

Macroeconomic Policy as an Epistemic Problem*

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Mainstream macroeconomic theory understands the economy as a phenomenon tractable by analysis adequately enough to be manageable by macroeconomic policy guided by this analysis. We explore why this epistemological approach of the economy has remained dominant in mainstream economics despite recurrent policy failures, contradictory theories and inconclusive revisions of both theories and policies. We identify a relationship of ‘epistemic entanglement’ between economics as a discipline and policymaking that has consolidated a reductionist analysis of the economy as well as the subsequent expectation for clear prescriptions on how policymakers can effectively steer the economy in a desired direction. We argue that this reductionist analysis misrepresents the micro-macro relationship, and it is responsible for recurrent patterns of both economists and policymakers overlooking diverse and intractable micro-adaptations to policy interventions that tend to result in undesired, unforeseen and unintended consequences over time. As such, this entangled relationship has contributed to macroeconomic instability.

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Introduction

The 2008 financial crisis re-activated the debate about economics as a source of knowledge and prediction. In the New York Review of Books, David Graeber's commentary on Robert Skidelsky's book *Money and Government* mentioned a growing feeling, among those with the responsibility to manage large economies, that the discipline of economics was 'no longer fit for purpose'; a disappointing realization for those who look to economic analysis for directions as to what the government should do.ⁱ Hayek criticized this ambition and the underlying analysis that promises to satisfy it as a 'pretense of knowledge'. His work presents a distinct conception of how productive coordination in the economy emerges from the way economic actors create and retrieve relevant knowledge in the form of incomplete informational signals from myriads of market interactions. Bringing the Hayekian perspective in the field of macroeconomics, Wagner (2012; 2020) conceptualized the macrolevel as an ecology of human interactions that are too complex for any form of analysis to forecast and cannot be re-arranged by a central command point at will.

Triggered by these contributions, the paper makes the following observations and arguments. First, major macroeconomic theories have been developed and amended over the decades, but they have all supported the idea that a central authority *can* and *must* macro-manage the economy. This belief endures because of the analytic reductionism that characterizes these theories and their frameworks of analysis; the economy is presented as analytically tractable, and this also makes it appear as potentially compliant to policy interventions if governments are informed by the right theory and analysis. Second, both the belief in the effectiveness of macroeconomic policy and the preference for analytical reductionism are mutually constitutive phenomena. They stem from the entangled relationship between economics and policymaking. Even when economists sought to understand previous policy failures with a view to revising their theories or methodologies, their work remained reductionist enough to serve as the next best policy framework. Third, this has been a significant and negative problem for real economies. Analytic reductionism has consistently fostered a misplaced confidence in the effectiveness of macroeconomic policies to successfully interfere with a complex social ecology. This has prevented economists and policymakers from properly understanding why and how macroeconomic policy interventions can generate serious unintended and unforeseen consequences.

The following section starts by revisiting the Hayekian ‘pretense of knowledge’ thesis and Wagner’s conception of the macroeconomy as a complex system, which form the foundations of our critique. We stress that macroeconomic developments are emergent properties of micro-interactions. The third part of the paper identifies what we call the ‘epistemic entanglement’ between the discipline of economics and the community of policymakers, and stresses how this feedback relationship favors analytical reductionism as well as fosters the expectation that policymakers can control and direct the economy. The fourth part revisits the macroeconomic history of the United States to illustrate how this entanglement evolved as both economists and policymakers tried to grasp the unintended consequences of prior macroeconomic policies and sought to come up with better theories and analysis addressing policymakers. The fifth part of the paper discerns reductionist bias in both the mainstream and the heterodox approaches that have been developed in response to policy mishaps.

The sixth part posits what these theories overlook: a better understanding of the macro-environment as emergent from micro dynamics that how radical interventions cause behavioral adaptations that tend to further disrupt rather than re-order the economy. A reductionist view of the economy overlooks the complexity of micro-level interactions that develop into the properties of the macro-environment and, consequently, obscures how macroeconomic interventions tamper with these processes

We elaborate on this point. Macroeconomic policies disrupt economic behavior by triggering multiple adaptations by economic actors under conditions of stress leading to a sequence of policy-induced behavioral reverberations on a larger scale and of an unpredictable direction. Models and statistical work covering prior observations cannot predict how these adaptations and interactions will evolve after an intervention has occurred in a new context and they cannot forecast its consequences at the system-level further into the future. As a result, macroeconomic interventions can be impactful indeed but in unpredictably disruptive ways.

The Hayekian-Wagnerian thesis on economics and the economy

There is a fundamental tension between the enormous complexity of the economy as a phenomenon, on the one hand, and the desire of economists for analytic precision and prediction, on the other (Caballero 2010, p.100). As Caballero put it, the problem is that ‘mainstream’ core of economics has developed a mathematical and inevitably reductionist

analysis that cannot capture the full range of complex interactions in the economy, but, on the other hand, the so-called periphery or ‘heterodoxy’ offers imprecise and broad generalizations on economic phenomena without direct solutions (Caballero, 2010, p. 86). Economists face a dilemma in terms of how they can plausibly reconcile the ‘virtue’ of parsimony in the methods and assumptions they rely on with a good degree of fitness between analysis and reality. The most influential benchmark for such reconciliation was articulated by Friedman: a model is valuable insofar as it offers a good degree of predictive capacity (Cf. Friedman 1953). Even if a model has very few assumptions and limited data, it is considered as valid if it can successfully guide policymakers on what they should do to achieve their desired ends (Cf. Manski 2019).

Hayek rejected this approach as both unrealistic and misleading (Cf. Wagner 2005, p. 84). In his Nobel Memorial Lecture (1974/1989), he criticized mainstream economics for offering policy prescriptions based on wrongly presumed knowledge, ‘scientism’:

... This way lies charlatanism and worse. To act on the belief that we possess the knowledge and the power which enable us to shape the processes of society entirely to our liking, knowledge which in fact we do not possess, is likely to make us do much harm. (1974/1989, p. 7)

Hayek stressed the complex nature of the economic phenomenon. The economy is a complex system that cannot be adequately captured with methods drawn from the natural and biological sciences. The economy consists of myriads of interacting actors in markets connected through multiple exchange relationships (Hayek 1952; 1967). These interactions create various learning processes that are incomplete and unique for each individual actor and evolve over time (Hayek 1937; 1945; 1955; 1967; 1968; Boettke 2002). No observer or central authority can gather the totality of these processes or harness such knowledge. Such knowledge is dynamic, local, dispersed, created in fragments and continuously communicated through myriads of interactions connecting multiple socioeconomic actors, which no analyst can access and model (Hayek, 1937, p 76; 1945, p. 524). While economic actors have imperfect knowledge of the circumstances of their environment (Cf. Boettke, 2012, p. 237), they can coordinate their activities for profitable production and exchange insofar as they are motivated by the profit motive and guided by prices and other signals pertinent to their plans under a legal framework that protects property and market exchange. On these grounds, Hayek argued, policy

commands on production and exchange will tamper with the way markets generate a good degree of coordination.

This conception of the economy as a dynamic discovery process is contrasted with the mainstream analysis, which during Hayek's time had come to occupy the mainstream of economics, in which the economic environment is represented with econometric analysis or formal modelling. The reductionism of neoclassical analysis entails a view of the economy as a system in which key variables can be measured, aggregated and causally associated as macro-foundations or relevant behavior can be represented in mathematic models with few assumptions.

Wagner elaborated on Hayek's work in the field of macroeconomics (2007; 2012; 2020). Drawing on Lindahl's conception of the macro-level as an emergent whole from multiple micro-interactions (1913), Wagner describes the economy as 'an ecology of plans' that hosts miscoordinations among market participants and achieves a degree of coordination as an emergent property of these coordinations, in a dynamic way, meaning that there is no equilibrium which a given system is supposed to reach.

Emergence describes how the co-evolution and mutual reconfiguration of connected parts of a system continuously generate new functions and the broader properties of the system itself. Ontologically speaking, macroeconomic phenomena are of a higher order of complexity than micro phenomena. The macro emerges through multiple micro interactions. Wagner emphasizes how mainstream economics misconstrue the economy with an aggregative view of the micro-macro relation:

.... the difference between the choice-theoretic and emergent-theoretic orientations can be summarized with reference to two distinct types of orderly social configuration: a parade and a crowd of pedestrians passing through a piazza.... Treating macro as an equilibrated aggregate of micro actions is equivalent to treating a parade as an aggregation of equilibrated pedestrians (2012: 434)

For Wagner, the economy is like a crowd of pedestrians whose individual movements continuously create ever-changing formations. Unlike random pedestrian crowds, however, the economy exhibits a degree of coordination, as market participants engage in profitable relations

of exchange and cooperation (Wagner 2020: 179). In other words, the economy is a ‘polyphonic’ system of multiple, purposeful and consequential interactions (Wagner 2020, pp. 4-5).ⁱⁱ Because the relationship between micro and macro is not simply an aggregation of inputs into outputs, the economy should not be conceptualized as a system in which variables such as economic output, employment, investment and price levels are causally associated as if they were directly acting on one another (Wagner 2012; 2020, 3; Cf. Leijonhufvud 1973; Stoker 1993; Hartley 1997; Hoover 2001). The interactions and diverse actions and decisions of myriads of actors generate a good degree of economic coordination (Wagner 2020: 61; 168; Cf. Koppl et al. 2015: 2).

In treating macro variables as aggregations from the activities of the economizing agents, mainstream economics falls short of acknowledging the economy in that sense, as an emergent ecology of interacting agents (Wagner 2020, 3). Mainstream economics mistakenly pictures the economy as if it were a parade of people that can be captured with a central point of mass or with a representative agent and could conform to the commands of a parade marshal as if it were a robotic system (Wagner 2020: 53). Instead:

‘within an ecology, the same micro units can generate different macro patterns in response to different patterns of connection among the micro units’ (Wagner 2012: 434).

Epistemic entanglement

Hayek and Wagner point to a key epistemic problem with how mainstream economics represent the economy. This analytic reductionism has had policy implications. If the economy can be adequately accessible to economists, it may also be seen as manageable by governments if the right analysis is provided to them. Reducing economic phenomena into the input of a sum of aggregates or basic units that can be modelled for analysis fosters the idea that policy interventions can re-arrange these parts following this analysis. Reductionist analysis helps policymakers build confidence in their capacity to control and direct economic activity. Informed by the right model or data analysis, the government supposedly knows what it should do. This is what Hayek called scientism: the idea that scientific analysis enables policymakers to manipulate collective behavior on such a scale that key properties of the social and economic environment will take a desired form or direction.

This conception of what policy can achieve has been shaped and entrenched through an ongoing interaction between economics and policymaking. We use the word ‘entanglement’ to refer to the fact that the scientific community is part of a complex human ecology of interactions through which experts and policymakers come to develop and share common epistemic goals and aspirations. Policymakers turn to experts for sound advice about how they can achieve desired social outcomes and experts try to help policymakers understand the problems they deal and apply knowledge from their sciences into practical purposes. Contributions from experts in the form of theory and analysis define what policymakers can envisage they can do in society and the economy but, at the same time, available scientific analysis puts pressure on them to do something substantial in line with expert advice. If they can do something, then they must do it.

By describing this relationship as ‘epistemic entanglement’, we extend Wagner’s work on entangled political economy to the epistemic level (Wagner 2016: 32).ⁱⁱⁱ The relationship between expert communities and policymakers is an important dimension in the development of macroeconomic theory and policy. Like any system of interactions, policymakers and economists create a distinct ecology for the production of knowledge.^{iv} Interactions among the participants in that ecology create basic norms and expectations in that system (Cf. Wagner 2016: 65, 73, 86).^v While, in the original Wagnerian conception, entanglement, broadly speaking, means that *no form of business* can determine a course of conduct independently of the desires of relevant entities (Wagner 2016: vii, emphasis added), our point here is that neither knowledge production nor research can develop independently of how the community of experts and the policymaking community interact with each other.

In economics, the interplay between epistemic and policy communities, particularly in the 20th century onwards, favored analytic reductionism as the epistemological way to make the economy analytically tractable across major theory revisions and, at the same time, fostered a distinct expectation about the role of economic policy. On the one hand, analytic reductionism allows theories and methods to be presented to policymakers as scientific, couched in mathematical models and statistical associations between observed phenomena with quantifiable properties. This analysis then creates expectations for specific policy prescriptions. Policymakers want economists to offer the ‘right type’ of theories and models to

guide their policy goals and plans, even if they have been, most of the times, relaxed about following them to the letter. This demand is, in turn, influencing the agenda of the economists who are involved in theory revision or methodological innovation. Hence, this synergistic relationship between economics and policymaking keeps boosting the use of analytical reductionism, despite differences in theories and the arguments that theorists occasionally proposed in key debates over specific policies and agendas over time, and despite the fact that there were indeed differences between what influential theories suggested and what policymakers actually did in their name.

This epistemic entanglement intersects with the problem of incentives in politics, primarily, that governments would promote their own priorities and would favor a specific agenda of research (White 2005), while many experts would convey the kind of information that could gain the approval of the policymakers and help them establish themselves as knowledge authorities (Koppl, 2018, pp. 151-153; 194). While incentives for opportunistic behavior can influence the relationship between economists and policymakers, the discipline of economics has been a community of scholars with diverse and competing contributions, with outputs often challenging policy decisions. Moreover, there have been changes in ‘policy paradigms’ triggered by theoretical revisions in conditions of competition (Hall 1993; Drezner, 2001, p. 60). Theories and ideas have been clustered into opposing theoretical frameworks. Although economists tend to resist challenging their own methodology (Yalcintas 2016), economic crises were key moments in which other economists coined new theories and proposed methodological innovations.

The entangled development of macroeconomic theory: the US context

Policy failure usually creates a momentum for policy reform with changes in the overarching goals that guided economic policy, the techniques or policy instruments that were used to achieve economic goals or the precise settings of these instruments (Hall 1993). It is also a moment for new theories to emerge and compete for policy approval. In economics, macroeconomic theories such as Keynesianism and monetarism were responses to epistemic ‘anomalies’, namely developments that could not be fully explained by the analytic terms and methods of the prior theoretical paradigm (Hall 1993). Policymakers became interested in receiving new economic analysis that could offer them a most reliable framework for effective policy interventions, and economists assumed the role of scientist *cum* social engineer

(Boettke, Coyne and Lesson 2006; Mankiw 2006). In response, despite their differences, these two major macroeconomic theories offered the type of analysis that guided large-scale, ‘radical’ interventions, i.e., interventions aiming at managing collective behavior to such an extent that such change was expected to be registered in measured changes in macro-economic variables.

The history of macroeconomic policy in the United States illustrates this relationship between policy and theory that developed around the quest for policy certainty. There were policy cycles of ‘failure, revision and failure’ followed by the search for the next ‘proper’ predictive and prescriptive theory. There were intense policy debates and important theoretical and methodological developments, particularly during the period of ‘stagflation’ in the 1970s and after the 2008 financial crisis, which at times led to changes of the predominant theory paradigm (Ikeda 1997, pp. 55, 77, 104; Cf. Hall 1992).

Keynesianism

Keynesianism guided government interventions in the 1950s and 1960. The aim was to fine-tune indices of economic performance and meet various goals through incomes policy, price controls, fiscal policy and monetary policy. Economists adjusted Keynes’s arguments to the emerging positivist epistemology of neoclassical economics in the so-called ‘neoclassical synthesis’ (Best 2014). At the same time, governments prepared their annual budgets on the basis of econometric forecasts of future aggregate indices. Despite a generally positive economic outlook, macroeconomic policies recurrently failed to meet their targets and confronted unintended consequences. By the end of the 1960s, growing government spending and taxes relative to GDP as well as the greater scale and complexity of government regulations led to a rise in policy-related economic uncertainty in Western Europe and the United States, despite the generally positive post-war economic outlook (Baker et al. 2014).

In the United States, rising inflation in the 1960s led the US Federal Reserve to tighten its fiscal policy and later sell its gold reserves to prop up the value of the US dollar which had been pegged to the price of gold. The rise of oil prices put an extra strain on manufacturing, while the fiscal cost of the Vietnam War burdened the federal budget. In a Keynesian fashion, the Federal Reserve responded by easing monetary policy to deal with the 1970 recession but soon

faced a rising inflation rate. Anemic growth, high unemployment and high inflation in the 1970s caused the economic situation infamously known as stagflation.

Stagflation undermined confidence in the US dollar. Monetary instability pushed the Nixon administration to cancel the direct convertibility of the dollar to gold in 1971. This decision opened the way for the Federal Reserve to target unemployment with aggressive monetary expansion. The expansionary monetary policy fueled inflation. To avoid soaring inflation, a policy of price and wage controls was introduced and lasted until 1975. Wage and price controls led to product shortages and contributed to economic stagnation. Following the devaluation of the dollar by 8 per cent in the summer of 1973, the Nixon administration allowed the value of the dollar to be determined by market transactions. Immediately after the devaluation of the US dollar, inflation soared. The United States was in recession between November 1973 and March 1975. Rising inflation and unemployment were partly attributed to events exogenous to macroeconomic policy, such as the cost of Vietnam War and rising oil-prices, inflation and unemployment.

Throughout the 1970s, policies designed to stimulate demand and boost employment looked inapplicable in an environment of rising inflation. Targeting one aggregate figure, such as growth or unemployment, was derailing the performance of other figures, such as inflation and vice versa. Real wage reductions (in the form of lower-to-inflation wage rises) to curb inflation did not work either. Among circles of policymakers and academics, rising inflation and unemployment called into question the idea encapsulated in the Philips curve that there was a trade-off between unemployment and inflation. Stagflation – the persistence of both economic stagnation and inflation – was the anomaly that Keynesian theory seemed unable not explain. Frequent changes regarding the hierarchy of macroeconomic goals exposed the instability of the policies of the Keynesian consensus and eventually paved the way to its demise as a policy paradigm by the late 1970s.

Monetarism

At the end of the 1970s, the Keynesian paradigm was eventually sidelined by monetarism with its emphasis on how to control inflation. Monetarism explained fluctuations in the economic output and inflation as the result of excessive changes in money supply. Milton Friedman, together with Anna Schwartz, called for a steady rate of increase in the supply of money,

regardless of the cyclical movements of the economy, and suggested that cyclical fiscal adjustment ought to be abandoned (Friedman 1960/1992). Central banks must create a fixed monetary rule to achieve price stability by forecasting which rate of growth in the supply of money would be in tune with anticipated future demand. Identifying the monetary equilibrium, as well as the level of money creation that would lead to it, was an ambitious task to be entrusted to central banks.

Monetarists challenged the Keynesian paradigm by asking central banks to replace interventions aiming at fine-tuning demand with the use of monetary policy to tame the rate of inflation. The key idea was that inflation can be brought down by means of restrictive monetary policy. Despite the emphasis monetarism places on steady money supply, monetarist theory was promoted as the response to the problem of persistent stagflation. The applied version of this theory was radical: an effort to seriously restrict money supply and raise interest rates in order to bring down the rate of inflation. Friedman endorsed this policy:

Reduced monetary growth produces a subsequent slowdown in spending, reflected first in output and employment, later in inflation. As inflation slows down, output and employment begin recovering. The phase of withdrawal from the drug of inflation is coming to an end (Friedman, 1980, p. 19)

The switch to monetary policy took place in an uneven way, driven by political expediency. Restrictive monetary policy led to a liquidity crunch and rising unemployment that monetarists foresaw as a temporary side effect in the fight against inflation. The full range of side effects, however, was unknown and unspecified.

Friedman's approval of tight monetary policy to lower inflation in that situation seems like a departure from the quantity theory of money that prescribes a steady rate of money growth, but it is indeed an interpretation of the situation then that called for a radical application of this very same macroeconomic idea in the form of an activist monetary policy, this time, fighting inflation, which adheres to the same logic that governments can effectively engage in macroeconomic management, particularly in the face of crisis. In that regard, because both neoclassical Keynesianism and monetarism share a common epistemological ground for analytic reductionism, their ideas were put in the service of radically interventionist government action. In the words of Friedman:

I believe that Keynes's theory is the right kind of theory in its simplicity, its concentration on a few key magnitudes, its potential fruitfulness (Friedman, 1986, p. 52)

Monetary policy soon drifted into an 'applied' anti-cyclical usage. In the United States, in the aftermath of the stock exchange panic on 'Black Monday' on October 19, 1987, Alan Greenspan, the newly appointed Chairman of the Federal Reserve, claimed that it was the Fed's responsibility to serve as a source of liquidity to support the economic and financial system (Carlson 2006, 10). This was hybrid form of Keynesianism through monetary policy with the dual concern of addressing both inflation and liquidity (Cf. McCombie and Negru, 2014). The goal of monetary policy was again to fine-tune the economy, but fine-tuning was dubbed 'stabilization' to be effectuated by way of monetary policy insofar as this intervention would not derail the rate of inflation. Friedman, for instance, advocated that, for the Japanese economy, 'the surest road to a healthy economic recovery is to increase the rate of monetary growth and shift from tight money to easier money... but without overdoing it' (Friedman 1997).

Macroeconomic policy in the US followed this trend of 'intervention for stabilization'. Macroeconomic policy involved periodically loosening the money supply and running budget deficits that were not supposed to fuel inflation to the extent that they did not cause a rapid above-equilibrium growth in the money supply and velocity. After the 2001 economic contraction, in the period up until the 2008 global financial crisis, the Fed took a more active role in using interest rates to boost the general performance of the economy, further moving away towards the idea of stabilization and growth through macroeconomic policy by fine-tuning interest rates and, ultimately, money supply.

Epistemic entanglement and recent theoretical debates

Friedman's preference for analytic reductionism was propped up by an instrumentalist stance on the use of models, which provided a reassuring defense of deductive modelling as an effective way to picture how the economy works:

Normative economics and the art of economics, on the other hand, cannot be independent of positive economics. Any policy conclusion necessarily rests on a prediction about the consequences of doing one thing rather than another, a prediction that must be based - implicitly or explicitly - on positive economics (Friedman 1953, p. 5)

For Friedman, the challenge for economic analysis is not about the fact that the assumptions of models are descriptively unrealistic - he acknowledged that they are never realistic - but whether models are good enough to deliver sufficiently accurate predictions (Friedman 1953, p.15). Following Friedman's criterion, economic analysis followed a *nonsequitur*: if a model predicts, keep considering it as a sound source for policy direction until we confront the kind of negative and unanticipated effects that would suggest that it was wrong from the very start and did not actually predict what it was supposed to predict.

The development of neoclassical macroeconomic models was further propelled by the famous 'Lucas critique' (Lucas 1976). Lucas postulated that we cannot predict the effects of a change in economic policy by relying on historical data to make inferences about future trends and that econometric models need to constantly account for endogenous change in the behavior of those who populate the model. The Lucas critique of econometrics triggered a shift to economic modelling under the neoclassical premises of rationality, optimization and equilibrium and brought about a new rationalization of macroeconomic policy on analytic grounds. In line with Friedman's criterion, several methodological innovations addressed the question of external validity as a problem of predictability and sought to strengthen economic analysis by refining the assumptions of rationality as optimization (Cf. Scheall 2015; Scheall, Butos and McQuade 2019). Reading Lucas, some of these efforts tried to build dynamic models with microfoundations. The so-called New Neoclassical Synthesis (Meyer 2001) followed the presumption that the behavior of firms and consumers can be model as a 'representative' firm agent engaged in constrained optimization under a few calibrated parameters (Kirman 1992; Goodfriend, 2004; Brancaccio and Saraceno, 2016). Models with rational microfoundations and time dynamics conformed to the dominant neoclassical paradigm of equilibrium analysis (Brancaccio and Saraceno 2016) with variations along the basic concepts of rationality, optimization and equilibrium, such as with adaptive expectations (Cagan 1956) and rational expectations (Muth 1961; Lucas and Rapping 1969; Sargent and Wallace 1975).^{vi} The

underlying idea is that collective behavior would more or less follow how the ‘representative agent’ is modeled to behave under these assumptions.

Dynamic stochastic general equilibrium models (DSGE) were developed and were trying to model a time dimension for outcomes that were still the result of optimizing economic behavior by representative agents. Like other models, DSGEs assumed that the agent of a model and her circumstances are adequately representative of how diverse economic agents would behave in reality. The external validity of these models was questioned on the grounds that they were set up under given preferences, technology and strict obedience to specified institutions and norms in a closed economy (Mankiw 1988; Wren-Lewis 2007; Buiter, 2009; Best, 2010; Caballero, 2010 Denis, 2016). The criticism is that both uncertainty – represented in the term ‘stochastic’ – and time – represented in the term ‘dynamic’ – are represented in a far too reductionist framework: in reality, these models included some pre-determined states of a foreseeable system and left no room for unforeseen disruptions, any novelty or further uncertainty beyond what the model designer configured (O’Driscoll and Rizzo 1985). Koppl summarized the essence of the critique:

‘DSGE models boil all this diversity to a few equations representing, typically, one person, the representative individual, choosing how to distribute one good, labelled “consumption”, over time given a production technology that can change only when a random shock alters one or more coefficients of the equation linking a few inputs to the output of the one consumption good’ (Koppl 2014, p. 50).

A key criticism is that these models overlook the multiple and unspecified ways by which different actors would define their preferred objectives, evaluate alternative means and take action in conditions of uncertainty (O’Driscoll and Rizzo 1985). It is impossible for economists to know the whole range of psychological and evaluative factors at play through time and the complexities of the surrounding structure (Cf. Granovetter 1985; Hodgson 2012; Wagner 2020, p. 44-45).

In particular, neoclassical models overlook the idea of *emergence* which is linked to the heterogeneity of human actors and their interactions across time. How a system would behave cannot be understood on the basis of direct connections between measured macro-variables or by how an imagined set of agents are presented in an equilibrium model (Devereaux and

Wagner 2018a). When data referring to past action is measured and analyzed but results are confounded with future action, the uncertainty associated with how actors act today to achieve future outcomes tomorrow is overlooked (Wagner 2020: 18). Instead, in the actual economy and society, diverse actions are entangled with the actions of other individuals and together they continually build the properties of a system (Devereaux and Wagner 2018a).

We can further elaborate on this. Economic actors are too diverse to be modelled as identical units and the economy too complex to be reduced to how an imagined representative agent would behave under preset assumptions. At the micro-level, diverse actors learn and adapt their behavior by interacting with others, meaning that future adaptations will be context-specific and dynamic, eluding general statistical inferences from past data analysis. Historical information tells little about how multiple behavioral adaptations would evolve in the future when new multiple learning processes occur. Time variance and context heterogeneity make each setting unique and intractable by models and data analysis. At each context, there will be multiple behavioral adaptations which, at the macro level, will create dynamic and diverse systems. At the macro-level, the properties of the macro ecology are equally unique due to the uniqueness of the micro-interactions that dynamically keep configuring it. This becomes an irresolvable problem for the external validity of economic models and for the reliability of past econometric associations. It is also an inevitable problem for policy interventions based on this type of analysis. The problem of intractability means that policymakers cannot predict how people would behave in response to policy interventions (Cf. Friedman 2019).

In a sense, by ignoring complexity, analytic reductionism serves as a misdirecting basis for both theoretical generalization and policy prescription because it obscures how actual contexts would behave and how they would respond to policy interventions. A key example is that central banks and experts did not pay attention to the building up of a subprime mortgage crisis and did not predict how this would eventually break up as a major financial crisis in 2008. While focusing on the rate of inflation, they did not see, and they could not predict, how money and interest rate policies were affecting the prices of assets in markets particularly sensitive to interest rates, by altering risk and opportunity perceptions for investment in finance, housing and construction. The financial crisis and its rapid escalation caught them by surprise. A panic reaction took over financial markets causing a credit crunch and escalating into a global financial crisis (Taylor, 2009) followed by a public finance crisis in Greece, Spain, Ireland and Portugal. In response to this crisis, most central banks engaged in monetary expansion and

quantitative easing (QE) and combined it with a short-lived fiscal stimulus. This was hailed as the revival of Keynesianism (Posner, 2009, Skidelsky, 2010; Blinder, 2013).

In the aftermath of the 2008 crisis, heterodox schools such as Post-Keynesianism and behavioral economics drew attention for their criticism of neoclassical economics. Post-Keynesians they support an inductive approach to data on the grounds that empirical evidence provides a much better indication of reality. The Post-Keynesian approach also sees human action as evolving under uncertainty and various cognitive and psychological factors that are partly responsible for creating ‘animal spirits’ and triggering crisis episodes. The key idea is that economies will not gravitate towards full employment and will require activist fiscal and monetary policies to recover from these shocks (Cf. Hein and Stockhammer 2011; Lavoie 2014). Keynesians call for macro-level interventions on the premise that markets are unstable and macroeconomic policies can boost aggregate demand and drive up the general output. What is intriguing is that the post-Keynesian analysis takes a particular position on the question of whether the economy is tractable enough to be manageable by government: while the system as a whole is unstable because of how its components behave, government can observe aggregate indices of performance indicative of actual micro behavior and can move to fix them.

In a similar vein, behavioral economics challenge the *homo economicus* perception of human agency by scrutinizing the baseline premises of rationality and optimization in lab experiments where they recorded a number of behavioral biases that seemingly challenge the foundations of neoclassical economic analysis (Cf. Kahneman and Tversky 1979; Kahneman, Slovic and Tversky 1982; Kahneman 2003). While these findings strengthen a general skepticism with the neoclassical view of the economy as manifested in models such as the DSGMs (Cf. Stiglitz 2018), like post-Keynesians, the view of the macro-level in behavioral economics is of an environment that is susceptible to crisis because less-than-rational actors act in conditions of limited information and under the influence of biases, short-term incentives, fear and panic (Shiller 2015).

To which extent do these approaches capture the real-life dynamics of the economy? How well do they conceptualize the processes that connect individuals in markets (Boettke 2012, p. 237)? First, the two heterodox schools develop their representations of the economy by choosing their own basic units of analysis and observation before extrapolating into the macro-level. Post-Keynesians look at indices of collective performance, while behavioralists look at

individual behavior observed to depart from set expectations of rationality and fear the aggregate effect of collective irrationality. For post-Keynesians, available data can be analyzed to tell us when and where in the macroeconomy a government must intervene. For behavioral economists, knowing what the behavioral biases in the population are will help authorities plan regulations and nudges for the decisions of economic actors. In that sense, post-Keynesianism and behavioral economics offer reductionist frameworks of analysis, just like the theories and analytic frameworks they criticize (Cf. Whitman and Rizzo, 2015; Rizzo 2019). The difference with these two heterodox approaches is that they both presume instability instead of the neoclassical presumptions of rationality and equilibrium.

Both approaches overlook the idea of emergence how the co-evolution and mutual reconfiguration of the interconnected actors in a system generate novel dynamics in that system. Their view of the macro-level rests upon generalizations from a basic level of analysis – aggregate measurements of economic performance or individual behavior as observed in lab experiments. Behavioral economists identify decisional biases in laboratory experiments, and automatically generalize from them into macro predictions that will most probably involve collectively irrational outcomes. By the same token, in post-Keynesian accounts, any instability observed at the system-level is likely to be reduced to how a few aggregate measurements are configured.

Tampering with complexity: unpredictable and unintended consequences

Governments are extraordinary ‘big’ players in the economy in the sense that their interventions can be both very consequential as well as ineffective about their own economic and welfare-related targets (Cf. Higgs 1997; Koppl 2002; Cochran 2004). This is the core of the Hayek’s thesis on the complexity of the economy as well as Wagner’s later development of the notion of emergence in the macroeconomy. From the perspective of entangled political economy, the social context can be analogized to a *piazza* full of pedestrians, each going in a different direction, with the government agency assuming the role of the traffic warden to turn this crowd into a well-ordered parade. This role, we claim, has been encouraged by experts and their analytic framework that neglects complexity - how micro-interactions reconfigure a system and can generate a good degree of coordination of economic plans, which evolves over time even under conditions of uncertainty, limited and dispersed information and less-than-perfectly rational behavior. Yet these methodological and theoretical developments offer a

deficient image of the economy and support the misplaced belief that economic policy can and must control how economic actors will behave. Politicians and public officials are misled to believe that the systems they are interfering with are quasi-mechanical, and they will be puzzled to observe that the effect of their interventions is not the one desired and planned. Lamentably, this error of judgment will be recurrent because new theories and new tools will be presented to them, producing an image of the economy as controllable and manipulable.

Here, we further elaborate on how macroeconomic interventions are tampering with complex systems of diverse micro-adaptations over time. Using the notion of emergence to describe the micro-macro connecting, we show that multiple micro-level plans branch out over time and recreate the macro level each time in an unpredictable fashion.

At the micro-level, the effect of government policies is conditioned by how it affects decisions by economic actors across time. In each setting, interventions will trigger a peculiar form of downward causation. Large-scale policy interventions will send a first set of informational signals to entrepreneurs and consumers whose interpretation of these signals and responses will vary. These responses, in turn, will create the opportunities that other entrepreneurs will perceive and seek to respond to. We can borrow a term from the study of natural ecologies to illustrate this: the ‘fitness’ of each entity is governed, in part, by what the other entities have done as they form a niche (Cf. Kauffman 1988). In the economy, niches are perceptions of potential or latent opportunities for profit which prior entrepreneurial actions have created for others to step in and exploit it (Gatti et al, 2020). Entrepreneurs have a strong incentive not to lose immediate opportunities for profit others have created (Cf. Salter and Luther 2016: 52).

We can imagine that reactions to a macroeconomic intervention will take the form of sequences of interdependent actions by economic actors that will develop over time, first as responses to the policy itself and then as further adaptations by them and others to the opportunities for investment and consumption created by previous responses.

The initial response by some of them to a fiscal or monetary stimulus will open new opportunities for others etc. Over time, the variety of economic niches grows. Because actions by some entrepreneurs create opportunities for others, there will be a sequence of adaptations. Patterns of collective behavior will develop as some actors respond to the original signal, but

their responses will trigger a variety of interdependent decisions of investment, production and consumption across markets, dynamically giving the macroeconomy new emergent properties.

Because each setting of coordination consists of discrete and adaptive economic actors, no analytic tool can capture these adaptations and predict how they would evolve in the future (Cf. Hayek 1945, p. 519). Behavioral adaptations are analytically unpredictable but highly consequential for the economy because they are essentially behavioral *reverberations*, **that are interdependent and co-evolving**, rather than simply one-off adjustments that aggregate into a settled pattern. These reverberations at the microlevel will continue to create system-level effects with unknown ramifications across diverse markets and locations.

A monetary or fiscal stimulus, for instance, will influence interdependent decisions and will trigger interrelated actions across markets, building up investment and consumption patterns. Government interventions will alter perceptions of risk and profit opportunity. Looking at these reactions through the lens of rational expectations would suggest that we can detect the immediate effects from a stimulus, for instance, an expansion of credit, but in an environment of interdependent plans, the original stimulus will trigger multiple sequences of interdependent decisions and actions – investment decisions and consumption decisions across markets such as housing, construction, finance etc. These micro-adaptations will recreate the macro-level in unpredictable ways. Economic actors will continue to re-evaluate new opportunities for profit and form new perceptions of risk and possible loss by looking at how their discernible environment changes. Yet the link to the original policy trigger becomes less and less visible to them and the policymakers.

Consider how fiscal spending, low interest rates or cheaper credit can change perceptions of opportunity costs in an economy (Prychitko 2010). A monetary policy that continuously expands money and credit supply will influence perceptions of profit opportunities formed by entrepreneurs in markets particularly sensitive to monetary policy. The stimulus can affect some sectors, such as housing, and then those indirectly affected by the housing market (e.g., construction) and later on, even less discernibly, will cause responses by other actors in sectors whose growth depends on those investments (machinery and materials for construction, engineering education, etc.). The housing market bubble in the United States during the 2000s illustrates how monetary policy can affect patterns of investment that produce effects that spill over across other markets. Several economic actors were reassured by lower interest rates that

housing was a relatively safe investment opportunity. Low interest rates encouraged borrowing from the banking system (Garrison 2001). The level of investment and borrowing would not have happened had it not been for low interest rates and cheaper credit relaxing perceptions of risk among investors and changing the perceived opportunity costs for economic actors involved in banking.

Finally, new information can upset existing perceptions of risk and opportunities and may trigger new and often cascading reactions. In 2008, a general credit crunch broke up and spilled over to other sectors the moment it became visible that there has been a nexus of interdependent investments that may no longer be sustainable. The impact of the subprime mortgage market was heavy on the banking and financial sectors. Following a credit crunch there, almost all other sectors of the economy were affected. The original pattern of interdependent investment decisions gave way to a new pattern of reactions, which, on some occasions, can be described as herd-like reactions. What Post-Keynesians regarded as ‘animal spirits’ or what behavioral economists could describe as a manifestation of a general irrationality of human agency, it was economic actors who responded to a sudden change of perceptions triggered by a revealing signal, and their response was a wave of adjustments across a nexus of interconnected investments and consumption patterns.

Still, in the fifteen years that followed the 2008 crisis, low interest rates and cheaper credit did not cause a bubble in the housing market of such a scale so far. In short, a radical macroeconomic policy intervention creates varied and evolving adaptations – including different perceptions of risk - which cannot be predicted even if the development of a prior crisis has been studied and understood well enough.

The concept of emergence is useful for understanding how policy-induced adaptations develop into the dynamic properties of the macro-level. It is in this unpredictable fashion that policy interventions intersect with complex interactions among economic actors (Cf. Wagner 2020: 128, 129, 134) to generate unintended and often undesired consequences. But specific side-effects and undesired consequences cannot be predicted based on prior observations. By generating multiple adjustments by economic actors over time, a large policy intervention will eventually have a sizeable impact on macro variables, but not one that can be predicted. Public policy faces a fundamental knowledge problem (Cf. Pennington, 2011). In macroeconomics, this problem is configured as such: neither governments nor experts can predict the behavioral

adaptations that will happen at the micro level after an intervention, and they cannot therefore predict how the macro level would change because of these adaptations. Just as there can be no reliable prediction regarding whether a planned intervention will produce a desired outcome, there can be neither a reliable prediction regarding the nature and scale of the unintended consequences one would expect from this intervention.

Conclusion

The paper focuses on the entangled relationship between economics and policymaking to explain its consequences for macroeconomic policy and macroeconomic outcomes. Our critique does not target analytic reductionism per se, as this seems to be an almost inevitable feature of deductive theory building and statistical analysis. Instead, it cautions about relying on this type of analysis to support and enact interventionist policies. Despite differences in methodology and theoretical disagreements, the development of mainstream economics has been governed by this common ‘epistemic’ denominator: a view of the social world as tractable enough to be manageable by policy interventions if guided by scientific knowledge. We argue that experts and policymakers have synergistically created this epistemic bias for analytic reductionism which, in turn, has embedded a belief among policymakers, technocrats and social scientists that economic theory and analysis can successfully serve as a source of guidance about what policymakers must do to macro-manage the economy.

Hence, our first contribution is to point to the origins of the problem. Economists and policymakers have synergistically developed a bias for analytic reductionism driven by a desire to impose order in the economy. What is important here is that reductionist analysis overlooks how macroeconomic policy interventions are triggering intractable behavioral reverberations that tend to generate unintended and unforeseen consequences. Unfortunately, prior crises have been missed opportunities for deeper reflection on this issue. As a result, the kind of advice politicians and officials receive simply renews what we call ‘a pretense of certainty’, namely a misplaced confidence in the capacity of science-led policy to effectuate a desired impact on collective behavior as planned.

This criticism is pertinent to ongoing developments in macroeconomic policy in the current inflationary environment. Massive monetary expansions during the pandemic are now

followed by contemplation on how far the central banks must go in raising interest rates and restricting money supply to bring down high rates of inflation.

The second contribution is to explain why, contrary to what is expected, radical government interventions tend to introduce rather than reduce uncertainty in the economy, by drastically disrupting economic decisions, and that this impact will not be the originally planned by the policymakers, at least not without unforeseen side effects and serious costs. This is because macroeconomic interventions trigger interdependent patterns of investment and consumption that are analytically intractable but will manifest themselves in the macro-level as unforeseen and unintended consequences.

The next step will be for the discipline of economics to develop a better understanding of the complexity of economic relations and adjust its proposals accordingly. Rather than offering manuals on how policymakers can re-arrange collective behavior (Cf. Wagner 2020: 157), economists can study how society and markets work to overcome ignorance and achieve a remarkable degree of coordination (Cowen 2019). Economists can explore general principles of organization behind this phenomenon (Hayek 1967, pp. 24-25, 35; Caldwell 2004, p. 305). They can then consider the best general rules and institutional framework for economic activity to flourish. Hayek suggested that economists should be more like gardeners, taking care that the economy is protected from harmful political interventions (Hayek 1974/1989; Boettke 2018, p. 287).

A plausible topic in macroeconomics, for instance, is about creating a monetary environment that facilitates the planning of economic activity with rules that will prevent governments from trying to influence economic outcomes based on narrow expediency. To return to Wagner's analogy of the pedestrian crowd, it is about proposing a reliable traffic code and a system of traffic lights and road signs and preventing governments from playing the role of an unhinged traffic warden. Economists have already proposed several ideas about the appropriate macroeconomic institutions. Milton Friedman recommended binding rules (1960[1992]; 1962a; 1962b; 1968). Robert Barro suggested a type of gold standard (1982; Cf. White 2015). James Buchanan proposed a monetary constitution, an idea developed by several other scholars (1987; Cf. Bernholz 1986; White, Vanberg, and Kohler 2015; Salter 2014; Paniagua 2016). Boettke, Salter and Smith (2021) highlighted the importance of rules binding monetary institutions rather than permitting discretion.^{vii}

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ⁱ Against Economics, New York Review of Books, 5 December 2019 at <https://www.nybooks.com/articles/2019/12/05/against-economics/>.

ⁱⁱ For a thesis on monetary systems as emergent systems from monetary relations, read Paniagua 2018 and Horwitz 1992.

ⁱⁱⁱ ‘... political and economic entities are deeply entangled. Being entangled means that a business typically cannot determine prudent conduct independently of the desires of relevant political entities... political practice is a peculiar form of business’ (Wagner 2016, p. vii).

^{iv} Our approach to the ecological production of knowledge resembles the idea of a *synecology* as a concept referring to connected networks and games across different fields of interaction (Devereaux and Wagner, 2018b) and a concept denoting how interactions of elements in an environment generate perceptions and biases (Kopp, 2018, p. 133).

^v Society has an ecological character, involving intertwined networks of various human enterprises, including commercial and political entities that do not operate independently of one another (Wagner 2016: 165).

^{vii} Hayek ultimately advocated the ‘denationalization’ of money, advocating money to be issued by competing private banks (1976a and 1976b; Cf. King, 1983; Selgin, 1988; Selgin and White 1994).