

REVIEW

Monetary Equilibrium and Nominal Income Targeting

by Nicolás Cachanosky

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Nicolas Cachanosky's *Monetary Equilibrium and Nominal Income Targeting* is a valuable and concise account of the idea of nominal income targeting. The book explores the idea, as a both practical and theoretical monetary policy rule, and its implications for central banking monetary policy and macroeconomic stability. Since the 2008 Great Recession, the idea of nominal income targeting has regained interest among policy makers and monetary economists (Sumner 2012; Paniagua 2016a). A certain group of economists have suggested that the Great Recession, both in duration and severity, was mostly generated and magnified by ill-conceived and contractionary monetary policy during late 2008, which allowed both nominal income and nominal gross domestic product (NGDP) expectations to fall significantly and deviate below trend (Sumner, 2012). As a consequence of those monetary policy failures, some economists—such as Sumner (2012)—have argued for a monetary policy rule that aims at targeting nominal income, which is a form of NGDP (level) targeting. It has become clear since the crisis that price-level stability is neither a sound-enough goal for monetary policy nor conducive to macroeconomic stability. This realization has led macroeconomists to recognize that different proposals for central banks to target NGDP are worth taking seriously and to compare them to better-known alternatives.

Given the above, this book is both relevant and necessary to fill certain important theoretical gaps in the literature on NGDP targeting and alternative monetary regimes and to contribute to the debate over the institutional properties and benefits of nominal income targeting as compared with alternative monetary rules. For that alone, this book is a welcome contribution. Consequently, this book is both timely and valuable, and it is of much interest to monetary and banking scholars and to monetary policy makers and central bankers.

The book can be interpreted as dealing with three broad themes related to NGDP targeting. Cachanosky starts with a theoretical exploration of monetary equilibrium and its analytical relationship with NGDP targeting, and how they relate conceptually to the “productivity norm.”⁶¹ The first part of the book explores how monetary equilibrium is the guiding principle of nominal income targeting. Later the book explores nominal income targeting as a rule and how it compares with other rules. Finally, the book explores scattered themes related to nominal income targeting, such as the 2008 financial crisis, and how we can lay out monetary policy reforms that can help us to transition toward nominal income targeting or a more robust monetary framework.

One thought-provoking aspect is that Cachanosky starts the book by asking, “How does a free market of money and banking (free banking) work and what is the monetary outcome?” (Cachanosky 2019, p. 1). He states that the ideal benchmark for monetary policy is some form of highly competitive free banking system. The reason is that Cachanosky and several other authors (me included) believe that a free banking system would attain something very close to monetary equilibrium or monetary neutrality (Paniagua 2016b) and that attaining such a policy goal should be paramount in any monetary system. This claim could be considered as a potential analytical weakness of the book since if someone does not consider either that monetary equilibrium is the crucial benchmark and goal of monetary policy or that a free banking regime could actually achieve monetary equilibrium, then they might question the entire normative and theoretical vision of the book. Consequently the case for nominal income targeting could be weakened as well.

Chapter 1 explores the institutional and banking properties of an ideal free banking regime and how such a system could, unintendedly, reach something very close to monetary equilibrium or a stable form of nominal income at the aggregated level. The chapter explores the institutional mechanisms that a free banking regime employs in order to achieve monetary equilibrium and how monetary equilibrium relates to stable nominal income or NGDP (per capita). The concepts of monetary equilibrium and of stable nominal income growth are relevant throughout the book as they are employed also as benchmarks and objectives to compare and evaluate monetary policy rules.

This chapter starts by suggesting that an evaluation of any monetary policy rule “requires a benchmark that specifies what a central bank should achieve. Since central banks play a crucial role in the management of money supply, monetary equilibrium should be their main objective” (p. 4).⁶² Here Cachanosky somewhat dubiously conflates monetary equilibrium as a theoretical benchmark with free banking as an institutional arrangement since the “theory and history of free banking provides a depiction of what monetary equilibrium looks like.” Thus he concludes that “a free banking system is a benchmark of what we should expect a *given* central bank to do and what its minimum level of efficiency should be” (p. 4). I don’t disagree with these statements; however, I believe that several other macroeconomists and banking theorists would find them too normative and hence difficult to accept. After all, the potential benefits and robustness of free banking are still a much debated and unsettled topic in the banking literature.

Moreover, other scholars have used the concept of monetary equilibrium as an ideal benchmark against which we can compare monetary alternatives (Horwitz 2011; Paniagua 2016b). However, most of them have acknowledged that, on its own, recognizing the relevance and desirability of monetary equilibrium does not commit oneself to any particular monetary institution, such as free banking. Yet this is exactly what Cachanosky seems to suggest in chapter 1. This is perhaps my only concern about Cachanosky’s otherwise fine and relevant book: it might deter other banking scholars—particularly those not fully convinced of the benefits of free banking—from engaging seriously with this book.

Nevertheless, chapter 1 does a great job in overviewing relevant topics and debates about the robustness, historical episodes, and institutional properties of free banking. Specifically, Cachanosky here succinctly reviews how free banking, through the process of adverse clearing, can actually attain monetary equilibrium; and he reviews how it also leverages contractual and legal tools, such as option clauses and unlimited liability, in order to avoid systemic bank runs. He also convincingly challenges some misconceptions about the stability of free banking, such as its inability to deal properly with systemic bank runs, how the Diamond-Dybvig model suggests inherent instability in competitive banking, and the capacity of free banking to generate an uncontrollable, concerted overexpansion in the supply of money and banknotes. By deploying both the theory of competitive banking and ample historical evidence, Cachanosky diligently shows all those misconceptions to be unsubstantiated.

Chapter 2 explores in more depth the “conditions and characteristics of monetary equilibrium in a more formal setting” (Cachanosky 2019, p. 23). These arguments are relevant for the entire book since the case in favor of nominal income targeting ultimately rests on the idea of monetary equilibrium and the fact that it could be potentially attained through a form of NGDP targeting. Here Cachanosky presents an analytical framework of nominal income targeting, specifically in the context of two related rules: Hayek’s stable-*MV*

rule and Sumner's (2012) NGDP targeting. The chapter also explores the idea of monetary equilibrium under the framework of the quantity theory of money (the left side of the equation of exchange). Cachanosky builds his framework of monetary equilibrium by noting that the demand for money is the share of nominal income that "is consumed as *liquidity services* rather than spent in acquiring goods and services" (p. 24, emphasis added). Cachanosky formally explains how monetary equilibrium is attained and what it means in the equation of exchange. Importantly, he acknowledges that monetary equilibrium implies two conditions, a static one and a dynamic one. The static one requires that the quantity of money supplied equal the quantity of money demanded ($Md = Ms$). The dynamic condition instead requires that changes in the velocity of circulation (V) be offset with a proportional and inverse change in the money supply (M), so that MV remains constant. This is similar to keeping PY (or NGDP) constant. It is this principle, Cachanosky argues, that analytically guides the different nominal-income-targeting rules.

Subsequently, chapter 2 explores two different versions of nominal-income-targeting rules, NGDP-level targeting and what he calls "Hayek's rule." In analyzing these rules, Cachanosky importantly acknowledges that any monetary policy rule actually requires "(1) a *target variable* and (2) what *value* the target variable should have" (p. 26). Indeed, these two components are crucial to decisions made by policy makers implementing monetary rules. Here Cachanosky also points out that when "different variables present a similar behavior, choosing the right target value is more important than choosing the right target variable . . . Both, Hayek's rule and NGDP targeting use NGDP as their target variable, but they differ on what the target value should be" (p. 26). Specifically, he explains that Hayek's rule aims at keeping MV constant (in per capita terms). Thus, it implies that " M should neither increase nor fall unless V is moving in the opposite direction" (ibid.). Under this rule, then, the NGDP target is held constant and is fixed at a zero-growth rate, which implies fixed aggregate demand. Meanwhile, NGDP-level targeting implies "first, targeting the level or path of NGDP and, second, keeping a constant growth rate of NGDP" (p. 28). Under this second rule, then, aggregate demand grows at a constant rate. Cachanosky points out that the specific value of the NGDP growth rate in this rule varies from author to author. The usually suggested number (see Sumner 2012) is around 5 percent yearly NGDP growth. Yet Cachanosky importantly suggests also that this 5 percent constant growth rate is highly questionable and might not be consistent with monetary equilibrium (see also chapter 4).

However, Cachanosky does not delve deeper into these crucial operational and practical questions about NGDP targeting. Indeed, he doesn't explore further the numeric relationship between the plausible behavior of NGDP that is consistent with monetary equilibrium and macroeconomic stability—if such a number in fact exists. Cachanosky does suggest that a constant 5 percent yearly NGDP growth rate might actually be excessive, leading to "a too loose monetary policy rather than being the right NGDP target . . . The observed 5% growth rate of NGDP on the years prior to the 2008 financial crisis is not itself a proof that such a number is a good (or bad) target" (ibid.). Alas, he explores neither which numeric growth rate might be "right" nor how we can find out which growth rate will be consistent with monetary equilibrium. Plausibly, the "right" equilibrating (or neutral) number for NGDP growth will be something in between the zero growth rate in Hayek's rule and a 3–4 percent constant growth rate. Nevertheless, it could be the case that a higher-than-zero fixed rate might prove inconsistent with micro-level monetary equilibrium whenever we experience changes in population growth and heterogenous changes in the endowment of the factors of production (or whenever the price level moves inversely but not in the same proportion to—or as rapidly as—changes in productivity) (Horwitz 2011; Paniagua 2016a).

Perhaps a *predictably flexible* NGDP growth rate—one that seeks foremost to maintain monetary equilibrium at the micro level while also adapting to the way the price level and changes in productivity behave through time—might be a more consistent and neutral goal for monetary policy than trying to keep a macro variable stable in its growth (Paniagua 2016a). That something is predictable and stable does not necessarily mean it is desirable and neutral. Hence, rather than keeping NGDP growth, or any other nominal macroeconomic variable, stable, "the so-called 'productivity norm' argues that the predictability of relative prices being indicators of relative scarcity is a more important form of predictability" (Horwitz 2011, p. 337). Consequent-

ly, stabilizing NGDP growth and keeping it fixed through time might prove inconsistent with targeting monetary equilibrium at the micro level.

Finally, chapter 2 explores how nominal income targeting deals with nominal and real productivity shocks and compares it with a price-level-stability policy such as inflation targeting. In a nutshell, the former is able to automatically distinguish between nominal shocks and real shocks and thus maintain monetary equilibrium. In contrast, the latter (a stable price level) is almost never consistent with monetary equilibrium. This is because, since monetary equilibrium implies that MV is constant, “the price level should be allowed to change inversely with changes in real output. Stabilizing the price level is not the same as targeting monetary equilibrium” (Cachanosky 2019, p. 30).

Chapter 3 uses the idea of monetary equilibrium and explores monetary rules that are better known among policy makers and central bankers around the world. It later compares such rules to nominal income targeting. According to Cachanosky, “For policy makers to reconsider what monetary rules or guiding principle they should follow then a clear advantage of a nominal income target rule over other more prevalent alternatives should be clear” (p. 40). In particular, the chapter overviews first the rules-versus-discretion debate and second the shortcomings of inflation targeting, Friedman’s k -percent rule, McCallum’s feedback rule, and Taylor’s rule. Cachanosky shows how all of these rules are unsuccessful at maintaining monetary equilibrium and NGDP stability, and he compares each of them with nominal income targeting “to explore to what extent nominal income targeting outperforms these other rules” (ibid.). Cachanosky ultimately argues that NGDP targeting is a better rule compared with these other rules since it deals better with productivity shocks and is better at maintaining monetary equilibrium.

The minor drawback of this chapter is its negligible treatment of potential incentive problems and other public choice considerations—such as political pressure, accountability issues, and enforceability problems—that could affect each monetary rule and how they compare with nominal income targeting. Indeed, the discussion on why monetary rules are not applied or enforced under central banking is confined to less than half a page (p. 51). The book neglects the valuable literature on different monetary regimes concerning political-economic and public choice considerations. Different monetary rules could, in theory, be able to target some form of nominal income and move closer to monetary equilibrium, but this does not mean that they can do so in practice, once one takes into account such considerations and the bureaucratic framework under which those rules will operate. These broader institutional and political concerns could revise and challenge our appraisal of different rules.

Chapter 4 deals with an important point hinted at earlier (p. 28) concerning the numeric target or the value of NGDP growth that a central bank should target. Cachanosky writes that “it is also possible that a nominal income rule is executed with the wrong [numeric] target and, therefore it will produce monetary disequilibrium” (p. 56). Here he departs from the market monetarists, such as Sumner (2012), since he questions the plausibility that a constant NGDP growth rate of 5 percent is neutral to the economy or consistent with monetary equilibrium. The chapter discusses the effects and symptoms of monetary disequilibrium under the plausible scenario “that a nominal income rule is executed with the wrong [numeric] target and, therefore, it will also produce monetary disequilibrium” (p. 57).

This is one of the most interesting and original chapters of the book since it explores the possibility that some forms of stable NGDP growth might hide monetary distortions and thus be inconsistent with monetary equilibrium. Cachanosky appropriately reminds us that “the good behavior” of macroeconomic indicators, such as price-level stability, “does not imply that there is no monetary disequilibrium or economic imbalances are being built up” (ibid.). Specifically, this chapter explores the possibility that “the 5% [stable] growth rate of the United States’ NGDP in the years prior to the 2008 crisis was the result of loose monetary policy . . . should the Federal Reserve had followed a 5% NGDP Targeting rule after the year 2001, it is likely that target would not achieve monetary equilibrium” (ibid.).

In line with the above, this chapter analyzes different macroeconomic indicators that seem to suggest that monetary policy in 2001 and (early) 2008 was too expansionary, leading to a persistent monetary disequilibrium and to a deep misallocation of resources and capital into housing that was unfortunately

not captured by conventional price indices. That misled policy makers about the true underlying stability and sustainability of the macroeconomy. Here Cachanosky explores how upward deviations of NGDP from trend are indicators of monetary policy being too expansionary or disequilibrating. He points at two steep upward trend deviations in NGDP, before the dot-com crisis and before the 2008 financial crisis, that could suggest unsustainable booms led by expansionary monetary policy. The chapter later explores how monetary disequilibrium can manifest itself in the gap between final prices and intermediate prices. Cachanosky suggests that “a proxy to see if there is an excess of money supply in the presence of a stable final price level is to observe the behavior of a producer price index (PPI) with respect to a consumer price index (CPI)” (p. 63). Here he shows that from roughly 2002 to 2007, the PPI grew at a significantly higher rate than the CPI, suggesting implicit inflation “due to a loose monetary policy that started early in the 2000s” (p. 64). Finally, Cachanosky explores the possible deviation of the interest rate from its equilibrium (natural) level between 2001 and 2006 according to some estimations of the natural rate that the Federal Reserve should target. All the estimations reviewed suggest that expansionary monetary policy allowed the federal funds rate to go significantly below its (estimated) equilibrium (natural) level approximately between 2001 and 2005; this also suggests persistent monetary disequilibrium for almost half a decade.

Chapter 5 discusses the fundamental difference between, first, a nominal-income-targeting rule that emerges as a process of market forces and competitive interactions of free banks and, second, the same NGDP rule implemented instead as a top-down policy enacted by a central bank. Cachanosky correctly points out that “achieving the right level and behavior of NGDP is not the only important issue a central bank has to deal with. It is not just the level of NGDP that matters, but also its composition” (p. 75). The superficially equivalent values of NGDP could have very different real economic compositions, different micro-level realities, and diverse levels of sustainability (Paniagua 2016a). Thus, as Cachanosky recognizes, the *process* of nominal income targeting and *how* the value of NGDP growth is actually attained are also extremely relevant issues to consider. Consequently, “central banks need to also consider their [institutional and structural] limits in achieving *microeconomic* equilibrium *from* macroeconomic equilibrium” (ibid., emphasis added).

Later this chapter explores how NGDP stability could be attained either through free banking or under central banking and how the processes differ. Free banking attains a form of nominal income targeting but does so as an unintended product of attaining first and foremost monetary equilibrium at the micro (or local) level, which eventually translates into a form of nominal income stability or macro equilibrium. Thus, the macro stability and the macro equilibrium attained are not explicit goals of monetary policy under free banking. They are rather the aggregated and unintentional outcomes that emerge from and are consistent with monetary equilibrium at the micro level, rather than the other way around. In this sense, free banking does not directly or consciously aim at stabilizing nominal income or at targeting a specific numeric value of NGDP growth. It merely aims at properly adjusting the money supply to offset changes in money demand at the local level. Hence, “under free banking no one needs to produce a certain level of NGDP” (Cachanosky 2019, p. 80). In contrast, Cachanosky argues, central banks—as monocentric systems of banking power—substantially alter (eliminate) the institutional and interactive-competitive context of free banking that enables the production of monetary and local knowledge necessary to attain monetary equilibrium. In other words, “in the absence of a complete market of money, the required market information for monetary equilibrium is also lacking. Therefore, policy makers need to use a proxy of monetary equilibrium as their benchmark” (p. 76). The crucial difference between these two forms of monetary policy is that central banking is epistemologically and informationally weaker since “the signals of an excess of money supply (i.e. adverse clearing) are looser and more erratic under central banking than under free banking” (p. 77; see also Paniagua 2016b).

Moreover, free banking—since it is a decentralized and competitive system—possesses several “money injection points in the economy” since each competitive bank and its branches is potentially a local entry point through which money is supplied into the system. Consequently the banks are much closer to the underlying banking signals and local changes in the demand for money. This means that “free banking is

more flexible in the sense of allowing changes in money supply to happen closer to the optimal injection point. On the contrary, in the case of central banking there is only one [top-down] injection point” (p. 77). Accordingly, the fundamental epistemic challenge that Cachanosky identifies is that central banks “need to know how far off they are from monetary equilibrium and how to get to equilibrium. But information required for such a task is missing the mere existence of a central bank. Because of this, policy makers face a [monetary] knowledge problem” (p. 78).

Following this discussion, Cachanosky explores further how Hayek’s “knowledge problem” could be extended and applied to monetary policy, and he explores the insurmountable epistemic challenges that central banks face in attempting to attain monetary equilibrium.⁶³ The core of the argument is that crucial local and personal knowledge about money (e.g., its desired demand and imbalances) is generated and conveyed only through certain institutional and competitive processes or banking signals that are absent (or much weaker) in a monopolistic and monocentric central banking setting. Thus local banking and monetary knowledge cannot exist and be generated without certain interactive and competitive market-based forms of processes among money holders and commercial banks (Paniagua 2016b). Facing such epistemic and institutional absence, central banks have to rely on crude proxies or aggregated informational substitutes such as statistical analysis and model calibration, thus exacerbating policy makers’ epistemic burden and increasing their informational costs. Alas, “even if the substitute was nominal income stability, this choice would still require building the right variable in a timely manner while under free banking it is not even necessary to calculate nominal income in the first place. The central bank needs to be able to forecast the right level and trend of money demand, but under free banking this is achieved without the need of such specific and challenging forecast” (Cachanosky 2019, p. 80). This leads Cachanosky to conclude that “monetary policy is not just a *technical* problem, it is also a *knowledge* or *alertness* issue” (p. 80).

Chapter 5 concludes by exploring the idea of Cantillon effects in monetary policy and the price-and-spending-related effects that occur whenever newly issued money enters the economy through different entry points. Cachanosky argues that there is a fundamental difference between central banking and free banking with respect to Cantillon effects. The main difference resides in the fact that central banking possesses only one source of change in the money supply, and therefore Cantillon effects are top down and more concentrated and their potential distortive effects on prices and spending are larger. In contrast, free banking has a myriad of decentralized and smaller injection points—mainly, competitive commercial banks that issue convertible banknotes. This, Cachanosky argues, “makes the pattern of money flow in the economy more evenly distributed and less costly if relative prices are affected in the wrong way . . . [Moreover] these [decentralized] injection points are also matched [and closer] to the sources of the changes in money demand . . . It is unlikely that under free banking relative prices will be distorted in a significant way” (p. 83). All these arguments suggest that free banking is—relatively speaking—superior to central banking in both attaining monetary equilibrium at the micro level and in avoiding severe distortions to relative prices and spending.

Chapter 6 overviews both the major policy and monetary events that led to the 2008 financial crisis and its banking and policy aftermath. Cachanosky here complements the market-monetarist view of the crisis by arguing that “a nominal income targeting framework does not suffice to explain the crisis completely, but it is a necessary framework to understand the economic effects at a broader scale” (p. 89). He starts by reviewing the political and monetary causes of the housing bubble, or the boom aspect of the crisis. Here he explores the ample empirical and statistical evidence that suggests that monetary policy was highly expansionary from 2001 to 2006. Particularly, after the 2001 dot-com crisis, the Federal Reserve “moved to a loose monetary policy with the intention of avoiding a downturn of the economy . . . Different benchmarks . . . point to an expansionary monetary policy in the years prior to the crisis (p. 90). In other words, the unsustainable housing bubble had its origins first and foremost in a too expansionary monetary policy.

Subsequently, Cachanosky reviews the 2008 bust aspect of the crisis, when the policy mistakes after the crisis unfolded. Here he points out that in mid-2008 the Fed, through contractionary and passive monetary policy, allowed nominal income to fall, producing a severe decline in NGDP and deviation below

trend, which “transform[ed] a relatively modest financial [and housing] crisis into a much larger crisis” (p. 95). Indeed, the NGDP series and its severe downward deviation suggest that monetary policy was exceptionally tight, rather than loose, after mid-2008 and during most of the financial crisis. Hence “the fall in NGDP means that money supply was not loose enough to compensate for the fall in money velocity” (ibid.). In other words, the damaging bust aspect of the crisis had its origins first and foremost in a too contractionary monetary policy.

Moreover, Cachanosky points out that the sluggish recovery suggests that “there was something other driving the crisis than the fall of NGDP from its level . . . the other factors present in the crisis were . . . a cluster misallocation of heterogenous resources (physical capital and labor as well) during the *too low for too long* interest rate policy of the Federal Reserve” (p. 96). Consequently, the duration and severity of the crisis can be more fruitfully explained by a monetary boom-and-bust cycle, or a *two-sided* monetary disequilibrium (bad inflation and malign deflation) led by central banks. After reviewing all the historical, banking, and statistical evidence, Cachanosky concludes that “the two largest economic crises in the United States are explained by a mistake on the part of the Federal Reserve” (p. 95).

The final chapter (chapter 7) discusses some of the potential banking reforms that could be enacted in order to improve the performance of central banks and move them closer to attaining monetary equilibrium or a stable form of nominal income targeting. The objective of these reforms is to increase the information available, and to improve the epistemic resources and incentives that central banks possess, so that central banks can attain monetary and income stability. Cachanosky here argues that central banks need to find accurate epistemic replacements for the missing information and banking signals that free banking normally provides. Thus a new institutional design or reform to the current central banking framework might be a more general and valuable approach to produce certain banking and informational features that would move the system toward achieving the goals of monetary equilibrium and nominal-income stabilization.

Specifically, Cachanosky reviews four of the most discussed reforms in the banking literature that allow more decentralized and active participation by market participants while reducing the epistemic and efficiency burdens on central banking. The discussed reforms are the feasibility of returning to the classical gold standard, Selgin’s proposal of a free banking regime built on a fixed fiat-based system, Hayek’s fiat-currency competition, and Sumner’s (2012) automatic NGDP targeting with an NGDP-futures market.

Cachanosky provides several—and adequate—arguments against Hayek’s currency competition (pp. 114-115), which suggests that it might be an inferior solution when compared to the other three proposals. Alas, in referring to the other three banking reforms, he reminds us that they might be politically unviable and thus difficult to implement. For example, regarding the gold standard, he acknowledges that “a successful return to the gold standard requires major countries to coordinate their [joint] return to the gold standard . . . The biggest challenge to return to the gold standard . . . is political [and international] rather than technical” (p. 111). Similarly, regarding Selgin’s proposal, Cachanosky recognizes that it is “less extreme than a plain return to the gold standard. This proposal, however, can still be considered politically inviable. Still, it should be noted that monetary regimes similar to this do exist in present times” (p. 112). Likewise, Sumner’s proposal for an NGDP-futures market requires that central banks relinquish both their monetary policy authority and their open-market-operation activities to investors and the entire market (p. 116). This implies that the Federal Open Market Committee, which enacts monetary policy, should be disbanded, making it politically unviable as well.

Consequently, the reader could conjecture that Selgin’s and Sumner’s proposals seem to be *less* politically unviable than the other two proposals. Moreover, Selgin’s proposal seems to be also superior to Sumner’s proposal in regard to achieving monetary equilibrium at the micro level since under Sumner’s (2012) NGDP-futures targeting “the central bank decides [ex ante] the [numeric value] *target* . . . The central bank, however, still remains responsible for choosing the right variable and the right target” (p. 116; see also Paniagua 2016a). Unfortunately, Cachanosky’s otherwise-valuable book is mostly silent on these interesting and unexplored matters concerning the comparative institutional analysis and relative robustness of radi-

cal and polycentric banking alternatives. Undoubtedly, more research is needed in these areas of monetary policy before making any definitive statements about the benefits of nominal income targeting, yet Cachanosky's book is without doubt a solid contribution toward broadening the analytical approach to, and the conceptual toolkit of, central banking policy and potential reforms.

NOTES

1. Cachanosky defines the “productivity norm” as the state of affairs in which “the price level should be allowed to change inversely in the presence of positive productivity gains” (Cachanosky 2019, p. 23).
2. Cachanosky defines monetary equilibrium as “the situation where the quantity of money supply equals the quantity of money demand. The quantity of money supplied is the amount of outside money plus the issued banknotes in circulations” (Cachanosky 2019, p. 6).
3. On this monetary-epistemic argument, see also Paniagua (2016b).

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