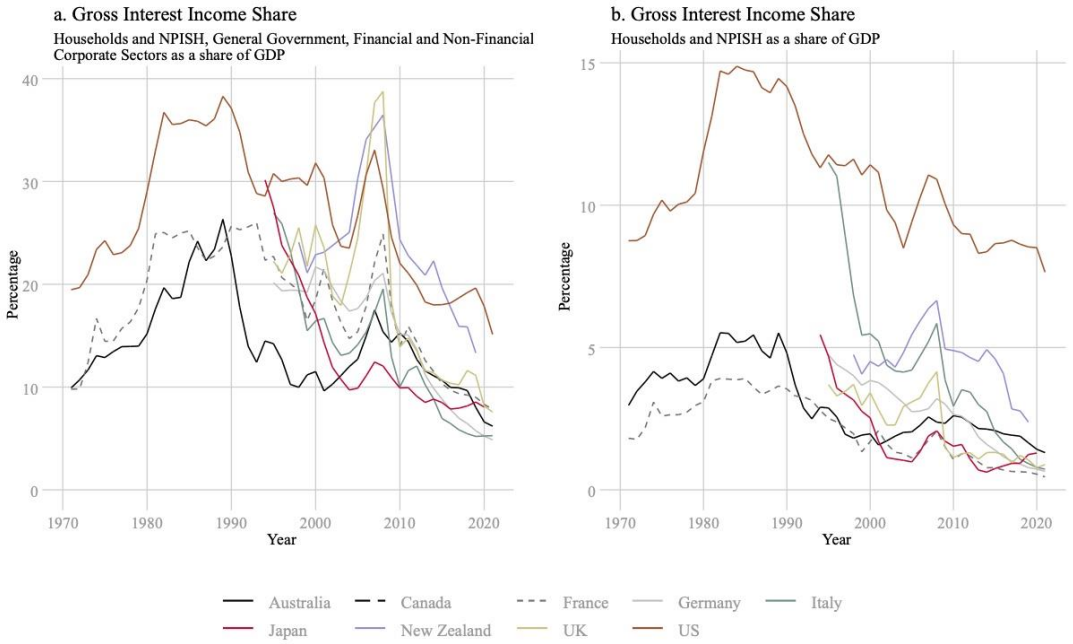
Source: Monthly Monetary and Financial Statistics (MEI), OECD.Stat

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 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:

$$R_h + R_f + R_c + R_g = P_h + P_f + P_c + P_g \quad [2]$$

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 2 depicts gross interest income as a share of GDP in two different forms. In panel (a), the left-hand side of the above identity 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 2. Evolution of Gross Interest Income Shares, Selected Countries, 1971-2021, Annual Observations



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

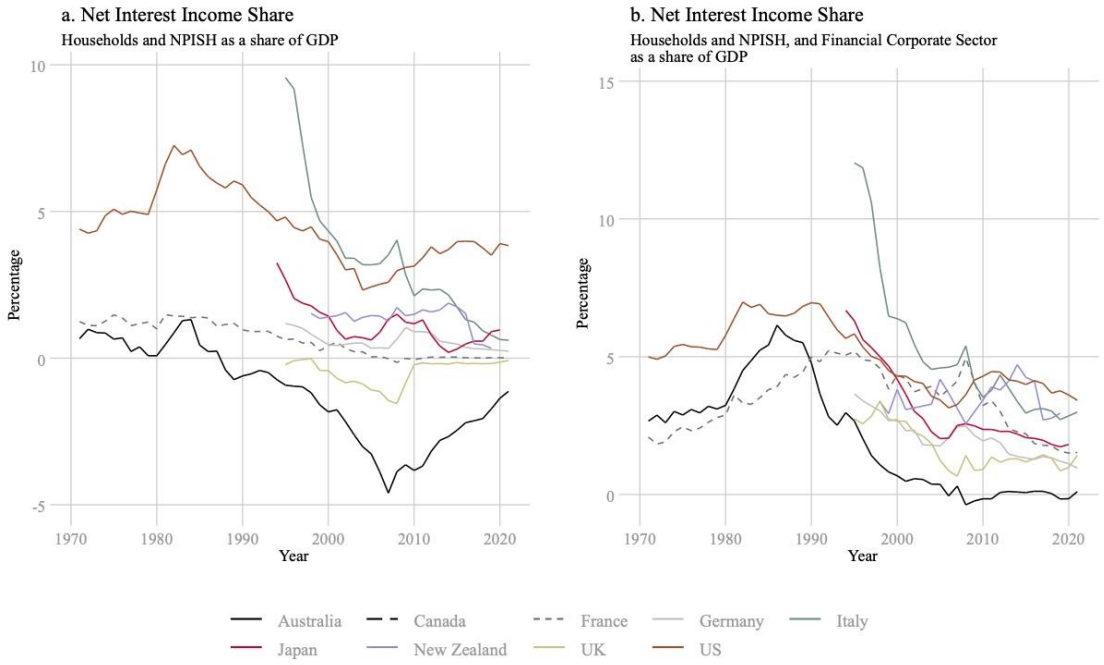
Equation (2) can also be rearranged to portray net interest income as a share of GDP as in Figure 3 below. Panel (a) depicts the net interest income share for households and NPISH from 1971 to 2021 for the nine selected industrialized countries. In general, for the three countries with available data, the evolution of

the rentier share 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 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 panel (a). Furthermore, side-to-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.[1] 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.

Figure 3. Evolution of Net Interest Income Shares, Selected Countries, 1971-2021, Annual Observations

[1] Kearns, Major and Norman (2020) study the rise in household indebtedness in Australia going back to the 1980s. They underscore 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).



NPISH: Non-Profit Institutions Serving Households

Source: Tables 1 & 14A, System of National Accounts (SNA), OECD.Stat

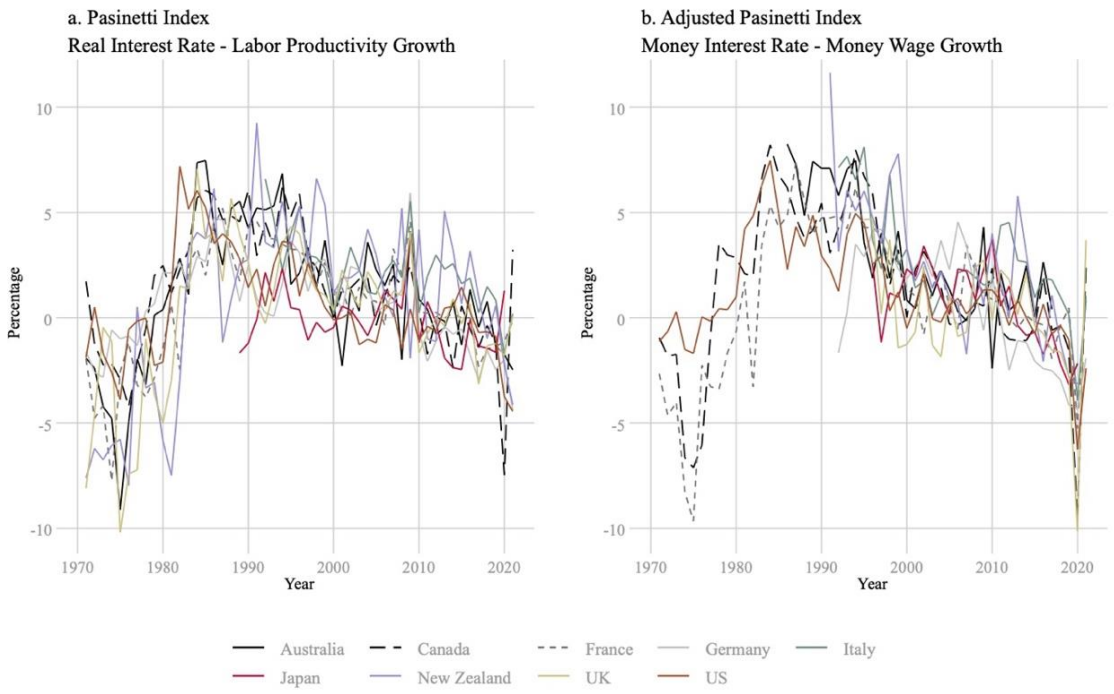
The limited data availability to calculate rentier income shares might be a compelling reason to look for an alternative measure of rentier income that could be used for longer periods and a greater number of countries. This is one of the reasons why one of us (see Seccareccia (1988) and Lavoie & Seccareccia (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" 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, and it is analogous to why average real wages growing commensurate with average labor productivity would ensure a stability in the share of labor income vis-à-vis non labor income. Accordingly, this measure of 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 the rentier groups, while a negative PI reveals a redistribution towards the non-rentier groups.

Figure 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 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 sticks to negative values in 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: data begin in 1986 and end in 2017 for Australia; they start 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.

Lastly, by comparing the PI with the interest income shares (Figures 2, 3 and 4), we do identify a similar evolution of the different indicators when data are available. For instance, the Pearson correlation between the gross interest income share in Figure 2 panel (a) and the PI is 0.4, which is significant at 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 panel (a) with the PI and the adjusted PI (Figure 4) are 0.36 and 0.4, respectively, which are significant at 1 percent level. We argue that this correlation is sufficiently high to consider the PI a relevant proxy for the rentier income share. As a result, based on the stylized facts and rentier income measures, we can safely say that there was a significant income redistribution towards the rentier groups during the 1980s all the way to the GFC. This era coincides with the implementation of a staunch “inflation first” monetary policy that would be contributing to a “rentier first” redistribution. Conversely, the 1970s decade is characterized by a redistribution towards the non-rentier groups depicted in 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.

Figure 4. Evolution of Pasinetti Indexes, Nine Selected Countries, 1971-2021, Annual Observations



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

The Taylor Rule versus the Wicksell Rule

As mentioned above, the Taylor rule reaction function has achieved a high level of acceptance historically, which in recent years may have even surpassed perhaps what was once the very popular Phillips curve, particularly because of the controversy about the latter's existence and flatness (see Seccareccia & Matamoros Romero 2022b). This generic-type central bank reaction function together with the Phillips curve are both key relations which, together with a third, the familiar 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 normally built. However, the question that one must first address is what is precisely the Taylor rule equation that some politicians wish to impose as interest rate-operating rule of central banks? As it was depicted in equation [1] above, the generic version is one in which there are two familiar components that the monetary authorities ought to be monitoring closely: the inflation gap and the output gap. The natural real rate ρ is merely the residual real policy rate $i - \pi$ when the inflation rate is at the desired/target level and output is at its "potential" level, 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 the problem is which 2 percent exactly? For instance, is it the broad CPI inflation or "core" inflation? Is this inflation 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? And if it is an average, is it a moving average over which period? In reality, 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 example, in the study by Levrero (2023), he 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 variable natural rate, ρ, as perhaps Wicksell himself believed.

Moreover, over what period does a central bank apply the rule, especially knowing that inflation and unemployment can only be known on a monthly basis 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 notion of a potential output from which is calculated the output gap is plagued with all sorts of both technical and methodological problems since 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 and 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.

In some way, this problem of the use of the output gap in the Taylor reaction function is also fundamentally problematic for yet another reason. Its inclusion in the standard Taylor rule rests on a key pillar of mainstream theory, namely 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 Romero 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, one may legitimately ask why nowadays it should still be there to be monitored by the research departments of central banks if the sole focus of the latter is essentially to control the inflation rate to fulfill their IT mandates.

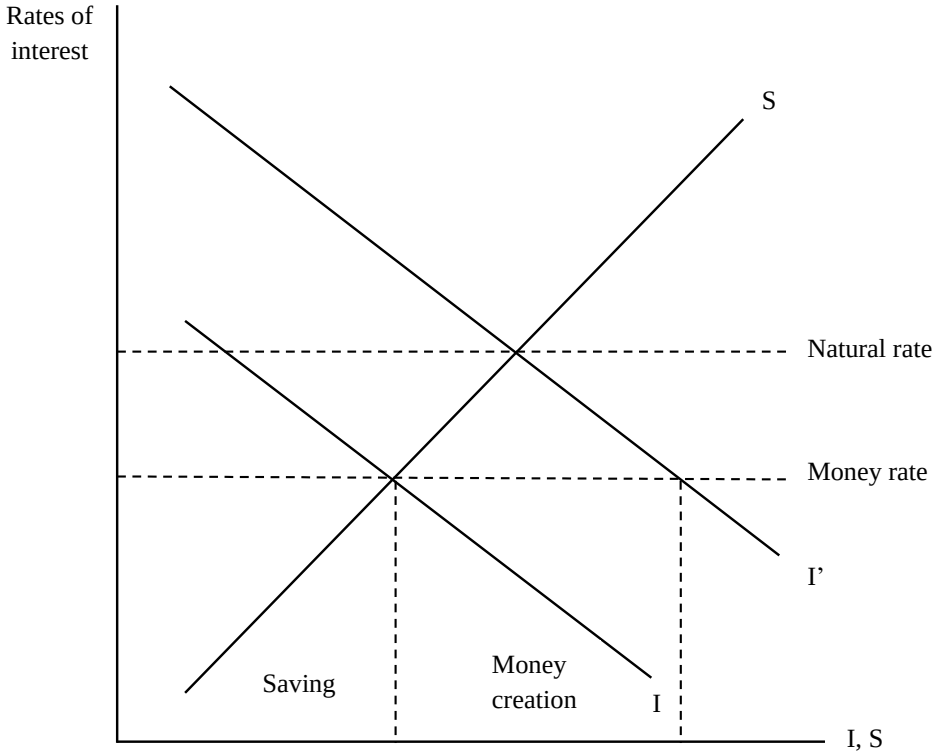
This issue of the questionable relevance of considering output gaps within IT regimes brings us to the whole question of the Wicksell rule versus the Taylor rule. Indeed, as is well known, the Taylor relation is a key pillar of the New Keynesian/Neo-Wicksellian macroeconomics (as, for instance, in Woodford, 2003). As discussed in Seccareccia (1998), at the superficial level, the Wicksell rule differentiates itself from the broad Taylor rule relation 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 reaction function. 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, and, 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. We wish to argue that both the setting of the money rate of interest and the exclusion of the output gap are 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. Before exploring empirically the possible implications of adopting these central bank rules from the historical evidence analyzed in the previous section within "inflation first" policy regimes, let us explore more carefully these reaction functions which led to a massive transfer in favor of rentier income until the GFC. Since then, central bank fears of deflation materialized and become more concerned with issues about both secular stagnation and the question of conducting interest-rate policy when one has reached the zero lower bound in the money interest rate. This is why central banks moved away from the strict IT regimes towards so-called flexible IT, which became more consistent with a hybrid dual mandate regime. But, let us first consider the implications of these theoretical approaches.

As is well known, Wicksell (1898) was deeply interested in central bank behavior within a "pure credit" context 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 on the basis of 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*). However, almost like did oracles in ancient times, the latter 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, assuming that 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 5: Wicksellian Investment-Saving Relation



To understand the mechanism described in Figure 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 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 as long as the gap between *ρ* 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 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:

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

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:

$$i = c + \alpha'(\pi) \quad [5]$$

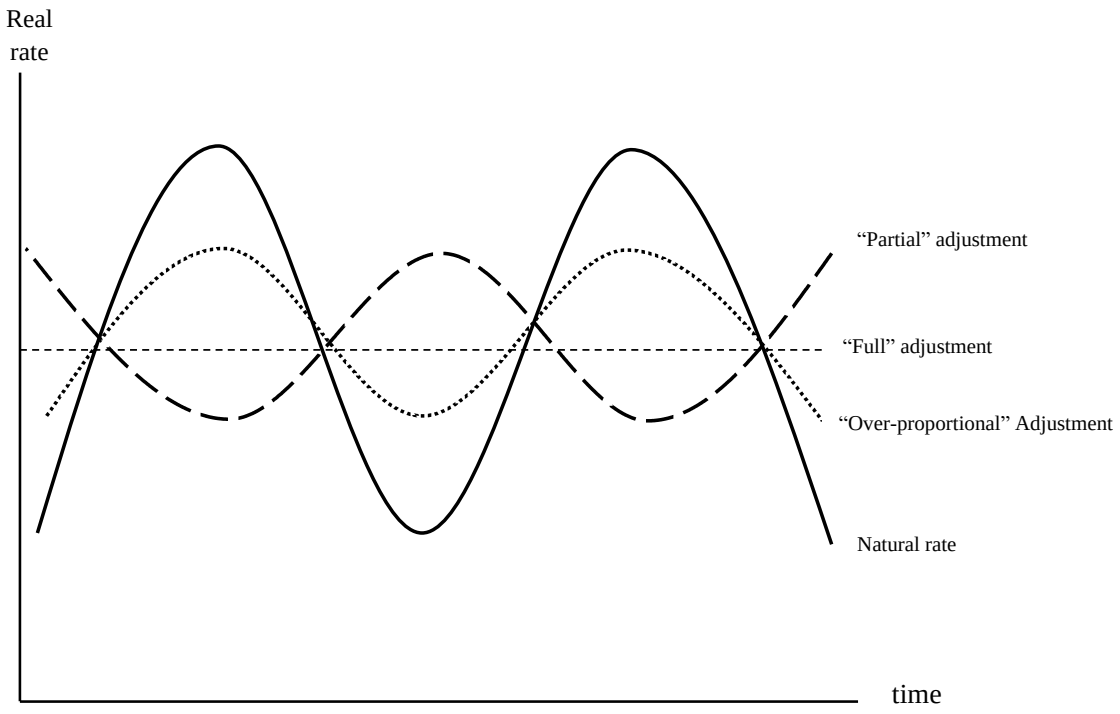
The properties of this Wicksellian reaction function are of some interest. When $\alpha' = 1$, this reaction function resembles a hybrid Fisher equation. However, unlike the Fisherian explanation, a stable real rate "*c*" is not the result of market forces (as is the residual term in the Taylor equation) but rather it is the outcome of the decision of the central bank to stabilize the price level by raising the money rate in proportion to inflation.

In reality, 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 critics of this essentially dubious concept with 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 in 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 6 below for partial adjustment ($\alpha' < 1$), proportional or "full" adjustment ($\alpha' = 1$), and "over-proportional" adjustment ($\alpha' > 1$) of i to π.

Figure 6: Evolution of *Ex Post* Real Rate of Interest under the Wicksell Rule for Central Banks



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. 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, under the Taylor assumption the central bank must raise the real rate, $i - \pi$, 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 its inferences on rentier income, is ρ in the Taylor rule equation 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 say to factors relating to technical change and intertemporal consumption/saving decisions. On the other hand, it cannot be a mere econometric outcome 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. 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 & 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.

Some Evidence on Monetary Policy Rules

The purpose of this section is to provide some evidence on the behavior of central banks following a Taylor-type and Wicksell-type reaction functions in major industrialized countries for the post-Bretton Woods period 1973-2022. Thus, we perform panel and pooled data regressions, comparing both Wicksell and

Taylor rules specifications. Also, in a first subsection we utilize annual data, which have the advantage of better capturing medium- and long-term effects as fluctuations are smoother and there is less of very short-run variations that potentially could blur things. Moreover, the concept of the "neutral" rate of interest, which takes the form of the constant term in a linear regression specification, as we will show, might be more adequately portrayed by annual data. Finally, annual data account, to some extent, for the lag in real-life central banks' behavior, which is generally based on medium-run economic conditions rather than short-run conditions. Nevertheless, we also present quarterly estimations in a second subsection as a sort of robustness check given the significantly larger sample size. In any case, we will see that both annual and quarterly data regressions are highly consistent.

a) Annual Data: 1973-2022

Table 1 presents the results of the fixed effects (FE) and pooled OLS (POLS) regressions for both the Wicksell rule and the Taylor rule. While the FE model considers that each country is a different entity over time, i.e., it accounts for a panel data structure, the POLS model puts all the observations together with no distinction of country, that is, it ignores the panel structure. We decided to include both models to contrast results in case it is argued that some of the nine industrialized countries in the sample (the G7 plus Australia and New Zealand) are very similar in terms of average interest rates and inflation behavior. Also, we included time fixed effects in all specifications given the long period involved consisting of 50 years for the countries with no missing data.

Specifically, because of the difficulty of obtaining output gap data for these long historical periods, we have looked at unemployment and have postulated simply the Wicksell rule for the FE and POLS models as follows:

$$FE:\ i_{it} = \alpha_i + \gamma_t + \beta_1 \pi_{it} + \beta_2 u_{it} + \varepsilon_{it} \quad (6)$$

$$POLS:\ i_t = \alpha_0 + \gamma_t + \beta_1 \pi_t + \beta_2 u_t + \varepsilon_t \quad (7)$$

where $i = 1, \dots, 9$ countries, $t = 1, \dots, T$ years, i stands for nominal interest rate, α_i represents country fixed effects, π is the inflation rate, u is the unemployment rate, β_1 and β_2 are the reaction parameters of inflation and unemployment, respectively, and γ_t are time fixed effects. As can be seen, the difference between FE and POLS is that the latter has no country fixed effects parameter. POLS assumes that all observations correspond to one entity so that there is just one parameter representing the average interest rate (α_0) whereas the FE has one parameter for each country. In theory, the constant parameter stands for the average or "neutral" interest rate – a hypothetical rate of interest for an economy at full employment and constant inflation – such that the POLS model assumes that the "neutral" interest rate is equal in all nine countries.

The Wicksell rule specifies the nominal short-term interest rate as the dependent variable whereas the Taylor rule depicts the real short-term interest rate (i.e., adjusted for CPI inflation) as the dependent variable. Columns 1 to 4 display results for the Wicksell rule estimation. Columns 1 and 2 depict the FE model and columns 3 and 4 the POLS model. The inflation coefficient is positive and statistically significant in all four specifications, meaning that a one percentage point increase in inflation on average is associated with an increase in roughly 40 basis points in the nominal short-term interest rate on average. Regarding

the unemployment rate coefficient, the coefficient is negative and significant in three out of the four specifications, revealing that a one percentage point increase in the unemployment rate is associated with a decrease in about 10 basis points in the nominal interest rate on average.

In specifications in columns 2 and 4 we have included interaction terms for the periods that followed the GFC and the COVID-19 crisis for both the inflation rate and the unemployment rate. Our aim is to identify whether the post-GFC and post-COVID-19 periods portray a reweighting in the reaction function of central banks. However, the only coefficient that resulted statistically significant is the inflation rate in the period 2008-2022. This coefficient is negative, such that when combined with the inflation coefficient for the whole period considered, the correlation between inflation and the short-term interest rate conditional on the period 2008-2022 is not statistically significant (according to a t-test upon the sum of the two coefficients).[2] Thus, we may argue that during the 2008-2022 period, the response of the short-term interest rates to changes in inflation, on average, becomes non-statistically significant. In other words, the average central bank reaction function does not seem to be responding much to changes in inflation rates during the period 2008-2022. The fact that the "inflation first" strategy seems to be relaxing in this period, or simply substituted by a flexible inflation targeting framework, due to deflation and secular stagnation fears from central banks, all is consistent with a constant income distribution between the rentier and non-rentier groups that is observed in the stylized facts of the rentier income shares and the PI trends.

On the other hand, the Taylor rule for both the FE and POLS models has the same specifications as equations (6) and (7) but replacing the nominal interest rate with the real interest rate (adjusted for CPI inflation). Columns 5 to 8 in Table 1 display the estimation of the Taylor rule, where the real short-term interest rate is the dependent variable. Again, columns 5 and 6 depict results for the FE model and columns 7 and 8 show results for the POLS model. It is no surprise that, since the short-term real interest rate has been deflated with CPI inflation, the inflation coefficient is negative and statistically significant for all specifications. In other words, an increase in one percentage point in inflation on average is associated with a decrease in the real short-term interest rate in 10 to 30 basis points on average. On the other hand, the unemployment rate coefficient is negative and significant only in the POLS model, implying that a one percentage point increase in the unemployment rate is associated with an average of 8 basis points decrease in the real interest rate.

Regarding the interaction term coefficients in columns 6 and 8, again, only the coefficient associated with inflation during the period 2008-2022 is statistically significant. In this case, however, the sign of the coefficient is equal to the inflation coefficient for the whole period. Therefore, the negative correlation between inflation and real interest rates conditional on the period 2008-2022 is greater, implying that a one percentage point increase in inflation is associated with a decrease in between 50 to 70 basis points in the real interest rate on average during 2008-2020.

Moreover, the constant coefficient representing the average interest rate is positive and significant in all specifications, except column 8. Hence, both average or "neutral" interest rates in the Wicksell and Taylor rules are positive for the period and countries considered. This is important because the constant coefficient is assumed to be an estimate of the "neutral" interest rate. Regarding the Wicksell rule, the "neutral" rate revolves around 2 to 3 percentage points on average but this *c* term should not be

[2] For instance, in column 2, the sum of both the interaction and main inflation coefficients is -0.049 and the sample standard deviation is 3.69. Performing a two-tail t-test with the null hypothesis being the combined interaction term equal to zero yields t=-0.2523, with a probability of 0.8 of rejecting the null.

considered an equivalent of the *rho* term, which is an unknown variable. As to the Taylor rule, the "neutral" interest rate lies in the range of 1.5 to 3 percentage points on average. In other words, in both specifications the "neutral" interest rate takes very similar values.

Finally, the total number of observations is 361 due to limited data availability. Data on unemployment rate start in 1982 for France, 1991 in Germany, 1983 in Italy and 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. It (to pinpoint that the period included in the regressions) very likely covers inflation-targeting experiences for the countries in the sample.

Table 1. Fixed Effects and Pooled OLS Regressions of Wicksell and Taylor Rules, Annual: 1973-2022

	Wicksell Rule: Money Interest Rate				Taylor Rule: Real Interest Rate			
	Fixed Effects		Pooled OLS		Fixed Effects		Pooled OLS	
	1	2	3	4	5	6	7	8
Inflation	0.345***	0.387***	0.371***	0.390***	-0.304***	-0.255***	-0.179***	-0.153***
	(0.0476)	(0.0541)	(0.0793)	(0.0847)	(0.0615)	(0.0758)	(0.0533)	(0.0574)
Unemployment rate	-0.125*	-0.0973	-0.0783***	-0.0839**	-0.140	-0.0971	-0.0751**	-0.0838*
	(0.0638)	(0.0863)	(0.0235)	(0.0403)	(0.0756)	(0.0977)	(0.0304)	(0.0483)
AR (1)	0.528***	0.516***	0.604***	0.606***	0.536***	0.530***	0.637***	0.647***
	(0.0634)	(0.0631)	(0.0478)	(0.0486)	(0.0585)	(0.0581)	(0.0605)	(0.0589)
Unemployment rate: 2008-2022		-0.0594		0.0150		-0.0858		0.0308
		(0.0725)		(0.0452)		(0.0784)		(0.0553)
Inflation: 2008-2022		-0.436**		-0.228**		-0.551***		-0.259*
		(0.140)		(0.115)		(0.144)		(0.132)
Unemployment rate: 2020-2022		0.0275		-0.00400		-0.0131		-0.0687
		(0.0515)		(0.0364)		(0.0858)		(0.0772)
Inflation: 2020-2022		0.00741		-0.215		-0.0646		-0.390*
		(0.201)		(0.142)		(0.252)		(0.233)
Constant	2.906***	2.469***	2.098**	1.963*	2.856***	2.224***	1.538*	1.380
	(0.788)	(0.733)	(0.926)	(1.000)	(0.670)	(0.645)	(0.787)	(0.861)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Observations	361	361	361	361	361	361	361	361
R-squared	0.955	0.956	0.960	0.961	0.899	0.904	0.893	0.896
Number of countries	9	9			9	9		

Robust standard errors in parentheses

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

Notes: The 9 countries are Australia, Canada, France, Germany, Italy, Japan, New Zealand, US, and UK.

b) Quarterly Data: 1973-2022

Table 2 presents the results for the same regressions as in Table 1 but using quarterly data, so that the number in our sample goes up four times approximately to 1,416 observations. However, broadly speaking, the results in Table 2 are consistent with the findings in Table 1. First, the inflation coefficient is positive and significant for the Wicksell rule regressions depicted in columns 1 to 4. The only difference is that the magnitude of the correlation is somewhat lower: a one percentage point increase in inflation is correlated with an increase in roughly 10 basis points in the nominal rate of interest on average. Moreover, the inflation coefficient is negative and significant for the Taylor rule regressions, but the magnitude of the correlation is smaller as well: a one percentage point increase in inflation is associated with a reduction in 15 to 30 basis points in the real rate of interest on average.

Second, the unemployment coefficient is negative and significant for both the Wicksell rule and the Taylor rule regressions, except in the specification in column 6. Like in Table 1, the correlation of the unemployment rate is smaller compared to the inflation rate, meaning that the central bank reaction function responded at least two times more decisively to deviations in inflation compared to deviations in the unemployment rate.

As to the interaction terms, like in Table 1, the coefficient associated with inflation during the 2008-2022 period is negative and significant. Also, when considered jointly with the main inflation coefficient, the combined coefficient is not statistically significant. This implies that, on the one hand, the Wicksell rule, conditional on the 2008-2022 period, did not respond significantly to changes in the inflation rate on average, whereas the Taylor rule responded more vigorously to changes in the inflation rate. The only difference with respect to Table 1, is that both interaction terms – inflation rate and unemployment rate – in the Taylor rule specification for the COVID-19 period are negative and significant (column 8), which means that the sensitivity of interest rates to changes in both inflation and unemployment increased during the COVID-19 period on average.

Furthermore, although the constant coefficient in the Wicksell rule regression depicting the “neutral” interest rate is always positive and significant (like in Table 1), the constant coefficient is not significant in the Taylor rule regression. Thus, according to the theory, the “neutral” interest rate would have a value between 1 and 2 percentage points on average in the Wicksell specifications, following the findings in Table 2. In contrast, the “neutral” interest rate would have a value no different from zero by looking at the Taylor rule regression in Table 2.

We must clarify that the total quarterly observations in table 2, which is 1,416, is not exactly equal to four times the annual data number found in Table 1, which is 361, because quarterly data are more limited

compared to annual data in the OECD Statistics. First, the Japan data start in 2002q3, France in 1983q1, New Zealand in 1986q1, and the Japan data end in 2021q2. Finally, 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 all person unemployment rates are harmonized to be comparable among countries, and the series of consumer price indexes (CPIs) were extracted from KEI database as well, that is, all databases found in the OECD Statistics website (OECD.Stat).

Table 2. Fixed Effects and Pooled OLS Regressions of Wicksell and Taylor Rules, Quarterly: 1973q1-2022q4

	Wicksell Rule: Money Interest Rate				Taylor Rule: Real Interest Rate			
	Fixed Effects		Pooled OLS		Fixed Effects		Pooled OLS	
	1	2	3	4	5	6	7	8
Inflation	0.0891***	0.108***	0.0870***	0.0963***	-0.154***	-0.124**	-0.0877***	-0.0650*
	(0.0250)	(0.0276)	(0.0291)	(0.0336)	(0.0337)	(0.0405)	(0.0296)	(0.0332)
Unemployment rate	-0.0593**	-0.0576*	-0.0282***	-0.0322***	-0.0801*	-0.0597	-0.0342***	-0.0336**
	(0.0228)	(0.0293)	(0.00619)	(0.0114)	(0.0390)	(0.0541)	(0.00930)	(0.0149)
AR (1)	0.842***	0.832***	0.883***	0.880***	0.769***	0.751***	0.844***	0.837***
	(0.0315)	(0.0333)	(0.0162)	(0.0168)	(0.0457)	(0.0471)	(0.0205)	(0.0208)
Unemployment rate: 2008-2022		-0.00372		0.0113		-0.0291		0.0101
		(0.0199)		(0.0119)		(0.0379)		(0.0169)
Inflation: 2008-2022		-0.127**		-0.0599*		-0.251***		-0.118**
		(0.0432)		(0.0351)		(0.0587)		(0.0475)
Unemployment rate: 2020-2022		-0.00571		-0.0190		-0.0370		-0.0660**
		(0.0179)		(0.0127)		(0.0467)		(0.0259)
Inflation: 2020-2022		0.0322		-0.0150		-0.160		-0.256***
		(0.0437)		(0.0249)		(0.115)		(0.0748)
Constant	1.779***	1.683***	1.414***	1.381***	0.961	0.638	0.230	0.0724
	(0.241)	(0.244)	(0.225)	(0.255)	(0.526)	(0.545)	(0.489)	(0.518)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,416	1,416	1,416	1,416	1,416	1,416	1,416	1,416
R-squared	0.983	0.983	0.985	0.985	0.947	0.949	0.947	0.949
Number of countries	9	9			9	9		

Robust standard errors in parentheses

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

Notes: The 9 countries are Australia, Canada, France, Germany, Italy, Japan, New Zealand, US, and UK.

Concluding Remarks

We began with an initial question derived directly from the title as to whether "inflation first" is synonymous with "rentier first" monetary policy, and we believe that both the theory and the evidenced-based arguments put forth would allow us to respond affirmatively. Firstly, the regression analysis provides evidence that central banks in major industrialized countries have been following primarily a Wicksellian-type reaction function, at least before the GFC, where money interest rates were set by central banks to chase the unobservable "neutral" interest rate according to the *ex-post* information provided by the observed rate of inflation. Central banks did not appear to be targeting any contemporaneous real interest rate along the lines of the simple Taylor rule, even though the Taylor framework had been heavily marketed and popularized. Seemingly, from the empirical evidence, what they 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 were redefining their priorities.

Secondly, 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 in the field of the calculation of rentier income measures due to the lack of accessible and long 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 employment 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 employment) 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 paper 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 become net lenders and money managers within an increasingly financialized macro-economy. Also, despite its methodological difficulties, it would be interesting to come up with more concrete estimates of the impact of "inflation first" monetary policy on the transfer of income and wealth to rentiers. These and other issues are left for future research.

Appendix

Table A. 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

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

Source: OECD.Stat

References

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.

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.

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

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.

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

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. (1923), *A Tract on Monetary Reform*, London: Macmillan.

Keynes, J.M. (1936), *The General Theory of Employment, Interest and Money*, London: Macmillan.

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., 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): 5–40; https://www.mcgill.ca/maxbellschool/article/articles-choosing-right-target/going-beyond-inflation-targeting-mantra-dual-mandate

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

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

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

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

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. (2014), "Were the Original Canada-U.S. 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(4) (Winter), pp. 414–428.

Seccareccia, M. (2022), "Crisis del Covid-19 y el resurguimiento 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 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.

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

Seccareccia, M., and G. Matamoros Romero (2023). "Why Central Bank Policy Is Not Income-Distribution 'Neutral'." In *Central Banking, Monetary Policy and Income Distribution*, ed. by S. Kappes, G. Vallet and L.-P. Rochon. Cheltenham: Edward Elgar, pp. 163-88.

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

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.

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

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

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

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

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

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