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A REAPPRAISAL OF THE FRIEDMAN-KALDOR DEBATE IN THE LIGHT OF THE GREAT RECESSION

Alexandre Reichart, https://orcid.org/0000-0002-2580-7113

PhD, Associate Professor of Economics, Sino-French Institute, Renmin University of China, P. R. China
Centre for Analysis and History of Economic Representations, University Paris 1 Panthéon-Sorbonne, France

Corresponding author: Alexandre Reichart, alexandre.reichart@univ-paris1.fr
Type of manuscript: research paper

Abstract: *This paper summarizes the arguments and counterarguments within the scientific discussion on the issue of the exogenous and endogenous money supply theories, developed by Milton Friedman and Nicholas Kaldor in the 1960s-1970s. The main purpose of the research is to demonstrate that the influence of the monetarist exogenous money supply theory has become low and that the influence of the Post-Keynesian endogenous money supply theory has become strong during the last decades. Systematization of the literary sources and approaches for solving the problem indicates that Friedman's metaphor has been deeply twisted from its original sense and is now interpreted as a fiscal policy rather than a monetary option; while hard-line monetarism never triumphed in central banks, Kaldor's endogenous money supply theory has gained ground at the same time. Investigation of the topic in the paper is carried out in the following logical sequence: an analysis of the Friedman-Kaldor debate of 1969-1970; a demonstration of Friedman's metaphor of the helicopter money was strong after this debate; a demonstration that Friedman's metaphor was linked to fiscal policy rather than to monetary policy and is therefore a weak metaphor; a demonstration that Kaldor's endogenous money supply theory gained ground within the main European central banks from the 1940s: in French, English and German monetary authorities. Methodological tools of the research methods were the primary sources of the main central banks ((Federal Reserve System, Bank of France, Bank of England, German Bundesbank, Committee of the Governors of the central banks of the European Economic Commission, Bank of International Settlements). The research empirically confirms and theoretically proves that Nicholas Kaldor finally won the debate and that the Post-Keynesian framework is more efficient to understand the functioning of monetary policies, especially the monetary creation process. The results of the research can be useful for all researchers working on the monetary creation process and on monetary theories and policies.*

Keywords: exogenous/endogenous money supply theories, monetarism, Post-Keynesianism, helicopter money.

JEL Classification: E51, E52, E58.

Received: 06.10.2022 **Accepted:** 09.11.2022 **Published:** 31.12.2022

Funding: There is no funding for this research.
Publisher: Sumy State University, Ukraine.
Founder: Sumy State University, Ukraine.

Cite as: Reichart, A. (2022). A reappraisal of the Friedman-Kaldor debate in the light of the great recession. *SocioEconomic Challenges*, *6*(4), 60-79. https://doi.org/10.21272/sec.6(4).60-79.2022.

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1. Introduction

A debate opposed Milton Friedman and Nicholas Kaldor on monetary issues in 1969-1970. The Friedman-Kaldor controversy has notably been discussed by Aschheim (1975), who aimed to reconcile monetarism and Keynesian "fiscalism". In turn, Desai (1989) analyzed Kaldor's criticisms of monetarism and of the quantity theory of money from 1958 to 1985, including so-called Radcliffe Lectures. Lavoie (1991) highlighted the evolution of Kaldor's

views on money in three steps, beginning with the Radcliffe Report of 1959 [1960], followed by Kaldor's 1970 paper, and ending with Kaldor's publications of the early 1980s. This evolution has also been stressed by Thirlwall (1987) and Targetti (1992) in their syntheses of Kaldor's criticism of monetarism. Humphrey (1991) and Hewitson (1993) put the Friedman-Kaldor debate into a historical perspective that began with the Bullion controversy in the beginning of the 19th century. Bertocco (2001) offered a reappraisal of Kaldor's theory, highlighting the absence of any relationship between nominal income and the quantity of money.[1] More recently, the Friedman-Kaldor controversy has been commented by John Edward King, whose conclusions have progressively evolved.

In a first step, King (2002) published *A History of Post Keynesian Economics since 1936*, chapter 8 of which is dedicated to the global controversy between Milton Friedman and Post Keynesians. In the conclusion of this chapter, King states that: "By the mid-1990s it was evident that the monetarists had won the war, but also that they had lost some important battles in the process." (2002, p. 179) The argument defending monetarists' victory was that nowadays every central bank in the world pursue a struggle against inflation, and that monetary authorities had access to independence. Nevertheless, King claimed that monetarists lost two battles, as monetary policymakers no longer pretend to control the money supply and prefer the management of key interest rates to monetary rules. Following this, King ([2008] 2009) published another book entitled *Nicholas Kaldor*, chapter 7 of which is devoted to "The Scourge of Monetarism". King's conclusions are then more moderate, stating that "Kaldor did not win his war on monetarism, but did not exactly lose it either." ([2008] 2009, p. 158) King claimed that Kaldor won a "Pyrrhic victory", winning on the theoretical ground because of the renewal of interest rate management, but losing on the political ground where monetarist values triumphed among politicians and professional economists. Among other arguments highlighting monetarists' victory, King pointed out the fact that it became widely held that fiscal policy was ineffective and that, in the long run, monetary policy had no lasting effect on anything but inflation. Finally, King (2016) published a tribute paper entitled "Nicholas Kaldor after thirty years". This paper offered a global analysis of Kaldor's legacy, including the different steps of his monetary statements[2] and of his "war on monetarism". This paper restated elements of chapter 7 of King's 2008 book, but not the conclusion. King's paper simply states that Kaldor has been vindicated on the theoretical ground, but that "this was little consolation" (2016, p. 129) towards the rise of monetarism that Kaldor observed in the 1980s. However, King says nothing about a potential victory of monetarists over Post Keynesians, as if something had changed and as if Friedman could not be declared winner of this debate from then on. From 2002 to 2016, King's conclusions are thus increasingly moderate, as if something happened and now prevent anyone from concluding a 'monetarist victory' over Post-Keynesians.

Methodology

This paper is the final step of this evolution: it states that Kaldor won the debate, in the light of the Great Recession. The originality of our contribution rests on the legacy of the Friedman-Kaldor debate in the light of the developments of the economic and financial crisis that began in 2007: we take the present inheritance of this debate into account, in the context of the Great Recession and of unconventional monetary policies implemented by the main central banks that have entailed renewed interest in Friedman's helicopter metaphor. Our reappraisal also differs from other contributions as we consider new sources to discuss the Friedman-Kaldor controversy, such as the testimonies of monetary policymakers, recent secondary literature devoted to 'helicopter money' and monetary authorities' primary sources that include new central bank publications (Federal Reserve System, Bank of France, Bank of England, German Bundesbank, Committee of the Governors of the central banks of the European Economic Commission, Bank of International Settlements). We highlight two arguments to claim that Kaldor can finally be declared triumphant in the debate.

Firstly, whereas Friedman's helicopter was initially used to point out the peril of expansionary monetary policies and to promote monetary rules, we emphasize that the 'helicopter fable' nowadays appears to be a fiscal operation rather than a monetary operation. This weakness in Friedman's theory has been deeply taken into account by a

[1] Bertocco (2001) also claimed that Kaldor's contributions permitted the elaboration of a credit and financial intermediaries theory more coherent with Keynes' approach than the New Keynesians' approach.

[2] Beginning with Kaldor's memories of family holiday in the Bavarian Alps in 1923, when Kaldor was 15 and marked by the German hyperinflation.

large part of the academic community and within central banks. We stress that even if economists are still looking for actual interpretations of the metaphor, a consensus has emerged according to which 'helicopter money' involves fiscal policy - or fiscal policy backed by monetary operations - rather than monetary policy in the narrow sense. Economists still discuss Friedman's helicopter, but certainly not in the same sense as Friedman: the helicopter metaphor has been largely twisted from its original sense (II.).

Secondly, while Friedman's metaphor has lost its original sense, we stress that Kaldor's endogenous money supply theory has gained ground within monetary authorities, with which hard-line monetarism has never triumphed. Testimonies from monetary policymakers from the 1940s stressed that monetary authorities cannot control the quantity of money, and that the money supply "accommodated itself" to the needs of economic activity. (Kaldor, 1970A, p. 8) Rather, central banks appear to be 'price setters' and 'quantity takers', as stressed by Post-Keynesian economist Moore (1988). Even if central bank economists and chairpersons do not stress the accuracy of Post-Keynesians' theories, they clearly adopt Kaldor's endogenous money supply theory and reject the monetarist framework. We highlight that this had been reinforced during the Great Recession (III.).

We conclude that Friedman won the debate in which he was involved with Kaldor in 1969-1970, due to the success of monetarism and of monetarist-inspired policies from the 1970s, the reception of the Nobel Memorial Prize in Economic Sciences by Friedman in 1976 for his monetary contributions, but also through the large popularity of his metaphor. Nevertheless, given the fact that Friedman's helicopter metaphor has been largely reinterpreted over the subsequent decades and is nowadays deeply twisted from its original sense, and given the fact that during that same time Kaldor's endogenous money supply theory has gained considerable influence among economists and within central banks, which never adopted hard-line monetarism, we conclude that Kaldor finally won the debate (IV.).

2. From One Helicopter to Another: How Friedman's Helicopter has been Twisted from its Original Sense

2.1 The Friedman-Kaldor Debate of 1969-1970: The Helicopter versus The Constitutional Monarch

"Friedman and I are agreed that it is the exogenous or endogenous character of the observed changes in the money supply on which the whole issue turns." (Kaldor, 1970B, p. 54) The Friedman-Kaldor controversy of 1969-1970 was a normative struggle surrounding the money supply[3], but a part of Friedman's strategy in normative debates was to claim that he was involved in the developments of positive economics.[4] Milton Friedman's book *The Optimum Quantity of Money and Other Essays* was published in 1969. It gathered significant essays written by Friedman from 1952 to 1969. As announced in the preface, Friedman contributed for many decades to the normative debate on monetary issues in order to fight the Keynesian framework and to promote the paradigm shift[5]:

> *At the time that many of the essays in this book appeared, they were highly unorthodox… In the interim, there has been a major shift in professional opinion. The quantity theory of money, once relegated to courses on the history of economic thought as an outmoded doctrine, has re-emerged as a part of the living body of economic theory. (Friedman 1969, p. vi)*

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[3] In the 'Rules versus discretion' debate, monetarists defend monetary rules whereas monetary policy can be discretionary implemented, according to Post-Keynesian economists.

[4] As stated by Bordo and Rockoff: "like [Irving] Fisher, Friedman was a strong practitioner of normative economics." (2013, p. 155) The metaphor of the helicopter was a rhetorical tool used by Friedman in the normative debate, since Bordo and Rockoff (2013, p. 159) pointed out that the hypothesis of a helicopter dropping notes from the sky had been largely inspired by Irving Fisher's analysis (Fisher 1911, pp. 153-4). Friedman had just changed the formulation of Fisher's assumption, introducing the powerful metaphor of the helicopter to defend the exogenous money supply theory. Forder (2010B) has also stressed that Friedman's criticisms of the Phillips curve as a policy menu had been inspired by Fisher's work of 1926.

[5] The fight against inflation appeared to be a major objective for Friedman as soon as 1951: "It is not clear that there is a single 'best' combination of monetary and fiscal measures and degree of inflation. A good combination, however, would be a roughly balanced budget together with whatever associated monetary policy would prevent inflation." (Friedman, 1951, p. 187)

"The Optimum Quantity of Money" was the first chapter of the book and was used in this struggle against Keynesianism. Friedman introduced stronger positions than ever before. In "A final schizoprhrenic note" concluding this essay, Friedman explained that he advocated from that point on for a "2 per cent rule" - a rise in the quantity of money of about two per cent per year - in place of the "5 per cent rule" that he defended before. (1969, pp. 47-8)[6] He nevertheless argued that the latter was supported as an intermediate objective, whereas the former has to be pursued in the long run. However, Friedman's goal was to promote a "steady and known rate of increase in the quantity of money", that was "more important than the precise numerical value of the rate of increase" (1969, p. 48) to achieve price stability. To defend these proposals, Friedman's work aimed to define the 'optimum quantity of money'. He studied the effects of a rise in the quantity of money thanks to the so-called helicopter metaphor:[7] "Let us suppose now that one day a helicopter flies over this community and drops an additional $1,000 in bills from the sky, which is, of course, hastily collected by members of the community." (1969, pp. 4-5)

Having pointed out the dangers of such a rise in the quantity of money, Friedman concluded that his "final rule for the optimum quantity of money is that it will be attained by a rate of price deflation that makes the nominal rate of interest equal to zero." (1969, p. 34) An alternative way to achieve the optimum that was preferable to deflation would be interest paid on bank deposits and free competition implemented in the banking sector. Under these conditions, the optimum quantity of money could be achieved. Friedman therefore drew from his theoretical model "some practical considerations and conclusions for policy", in addition to the two per cent rule.[8] The so-called metaphor of the helicopter according to which money was dropped from the sky was therefore used by Friedman as a weapon in the theoretical struggle.[9] He challenged the Keynesian framework - particularly the Phillips curve as a policy menu - in a clearly normative contribution.[10] Friedman nevertheless claimed that his work was different from previous literature, since he tried to find objective elements, such as the optimum quantity of money. In the normative struggle on monetary issues and elsewhere, Friedman's strategy was therefore to pretend to look for objective criteria and to contribute to the developments of positive economics.[11] Friedman's claim to contribute to the developments of positive economics was nevertheless rhetorical. This had been stressed by Angus R. Burgin in his biography of Milton Friedman: "Friedman believed that he would be more persuasive if he performed positive economics and refrained from further discussions of its normative underpinnings." (2012, p. 163) Friedman's 1969 essay and his powerful metaphor of the helicopter promoting the exogenous money supply theory contributed to the success of monetarism and to the loss of influence of Keynesian ideas. The monetarist theory has nevertheless been challenged by Post-Keynesian economists.

In a paper entitled "The New Monetarism" published in July 1970, Kaldor underlined this paradigm shift and the resurgence of neoclassical ideas: "we now have a 'monetary' counter-revolution whose message is that during this time we have been wrong and our forebears largely, if not perhaps entirely, right" (1970A, p. 1). Stressing the ongoing normative struggle, Kaldor compared monetarism to a church and claimed: "[t]his new doctrine is assiduously propagated from across the Atlantic by a growing band of enthusiasts, combining the fervor of early

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[6] Friedman often changed his mind about the rule that central banks should follow. Rivot (2013) showed that Friedman had also changed the instrument involved, stating that: "From 1948 to 1959 Friedman moved from a rule in terms of counter-cyclical fluctuations in the stock of money to a rule in terms of a constant growth of money." (2013, p. 86)

[7] Ramrattan (2003) stressed that "Friedman was standing on the shoulder of giants such as David Hume" with the helicopter metaphor. For a thorough analysis of the influence of the "old classical quantity theory of money first propounded by the English philosopher David Hume" on Friedman's statements, see also Thirlwall (1987, pp. 291-315).

[8] "The analysis in this paper strongly argues against the present prohibition on the payment of interest by the Federal Reserve System on bank reserves held in the form of deposits at Federal Reserve Banks – measures that I have long favored for the reasons advanced in this paper." (Friedman, 1969, p. 47)

[9] As explained by Laidler: "Friedman's fable of an increase in the nominal supply of money delivered to an economy by helicopter was intended to characterize an economy in which money was clearly exogenous." (1999, p. 9)

[10] Or the "Phillips curve myth": see James Forder (2010A; 2014).

[11] This had been claimed in his 1953 methodological essay, in which Friedman aimed to construct "the 'distinct positive science' Keynes called for" (Friedman [1953] 2008, p. 145). Using the name of - John Neville - Keynes to challenge the Keynesian framework was probably a part of Friedman's strategy. John Neville Keynes stated that "a positive science may be defined as a body of systematized knowledge concerning what is; a normative or regulative science as a body of systematized knowledge discussing criteria of what ought to be." (Keynes [1891] 2011, p. 34)

Christians with the suavity and selling power of a Madison Avenue executive." (1970A, p. 1) In very vivid style, Kaldor therefore used religious vocabulary to depict the crusade launched by monetarists against the Keynesian framework.[12] Despite Friedman's claim to contribute to the development of positive economics, a normative struggle was clearly in progress.

Kaldor used the metaphor of the constitutional monarch to point out that central banks were not as powerful as theorized by monetarists, because second-tier banks determine the money supply by providing loans to households and companies.[13] Friedman responded to Kaldor's paper in October 1970 in a short paper entitled "The New Monetarism: Comment". Kaldor was qualified by Friedman as "a Johnny-come-lately", criticizing monetarists "with all the air of Little Jack Horner extracting a plum from his Christmas pie" (Friedman, 1970, p. 29)[14] Friedman's comment was shortly followed by a rebuttal from Kaldor that same month, simply entitled "Reply to Friedman". Kaldor stated that "Professor Friedman makes no attempt to refute any of my contentions" (Kaldor, 1970B, p. 54), but we can stress here that Friedman undoubtedly won the battle in the early 1970s. As claimed by King (2002), monetarists may have lost some battles, but they nevertheless won the war, because monetary authorities are nowadays independent and target inflation. We add some arguments here, highlighting that Friedman initially won his battle with Kaldor.

Monetarism undoubtedly gained ground in the 1970s, with major central banks starting to implement monetarist-inspired policies. As stressed by Mishkin (2000), the U.S. Federal Reserve System began informal monetary targeting in 1970 and announced it publicly in 1975. The 'Volcker shock' launched in 1979 was a deep change in the operating procedures, deemphasizing Federal funds rate targeting and organizing monetary targeting through non-borrowed reserves. (Mishkin 2000, p. 2) In turn, the Bank of England experienced informal monetary targeting in 1973 and formal publication of the targets in 1976.[15] Such monetarist-inspired policies had also been launched by the German Bundesbank and the Swiss National Bank in 1974, by the Bank of Canada in 1975 and by the Bank of France in 1976.[16] Monetarism had strong influence on central banks throughout the 1970s and the 1980s, especially the Federal Reserve System.[17] During this time, Milton Friedman received the Nobel Memorial Prize in Economic Sciences in 1976 "for his achievements in the fields of ... monetary history and theory", whereas Kaldor never received such a distinction.

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[12] Krugman also depicted the monetarist counter-revolution using this religious vocabulary: "Keynesianism was a great reformation of economic thought. It was followed, inevitably, by a counter-reformation. A number of economists played important roles in the great revival of classical economics between 1950 and 2000, but none was as influential as Milton Friedman. If Keynes was Luther, Friedman was Ignatius of Loyola, founder of the Jesuits. And like the Jesuits, Friedman's followers have acted as a sort of disciplined army of faithful, spearheading a broad, but incomplete, rollback of Keynesian heresy." (Krugman, 2007, p. 27)

[13] Beyond the debates on the exogenous or endogenous nature of the money supply, Bibow had stressed the importance of the relation between monetary authorities and second-tier banks. Whereas the reader can find the outcome of this relationship, that complex interaction "takes place largely behind the scenes." (2000, p. 560) If second-tier banks do not thwart monetary policies implemented by central banks, the monetary multiplier can be regarded as stable, as assumed by Friedman. This issue nevertheless remains a complex one, that even John Maynard Keynes himself had to evacuate in *The General Theory of Employment, Interest and Money* [1936]: "the Pandora's box kept shut". (Bibow, 2000, p. 560)

[14] Friedman used very offensive comments about Kaldor elsewhere: "Kaldor and Balogh were known as the 'Budapest Lords,' and the common saying was that it was easy to know which was Buddha and which Pest. Kaldor was large, somewhat obese, and very cheerful – clearly Buddha; Balogh was thin, austere, and dour, truly a pest. When I engaged in a television discussion (debate) with him some years later … I infuriated him almost to the point of speechlessness by insisting on calling him 'Mr.' rather than 'Lord.' He correctly interpreted it as a mark of my lack of respect for him." (Friedman, M. and Friedman, R., 1998, p. 247)

[15] On the influence of Friedman and monetarists on monetary targeting at the Bank of England, see for instance Hotson (2010). Buiter and Miller (1983) stated that what mattered to monetarists was not the monetary targets followed by central banks or by governments, but rather the objectives that were not followed. By focusing on monetary targets as intermediate objectives, central banks or governments did not stimulate nor aggregate demand neither economic activity and employment, which were left to the market forces. These statements have been based on John S. Fforde's testimonies (see also Thompson [1986] 2015), a monetarist economist of the Bank of England. See also Fforde (1983).

[16] With regards to other European countries: the Bank of Italy used Total Domestic Credit Expansion (TDCE) targeting from 1974 to 1983, while the Nederlandsche Bank had a liquidity rate objective. Danish and Belgian monetary authorities did not publish any official monetary or liquidity target.

[17] See for instance Reichart and Slifi (2016).

2.2 The Revival of Friedman's Helicopter

Another argument should be mentioned to justify Friedman's initial victory in this debate: while Kaldor's constitutional monarch disappeared,[18] the helicopter metaphor is still widely discussed in contemporary public debates and by the secondary literature, especially in the context of the current economic and financial crises that have called for unconventional monetary policies. Four decades after Friedman's essay, economists are still looking for actual interpretations for the metaphor of the helicopter. This had also been the case before the Great Recession. Wagner (1974) distinguished an increase of the money supply due to public spending from the helicopter drop, stating that: "an increase in the money supply is brought about (a) by a governmental deficit, or (b) by scattering money from a helicopter." (1974, p. 157) Buiter (2003) interpreted Friedman's helicopter as a drop of money that stimulates demand and looked for the "practical modalities" (2003, p. 3) of implementing such a drop. Latter, he claimed that the helicopter could be viewed as "a permanent/irreversible increase in the nominal stock of fiat base money with a zero nominal interest rate, which respects the intertemporal budget constraint of the consolidated Central Bank and fiscal authority/Treasury – henceforth the State." (Buiter, 2014, p. 1). For Buiter, quantitative easing is a relevant case of the helicopter drop: "a permanent increase in the stock of base money through an irreversible open market purchase by the Central Bank of non-monetary sovereign debt held by the public – that is, QE." (2014, p. 1) Dai (2011) supported that comparison. On the contrary, Artus (2012) and Waldman (2013) both claimed that helicopter money could be seen as monetary creation without asset purchases as a counterpart. Jain and Kondeti (2016) recently exhibited differences between Quantitative Easing policies currently implemented by central banks and helicopter drops, while Reis (2016) claimed that "helicopter money is the antithesis of QE." (2016, p. 459) Simonnot and Le Lien (2012) spoke about a helicopter drop of notes 'on Wall Street'. For McCulley and Pozsar (2013), helicopter money means fiscal-monetary cooperation. In turn, Reichlin, Turner and Woodford (2013) offered an interpretation of the helicopter metaphor as the overt monetary financing of government deficits. Turner also defined helicopter money as "a permanent monetization of government debt." (Turner 2013, p. 2)[19] Since economists are still looking for actual interpretations of the helicopter metaphor, Cecchetti and Schoenholtz claim to be "wary of joining the cacophony of commentators on helicopter money." (2016).

If academic economists discuss the way in which the helicopter metaphor should be interpreted, the helicopter option as a monetary operation has also been mentioned inside monetary authorities. Taking the differences between QE and helicopter drop into account, Narayana Kocherlakota[20] defended the latter option during a meeting of the Federal Open Market Committee (hereafter FOMC) in September 2010: "The problem with open market operations is that they require the Fed to give up reserves for assets of equal value, given the current price level. These kinds of exchanges put no pressure on the price level when the system is awash in excess reserves. What we need to do is give up the dollars for nothing, to do what Milton Friedman described as a helicopter drop of currency."[21] In this version, helicopter drop could be used to reflate the economy and remains a monetary policy instrument in the hands of central banks: "In my view we need to do some "blue sky" thinking about how the FOMC can best approximate a helicopter drop... the Federal Reserve Act does provide ways for the Fed to approximate a helicopter drop."[22]

This has been the traditional interpretation of the helicopter metaphor, according to which helicopter drops are monetary operations and therefore instruments in central banks toolboxes (the current interpretation will be discussed latter). That traditional view included Friedman's original framework according to which the helicopter drop entails the doubling of the nominal prices, stressed during a Federal Reserve Inflation Briefing by Lawrence Slifman in November 1983: "over long periods changes in money only influence the price level and do not permanently affect

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[18] The constitutional monarch metaphor was incidentally abandoned by Kaldor himself in his following publications (see for instance Kaldor [1982] 1986). Since a constitutional monarch enjoys respect but no power, it appeared to be a bad metaphor. By the early 1980s, Kaldor had come to realize that central banks did in fact enjoy great power to do evil. It was especially the case in United Kingdom during the Thatcher years.

[19] See also Kim (2016) and De Koning (2016).

[20] President of the Federal Reserve Bank of Minneapolis from 2009 to 2015.

[21] FOMC Meeting Transcript, September 21, 2010, p. 103.

[22] *Ibid.*, pp. 103-104.

real variables in the economy. The usual intuition is that if everyone's cash balances were doubled by dropping money from helicopters, the real economy would eventually end up about the same except that prices would be doubled[23].” It also includes the zero nominal interest rate option – the “final rule” – advocated by Friedman in his essay of 1969. These options were considered by FOMC member Vincent Reinhart in June 2003:

> *According to a very influential paper that Milton Friedman published in 1969, a low nominal interest rate imposes no costs but only benefits. In Friedman’s framework, an overnight interest rate of zero is optimal because it implies that society does not wastefully devote resources to economizing on transactions balances. While the example of Japan strongly suggests that a zero-rate environment creates other difficulties, his perspective is instructive in that what many people call costs of low short rates are actually related to the unwinding of schemes designed to make holding transactions balances less burdensome[24].*

Friedman’s helicopter has therefore been discussed in the Federal Reserve and in academic circles as a monetary policy option. However, a new interpretation of Friedman’s metaphor has emerged and has been largely accepted by academic and central bank economists: the helicopter is not a monetary, but a fiscal option.

2.3 The Helicopter Is Not a Monetary Option: Friedman’s Helicopter Has Crashed

“In the real world, money does not drop from helicopters” claimed Friedman a few decades after the publication of his 1969 essay. (Friedman [1992] 1994, p. 40) Uses of this metaphor by the secondary literature mentioned above are nothing more than subjective interpretations. In Friedman’s own work, another mention of the metaphor has been made. He claimed: “Consider, in light of the helicopter fable, the effect of flood of gold from California and Australia in the 1850s. Like those who were quickest to pick up the helicopter money, the first to extract the gold were clearly enriched.” ([1992] 1994, p. 40) In both ‘helicopter cases’, money was directly picked up by individuals. The exogenous shock was linked to a helicopter drop of money in the first case and to gold discoveries in the second case. In both cases, this had nothing to do with monetary policies. Central banks finance second-tier banks that provide credit to economic agents, but monetary authorities never directly fund households and companies, even in Friedman’s theoretical world. Central bankers would agree with the idea that Friedman’s helicopter had nothing to do with monetary policies, at least former Chair of the Federal Reserve System Ben S. Bernanke, in his analysis of the Japanese financial crisis:

> *Suppose that the yen-depreciation strategy is tried but fails to raise aggregate demand and prices sufficiently... An alternative strategy, which does not rely at all on trade diversion, is money-financed transfers to domestic households – the real-life equivalent of that hoary thought experiment, the ‘helicopter drop’ of newly printed money. (Bernanke, 2000, p. 162)*

This interpretation was reaffirmed by Bernanke two years later, during a famous speech in front of the National Economists Club: “A money-financed tax cut is essentially equivalent to Milton Friedman's famous "helicopter drop" of money.”[25] (2002) In Bernanke’s view, helicopter drops do not involve monetary-fiscal cooperation: “A tax cut financed by money creation is the equivalent of a bond-financed tax cut plus an open-market operation in bonds by the Fed, and so arguably no explicit coordination is needed.” (2002) The direct transfers to domestic households mentioned here cannot be linked to monetary policies. If such direct transfers were implemented, they

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[23] FOMC Meeting Presentation Materials, Inflation Briefing, L. Slifman, 14 November 1983, p. 3.
[24] FOMC Meeting Transcript, June 24-25, 2003, p. 4.
[25] After this speech, Bernanke was nicknamed ‘Helicopter Ben.’ David Skidmore, Special Assistant to the Board of Governors of the Federal Reserve System advised Bernanke to delete the helicopter metaphor: *“The deflation speech saddled me with the nickname ‘Helicopter Ben.’ In a discussion of hypothetical possibilities for combating deflation, I mentioned an extreme tactic - a broad-based tax cut combined with money creation by the central bank to finance the cut. Milton Friedman had dubbed the approach a ‘helicopter drop’ of money. Dave Skidmore, the media relations officer… had advised me to delete the helicopter-drop metaphor…’ It’s just not the sort of thing a central banker says,’ he told me. I replied, ‘Everybody knows Milton Friedman said it.’ As it turned out, many Wall Street bond traders had apparently not delved deeply into Milton’s oeuvre.”* (Bernanke, 2015, p. 64).

would be financed by governments rather than by central banks. A new interpretation of the helicopter metaphor has emerged: it is a matter of fiscal policy, as claimed by Cochrane: "A helicopter drop is at heart a fiscal operation … Milton Friedman's helicopters have nothing really to do with money." (2011, p. 16) This has also been stated by Rivot, arguing that the helicopter drop "is a perfect equivalent of a tax relief financed by money issuance. Ironically, this unconventional monetary policy turns out to be a quite unconventional fiscal stimulus package, i.e. a money-financed fiscal policy." (2013, p. 129).

That idea is indeed completely relevant to the other metaphor used by Friedman in his 1969 essay. Whereas the helicopter was introduced to depict the effect of an increase in the quantity of money, Friedman used the metaphor of the furnace to represent the effect of a decrease in the quantity of money. According to the furnace metaphor, the State implemented a tax and burned the receipt: "Suppose therefore that we substitute a furnace for the helicopter. Let us introduce a *government*[26] which imposes a tax on all individuals and burns up the proceeds, engaging no other functions." (Friedman, 1969, p. 16) Both metaphors referred to changes in the quantity of money, but they were not properly linked to monetary policies. They were rather consistent with fiscal policies in Friedman's essay in which governments were involved, contrary to central banks. As claimed by Rivot: "Clearly, the helicopter drop parable was not the proper way to settle the issue." (2013, p. 129) For that matter, Friedman's fable was rewritten by Bernanke and renamed Money-Financed Fiscal Program (hereafter MFFP). In place of Friedman's helicopter, he introduced three institutions in charge of fiscal and monetary policies - the U.S. Congress, the Department of the Treasury and the Federal Reserve System-:

> *To illustrate, imagine that the U.S. economy is operating well below potential and with below-target inflation, and monetary policy alone appears inadequate to address the problem. Assume that, in response, Congress approves a $100 billion one-time fiscal program, which consists of a $50 billion increase in public works spending and a $50 billion one-time tax rebate. In the first instance, this program raises the federal budget deficit by $100 billion. However, unlike standard fiscal programs, the increase in the deficit is not paid for by issuance of new government debt to the public. Instead, the Fed credits the Treasury with $100 billion in the Treasury's "checking account" at the central bank, and those funds are used to pay for the new spending and the tax rebate. Alternatively and equivalently, the Treasury could issue $100 billion in debt, which the Fed agrees to purchase and hold indefinitely, rebating any interest received to the Treasury. In either case, the Fed must pledge that it will not reverse the effects of the MMFP on the money supply.*[27] *(Bernanke, 2016)*

In Bernanke's view, helicopter drops include both money-financed tax cuts and money-financed public spending, but in any case: "In more prosaic and realistic terms, a "helicopter drop" of money is an expansionary fiscal policy - an increase in public spending or a tax cut - financed by a permanent increase in the money stock." (2016) The Federal Reserve System adopted Bernanke's view, according to which Friedman's helicopter implies fiscal policies or monetary-financed fiscal programs. In June 2016, during Chair Janet Yellen's Press Conference, a journalist stressed that "some economists think that central banks should think about using helicopter money, maybe in Japan first or Europe first. But then, former Fed Chairman Ben Bernanke weighed in saying that he thought it would be a good thing for the Fed to put helicopter money in its toolkit in case there was a downturn in the United States." (Yellen, 2016, p. 17) Chair Yellen answered by highlighting the fact that helicopter drops involved fiscal policies and monetary-fiscal cooperation:

> *So, in normal times, I think it's very important that there be a separation between monetary and fiscal policy, and it's a primary reason for independence of a central bank. We have seen all too many examples of countries that end up with high or even hyperinflation because those in charge of fiscal policy direct their central bank to help them finance it by printing money, and maintaining price stability and low and*

[26] Our italics.
[27] Bernanke nevertheless stressed that such MFFP are very unlikely to be needed in the United States in the near future and may receive more attention in Japan or in Europe.

stable inflation is very much aided by having central bank independence. Now, that said, in unusual times where the concern is with very weak growth or possibly deflation - rather rare circumstances - first of all, fiscal policy can be a very important tool. And it's natural that if it can be employed that, just as monetary policy is doing a lot to try to stimulate growth, that fiscal policy should play a role. And normally, you would hope, in an economy with those severe downside risks, monetary and fiscal policy would not be working at cross purposes to get - but together. Now, whether or not in such extreme circumstances, there might be a case for, let's say, coordination - close coordination, with the central bank playing a role in financing fiscal policy; this is something that academics are debating, and it is something that one might legitimately consider. I would see this as a very abnormal, extreme situation where one needs an all-out attempt, and even then it's a matter that academics are debating, but only in an unusual situation. (Yellen, 2016, pp. 17-8)

From Bernanke to Yellen, the helicopter metaphor is now clearly interpreted as an expansionary fiscal policy backed by bond purchases implemented by central banks. The main difference between both chairpersons of the Federal Reserve System is that helicopter drops entail no explicit coordination for Bernanke, whereas they involve close cooperation between governments and central banks in the eyes of Yellen. In both cases, Friedman's helicopter is not a relevant metaphor for monetary policy. This line has been reaffirmed in a paper from English, Erceg and Lopez-Salido (2017) of the Divisions of Research & Statistics and Monetary Affairs of the Federal Reserve Board, stating that helicopter drops are "money-financed fiscal programs"[28] as claimed by Bernanke.

If helicopter drops now involve fiscal policies in the Federal Reserve, it is also the case in the European Central Bank (hereafter ECB). This has been clearly stated by ECB Vice-President Vítor Constâncio during an interview for Dutch newspaper Het Financieele Dagblad in April 2015:

First and foremost, the purchase of securities is an instrument that we can use because it is in line with our statute. There is nothing that controversial about it, but the same cannot be said for your "helicopter money". Moreover, with our programme we are injecting money into the economy. That money will bring about an improvement in market conditions and thereby make it easier for private parties to access financing. Helicopter money has had different meanings in various contexts, from giving money directly to households to financing of public infrastructure. But all these options would bring us very close to pursuing fiscal policy. And that's what we cannot do. (Constâncio, 2015)

Vice-President Constâncio clarified this during a Lecture at the Instituto Superior de Economia e Gestão of Lisbon in May 2017 by stating that there are two kinds of helicopter drops and that both are fiscal policies, i.e. something different from Friedman's statements:

The "helicopter money" policy recently proposed however, operates through different channels than those in Friedman's original thinking: it is expansionary fiscal policy financed by the central bank. There are, however, two types of helicopter money policy. The first one is combined with fiscal policy, having the central bank temporarily financing an increase in public expenditure thus avoiding additional public debt issuance and its potential Ricardian effects when debt is very high. The second one is by directly distributing money to consumers by means of crediting their deposit accounts. This could be done by the Treasury as a form of expenditure or by the central bank itself. Both cases can therefore be seen as examples of fiscal policy with monetary financing. (Constâncio, 2017, p. 14)

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[28] The authors give historical examples of monetary-fiscal cooperation, such as the U.S. experience during and after the Civil War, the French experience during and after World War I, Japan in the early 1930s, United Kingdom in the 1960s...

Once again, helicopter drops involve fiscal operations or fiscal policies backed by monetary operations, but certainly not monetary policy in the narrow sense, nor an instrument in central banks' toolboxes. One can stress here that ECB President Mario Draghi has been less clear than Vice-President Constâncio on the definition of helicopter drops. When asked during a press conference if the helicopter drop was part of the ECB's toolbox, Draghi stated: "We haven't really thought or talked about helicopter money. It's a very interesting concept that is now being discussed by academic economists and in various environments. But we haven't really studied yet the concept. ... by this term "helicopter money" one may mean many different things, and so we have to see that." (Draghi and Constâncio, 2016) In a letter to Member of the European Parliament (hereafter MEP) Fabio De Masi, Draghi excludes the unclear helicopter option: "Helicopter money means different things to different people, but all these schemes are fraught with complexities from accounting, operational, and legal perspectives, especially as regards compatibility with Article 123 of the Treaty on the Functioning of the European Union." (Draghi, 2016A, p. 2) In another letter to MEP Jonás Fernández, Draghi repeated that "helicopter money can take different forms and can mean different things to different people." (Draghi, 2016B, p. 1) The ECB President again refers to the aforementioned article 123 to point out that a helicopter drop would be prohibited.[29] Helicopter money is something poorly defined and, at the very least, involving legal complexities in Draghi's view. Member of the Executive Board of the ECB Peter Praet also emphasized the legal complexity involved in helicopter drops, highlighting that such operations imply monetary financing of governments: "It would be for parliaments to decide how to distribute it. But the ECB would then be directly involved in the monetary financing of governments, which it is not allowed to do." (Praet 2015) The exclusion of the helicopter option has been clarified by Member of the Executive Board of the ECB Benoît Cœuré. He stressed that the academic discussion was exciting, stating: "It is good that academics force us to think outside the box." (Cœuré, 2016) Although interesting, the helicopter option was nevertheless not on the table for practical reasons, such as impinging on fiscal policy:

> *If we decided to get into that discussion, we would have to deal with many questions, such as: how exactly would it work in practice? How would "helicopter money" fit within our monetary policy? And finally and most importantly, how do we make sure it doesn't cross the line between monetary and fiscal policy? To be honest, I don't see how it could work without some kind of risk-sharing with governments, which could be practically and legally problematic. So whatever my own intellectual interest in helicopter money, as a Governing Council member I have a fair deal of skepticism and circumspection. (Cœuré, 2016)*

Like the aforementioned Federal Reserve Board research paper, papers discussed at the ECB point out that helicopter drops cannot be implemented by central banks. Caballero, Farhi and Gourinchas stated that "All in all, fiscal policy - be it in the form of public debt issuances, helicopter drops of money, or budget-balanced increases in government spending - is a positive-sum remedy in contrast with zero-sum exchange rate devaluations." (2016, p. 7).

The helicopter fable has also been discussed in the Bank of England: Cumming states that "a modern helicopter drop would be a joint operation between a government and a central bank" (Cumming, 2015), with the government acting first by implementing a bond-financed tax cut or a spending programme and the central bank buying the equivalent amount of government debt in the secondary market in exchange for reserves. Cumming stresses that helicopter drops are different from conventional fiscal policies since helicopter operations are funded by newly created money, but nevertheless emphasizes that "Such an operation possesses many of the hallmarks of pure fiscal policy." (2015) Such a view has been expressed by the Deputy Governor for Monetary Policy of the Bank of England, Charlie Bean, during in a speech in 2012. Bean stressed that helicopter drops can be split in

[29] Article 123(1) of the Treaty on the Functioning of the European Union asserts that: "Overdraft facilities or any other type of credit facility with the European Central Bank or with the central banks of the Member States (hereinafter referred to as "national central banks") in favour of Union institutions, bodies, offices or agencies, central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of Member States shall be prohibited, as shall the purchase directly from them by the European Central Bank or national central banks of debt instruments."

two legs: the fiscal leg involving bond-financed public expenditure and the monetary leg (or financing leg) entailing purchases of the corresponding quantity of government debt by the central bank on the secondary market. Bean stresses that "the easiest way to implement a 'helicopter drop' would be to increase tax allowances temporarily." (2012, p. 10).

While Friedman introduced his helicopter fable to promote the exogenous money supply theory and strong monetary rules tying monetary authorities' hands, central banks nowadays regard the helicopter metaphor as a fiscal operation or as a fiscal policy backed by monetary operations - certainly not as a monetary policy option available in their toolboxes. The helicopter metaphor has been largely reinterpreted while monetarist experiments implemented from the 1970s were progressively abandoned by monetary authorities in the 1980s and early 1990s. While Friedman's ideas have progressively lost their influence, Kaldor's endogenous monetary theory has gained ground.

3. From the 1940s to the Great Recession: How Endogenous Money Supply Theory gained Ground within Central Banks

3.1 The Endogenous Money Supply Theory Supported by French Monetary Authorities

Friedman stressed that central banks should follow "a steady and known rate of the increase in the quantity of money" (Friedman, 1969, p. 48). From this claim spring two important corollaries. On the one hand, monetary targeting should be implemented in an independent manner - regardless of the management of fiscal policy and macroeconomic evolutions - in order to control the level of growth of monetary aggregates, which have to be stable in a long-term perspective. On the other hand, monetary authorities can control the quantity of money and should control it through monetary objectives or targets, in order to fight against inflation. This latter point does not seem to be prominent in testimonies left by a number of important practitioners of monetary policy from the late 1940s to the present time. It has been stated that "[t]he Post Keynesian theory of endogenous money supply theory has been largely dismissed by most economists and practitioners". (Fontana, 2003, p. 292) Some monetary policymakers and central bank economists have nevertheless supported the endogenous money supply theory.

This was especially the case at the Bank of France, as emphasized by Béziade (1979, p. 298). Jacques Rueff, who was Deputy Governor of the Bank of France between 1939 and 1941,[30] claimed: "As Deputy Governor of the Bank of France, I witnessed the vain attempts of the central bank to resist the increase of note issue. Thus, the quantity of money in circulation, contrary to popular belief, is not fixed by the authorities of the market." (Rueff, 1947, p. 358) Ten years later, Rueff reemphasized this idea: "As member of the General Council of the Bank of France, then as Deputy Governor, I often saw the Institut d'Émission worry about the variations of the circulation and try to impede them... At no moment, I had the feeling that the bank of issue 'changed' the quantity of money." (Rueff, 1957, p. 531) Such an idea was also expressed by Henri Fournier, Director of Studies of the Bank of France in the 1960s: "In any event, this is ultimately the overall demand for liquidities which commands the volume of money supply." (Fournier, 1970) The same opinion was stated by Pierre Berger, former Director of the Monetary and Statistical Analyses and former General Director of the Bank of France: "In most cases, the Central Bank does not play a leading role in the creation of money, as its supports do not predate the distribution of credits... by the contrary, those are granted after the requests of the banks which put themselves in the situation to undergo the need following their activities in terms of credits" (Berger, 1974).

French monetary policymakers and central bank economists therefore believed in the endogenous character of monetary creation, at least since the 1940s. In addition, they never supported hard-line monetarism, even during the golden age of quantitativism in the late 1970s and in the early 1980s. In his letter addressed to the President of the French Republic in introduction to the 1981 Annual Report, Renaud de la Genière – Governor of the Bank of France from 1979 to 1984 – stated that French monetary policy has been criticized and associated with an "extreme monetarism." (Bank of France 1981, p. 3). He claimed that French monetary policy took a larger number of parameters into account (interest rates, exchange rates, the general economic context that included domestic fiscal policy, earnings or sectorial aids) and could therefore not be reduced to a strict quantitativism. In the Committee of the Governors of

[30] But also a strong opponent of Keynesianism.

ARMG Publishing "Thinking ahead"
sciendo
SocioEconomic Challenges, Volume 6, Issue 4, 2022
ISSN (print) – 2520-6621, ISSN (online) – 2520-6214

the central banks of the European Economic Community (hereafter EEC), in February 1983, La Genière described French monetary policy as an "enlightened monetarism," rather than a strong quantitativism with "theological" monetary targets.[31] (Committee of the Governors of the EEC 1983, p. 15).

Figure 1. Bank of France Monetary Targeting Policy, 1980-198

Objectives	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Nominal GDP forecasts, published when implementing monetary targets	11,9	12,3	17	11,2	7,7	7,5	6,1	4,5	4,8	5,1
Nominal results	13,4	12,3	14,7	10,3	8,9	7,6	7,2	5	6,8	6,6
M2 targets (year on year)	11	10 then 12[32]	12,5 - 13,5	10 then 9[33]						
M2R[34] targets (year on year[35]) :					5,5 - 6,5	5 - 6				
M3 targets (en glissement entre MM3[36]):							3 - 5	3 - 5		
M2 targets (en glissement entre MM3[37]):								4 - 6	4 - 6	4 - 6
Results:	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
M2 (year on year)	9,8	11,4	11,5	10,3						
Gap (results - objectives) (in percentage points):	-1,2	-0,6	-1	+1,1						
M2R (year on year)					7,6	6,9				
Gap (results - objectives) (in percentage points)					+1,1	+0,9				
M3 (year on year)							4,6	9,2		
Gap (results - objectives) (in percentage points)							0	+4,2		
M2 (year on year)								4,2	4	4,3
Gap (results - objectives) (in percentage points)								0	0	0

Source: Bank, Annual Report 1989, pp. 20-21.

As underlined by James K. Galbraith, a French-specific monetarism existed in the 1980s implying "nothing more than monetary targeting, and monetary targeting as such implies nothing whatever about the techniques of monetary control, the zeal with which control is pursued, or the political ramifications both within and between organs of government and on the wider world." (Galbraith, 1982, p. 402) Reichart identified four reasons why monetarism only had a partial influence in France: (1) the definition of a target range, in place of a specific numerical value; (2) the permanent change of the annual objective, in place of a steady objective like Friedman's k-rule; (3) the permanent change of the monetary aggregate that was targeted; and (4) the fact that Gross Domestic Product was taken into account in the determination of the monetary targets, whereas hard-line monetarism defended the fact that targets should be implemented regardless of the global economic context. (Reichart, 2014, p. 19). While hard-line monetarism never triumphed in France during

[31] In the Committee of the Governors of the central banks of the European Economic Commission, in May 1982, La Genière also stressed the "pragmatic" nature of the French monetary policy, emphasizing that monetary targets are not the single objective of French monetary authorities but are rather placed at the same level that interest and exchange rates.
[32] The M2 monetary target for the year 1981 has been informally changed during the summer.
[33] The M2 monetary target for the year 1983 has been reduced to 9% after the devaluation of French franc in March 1983.
[34] M2R was a specific aggregate that only took the money possessed by residents into account. The stock of money held by non-residents was excluded from this aggregate.
[35] Variations between three-monthly averages for the months of November, December and January.
[36] Variations between three-monthly averages for the months of October, November and December.
[37] *Idem*.

the 1970s-1980s, the Post-Keynesian-inspired endogenous view of the money creation process has been restated some decades later, during the Great Recession.

A memorandum devoted to the monetary creation process was published by the Bank of France in 2015, highlighting that credits do not require preexisting savings deposits. On the contrary, it stresses that "credits make deposits" and that second-tier banks "play an active role in money creation".[38] (Bank of France, 2015, p. 4) The memorandum stresses that, if "it is nowadays understood that lending makes deposits" and that "it is the banking system that creates money in an endogenous way" (2015, p. 4), the opposite idea was defended until the 1970s. This opposite monetarist theory, "which could have been true historically in some [central] banks, does not reflect today's banking practice". (2015, p. 4) French monetary authorities claim that the monetarist exogenous money supply theory could exist in a hypothetical economy in which the quantity of money is fixed by a central bank that does not additionally refinance second-tier banks, but add that the monetary base is largely produced by commercial banks' endogenous demand in the real world. Another memorandum published by the Bank of France two years later reaffirmed that money is endogenously created by second-tier banks as a function of the amount of credits required by economic agents, emphasizing that central banks nevertheless control the price of money through their key interest rates. (2017, pp. 1-2) French monetary authorities therefore clearly assert that central banks are 'price setters' and 'quantity takers', as claimed by Moore in 1988. The endogenous money supply theory has also been supported in other monetary authorities, including the Bank of England.

3.2 The Endogenous Money Supply Theory Supported by English Monetary Authorities

The endogenous money supply theory has been supported by policymakers and economists in the Bank of England, one of the central banks labelled as a 'constitutional monarch' in Kaldor's 1970 paper. Charles A. E. Goodhart worked more than fifteen years at the Bank of England, during the English monetary targeting experience: as monetary policy adviser from 1969 to 1980 and as chief adviser from 1980 to 1985. In 1997, he was appointed outside independent member of the Bank of England's new Monetary Policy Committee (a position he held until 2000). The so-called "Goodhart's Law" criticizing English monetarist-inspired monetary targeting was named after him.[39] On the monetary creation process, Goodhart clearly embraced Post-Keynesian proposals emphasizing the existing gap between academic economists and monetary policymakers during the 'monetarist era':

> *There is, perhaps, no wider gap in monetary economics between practitioners in central banks and the majority of academics on this subject. The practitioners feel that, in reality there is no alternative for a central bank but to provide the banking system with the cash base it needs. The effective choice of central banks is limited to the terms on which such cash is made available. On this view, the process of money stock adjustment is one aspect of portfolio adjustment in which the authorities are influencing certain prices/interest rates rather than physically rationing the base itself. (Goodhart, 1984, p. 15)*[40]

Before becoming Governor of the Bank of England, Mervyn A. King had also emphasized this idea: "In the United Kingdom, money is endogenous - the Bank supplies base money on demand at its prevailing interest rate and broad money is created by the banking system." (King, 1994, p. 264) A recent paper published by the Bank of England - written by McLeay, Radia and Thomas - also supported the endogenous money supply theory and claimed that, in the modern economy, second-tier banks create money through loans. Authors highlight two misconceptions about money creation.

The first common misconception is that "banks act simply as intermediaries, lending out the deposits that savers place with them." (McLeay, Radia and Thomas, 2014, p. 2) In this view, deposits are created by households' saving decisions and banks can therefore lend out those existing deposits to borrowers, i.e. deposits create credits. McLeay, Radia and Thomas, on the other hand, stress that an increase in households' savings comes at the expense of deposits that would have otherwise gone to companies in the form of payments for goods and services, and that "in reality in the modern economy, commercial banks are the creators of deposit money." (2014, p. 2) Authors therefore claim that second-tier banks create money in the form of bank deposits by providing new loans, i.e. that lending creates deposits. The second

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[38] Our translation.

[39] Goodhart stressed that: "Any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes." (Goodhart, [1975] 1984, p. 96) This has been rephrased by Marilyn Strathern as follows: "When a measure becomes a target, it ceases to be a good measure." (Strathern, 1997, p. 308) On Goodhart's Law, see for instance Chrystal (2001).

[40] Quoted by Guerrien (1985, pp. 9-10).

common misconception is that "the central bank determines the quantity of loans and deposits in the economy by controlling the quantity of central bank money — the so-called 'money multiplier' approach."[41] (2014, p. 2) McLeay, Radia and Thomas attack the monetarist quantitative framework according to which central banks implement monetary policy by choosing a quantity of reserves, there is a constant ratio of broad money to base money and "these reserves are then 'multiplied up' to a much greater change in bank loans and deposits." (2014, p. 2) The authors rather support Moore's statements, claiming that monetary authorities are 'price setters' and 'quantity takers'. They also claim, in a Kaldorian style, that "reserves are, in normal times, supplied 'on demand' by the Bank of England to commercial banks in exchange for other assets on their balance sheets." (2014, p. 3) The endogenous money supply theory has therefore been backed by French and English monetary authorities. More surprisingly, it is also the case in the German Bundesbank, seen by many as a highly orthodox institution.

3.3 The Endogenous Money Supply Theory Supported by German Monetary Authorities

Since the 1920s hyperinflation, the struggle against inflation became one of the most important economic objectives of German policymakers. If German monetary authorities are on the frontline of this battle, their devotion cannot be reduced to a strong monetarism or a simple quantitative monetary policy, even during the golden age of monetarism of the 1970s and 1980s. This was stressed by Karl Otto Pöhl – President of the German Bundesbank from 1980 to 1991 – during a meeting of the Committee of Governors of the central banks of the EEC in February 1983. Like Renaud de la Genière, Pöhl emphasized the "pragmatic" nature of German monetary policy (Committee of the Governors of the EEC 1983, p. 9) that has been criticized by the academic community. Like his French colleague, the German chairman stated that monetary targets were not the sole purpose of monetary policy. In addition, he stressed that German targets were not specific numerical values, but were rather included in a range. Pöhl also underlined the explanatory and pedagogical nature of published monetary targets for the public[42] and specified that German monetary policy would not have been different without these quantitative objectives.

Figure 2. German Bundesbank Monetary Targeting Policy, 1980-1989

Objectives:	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Central bank money growth targets (year on year)	5-8	4-7	4-7	4-7	4-6	3-5	3,5-5,5	3-6		
Central bank money growth targets (annual average)	6	5-5,5	4,75		5	4,5	4,5			
Midyear review	lower half	lower half	upper half	upper half						
M3 targets (year on year)									3-6	about 5
M3 targets (annual average)										just under 5
Results:	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Year on year	5	4	6	7	5	5	8	8	7	5
Gap (results - objectives) (in percentage points)	0	0	0	0	0	0	2,5	2	1	0

Source: C. Gerberding, A. Worms & F. Seitz, "How the Bundesbank really conducted monetary policy: An analysis based on real-time data", Deutsche Bundesbank, Discussion Paper, Series 1: Studies of the Economic Research Centre, vol. 25, 2004.

The moderate monetarist nature of German monetary policy was restated by Pöhl in January 1987, when he reemphasized that the Bundesbank had been criticized by a "kind of monetarism that conserves influence in Germany" (Committee of the Governors of the EEC 1987, p. 7), but that did not come from German monetary authorities...

[41] Friedman's helicopter became the symbol of monetarist views on the monetary creation process, i.e. the emblem of the so-called exogenous money supply theory. It was used to underline the actions of powerful central banks that control the monetary base and, in doing so, determine the money supply thanks to the stability of the multiplier. See Johannes and Rasche (1979). See also the influential paper of Poole (1970) devoted to the choice of instruments, between quantity control or interest rates control.

[42] By contrast, the Bank of Japan practiced a "closet monetarism," in which "actions speak louder than words". (Bernanke and Mishkin, 1992).

While the chairman argued that German monetary policy implemented in the 1980s had nothing to do with a hard-line monetarism, head of the Research Department of the Bundesbank Otmar Issing claimed that "the central bank has never seen fit to transfer monetary targeting to an 'autopilot." (Issing, 1996) Bernanke and Mishkin (1992) stress that German money growth targets were intermediate-term objectives. Clarida and Gertler underline that the German monetary targeting that began in the 1970s had always been smooth and gradual, stating that: "There is no blind commitment to hitting the monetary target." (1997, p. 367) In turn, Johnson emphasized the "less radical version of monetarism in Germany with the version found in the United States" (1998, p. 16), while Calverley stressed a German "partial monetarist approach". (2003, p. 55) While hard-line monetarism never triumphed in Germany, recent publications of the German Bundesbank show that the institution has now adopted the endogenous money supply theory.

In their Monthly Report of April 2017, German monetary authorities published a paper entitled "The role of banks, non-banks and the central bank in the money creation process". In line with the paper published by the Bank of England mentioned above, the German Bundesbank's paper stresses a common misconception in the money creation process:

> *[A] bank can grant loans without any prior inflows of customer deposits. In fact, book money is created as a result of an accounting entry: when a bank grants a loan, it posts the associated credit entry for the customer as a sight deposit by the latter and therefore as a liability on the liability side of its own balance sheet. This refutes a popular misconception that banks act simply as intermediaries at the time of lending – ie that banks can only grant loans using funds placed with them previously as deposits by other customers. (German Bundesbank, 2017, p. 17)*

For the German Bundesbank, the money supply is endogenously created through the loans granted by second-tier banks to domestic households and companies that take interest rates into account, as well as general economic conditions, projected profitability of investment projects and unspecified institutional factors. Central banks nevertheless influence the distribution of credits and money growth through interest rate policies: "an increase in the key monetary policy rates will, all other things being equal, dampen monetary and credit growth – through changes to funding costs, the supply of credit and the terms of lending by the banking system, as well as to portfolio decisions and credit demand on the part of non-banks. By contrast, a cut in the policy rate per se stimulates money and credit creation." (German Bundesbank, 2017, p. 23) While monetary authorities cannot control the quantity of money created by second-tier banks, they control the price of money through their key interest rates. Once again, it is stated here that central banks are 'price setters' and 'quantity takers'. Even in a central bank that has been largely viewed as strongly orthodox, the Post-Keynesian endogenous money supply theory seems to be well entrenched in thinking. All of the policymaker testimonies and central bank papers mentioned here reinforce the idea that Post-Keynesian statements seem to be consistent with the exercise of central banking functions.

At the same time, monetarist-inspired monetary targeting policies implemented from the 1970s onwards have been largely abandoned by central banks. As early as 1978, the Bank of Canada deemphasized monetary targeting, which was subsequently totally abandoned in 1982. In the United States, the Volcker shock implemented in 1979 was ended three years later: the Federal Reserve System deemphasized monetary targeting in October 1982, abandoned M1 targets in 1987 and abandoned monetary targets altogether in 1993. In turn, the Bank of England temporarily suspended M3 targeting in 1985, before dropping it in 1987. (Mishkin, 2000, pp. 2-3) Monetary targeting was quickly replaced by inflation targeting that began in 1990 in the New Zealand Reserve Bank. Inflation targets were the new tool and key interest rates had been reemphasized as monetary instruments: in place of monetary rules, central banks revived discretionary policies that implied interest rate management. Post-Keynesian statements have undoubtedly gained ground during the last decades within monetary authorities, which have debunked monetarist-inspired misconceptions. This shift has intensified since the Great Recession, offering new evidence with which to reasses the Friedman-Kaldor debate of 1969-1970.

Results

The paradox stressed in this paper is the following one: despite Friedman's victory in his debate with Kaldor in 1969-1970, the legacy of this debate today shows that Kaldor can be proclaimed victorious for two reasons. Firstly, Friedman introduced the helicopter fable as a tool to promote the exogenous money supply theory and monetary rules, but the helicopter metaphor is nowadays widely interpreted as a fiscal operation - or a fiscal operation backed by monetary authorities – rather than as a monetary option in central banks' toolboxes. This point has been clearly stated by central bank chairpersons themselves. It is not Friedman's helicopter that is widely discussed today, but another one that could, for example, be called Bernanke's helicopter. Secondly, many testimonies from central banks show that most of these institutions never adopted hard-line monetarism and do not believe that money supply can be exogenously created by powerful central banks. On the contrary, they claim that central banks are 'price setters' (interest rates setters) and 'quantity takers', i.e. that the endogenous money supply theory is guiding their approach.

While Friedman unquestionably won the debate in the 1970s, our reappraisal of that famous controversy in the light of the Great Recession shows that Kaldor could now be proclaimed the winner. Claudio Borio, Head of the Bank of International Settlement's Monetary and Economic Department, recently criticized the monetarist framework. During a conference held on 15 November 2018 at the Cato Institute, he claimed that the "monetary base ... plays no significant causal role in the determination of the money supply" and that "money multiplier ... is not a useful concept." (2018, p. 7) On the contrary, Borio supported Post-Keynesian premises. He underlined that the "central bank satiates the market" and "simply sets the desired interest rate" (2018, p. 7) And he claimed: "once we recognise that money is fundamentally endogenous, analytical thought experiments that assume an exogenous change and trace its impact are not that helpful, if not meaningless. They obscure, rather than illuminate, the mechanisms at work." (2018, p. 12).

4. Conclusion

The exogenous money supply theory, and what appeared to be its totem - the helicopter metaphor -, were weapons supporting the monetarist discourse. Milton Friedman unquestionably won his debate with Nicholas Kaldor in 1969-1970: despite Kaldor's strong arguments, monetarism and money supply targeting gained ground from the 1970s onwards. Friedman even received the Nobel Memorial Prize in Economic Sciences in 1976 "for his achievements in the fields of ... monetary history and theory". Five decades after its introduction in his 1969 essay, Friedman's helicopter remains a popular metaphor discussed by the secondary literature, in central banks and even in public debates. The helicopter metaphor has even experienced a revival of sorts in the context of the Great Recession and the unconventional monetary policies implemented by central banks.

Author Contributions: conceptualization: Alexandre Reichart; methodology: Alexandre Reichart; software: Alexandre Reichart; validation: Alexandre Reichart; formal analysis: Alexandre Reichart; investigation: Alexandre Reichart; resources: Alexandre Reichart; writing original: Alexandre Reichart; draft preparation: Alexandre Reichart; writing-review and editing: Alexandre Reichart; visualization: Alexandre Reichart; supervision: Alexandre Reichart.

Conflicts of Interest: Author declares no conflict of interest.

Data Availability Statement: Not applicable.

Informed Consent Statement: Not applicable.

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