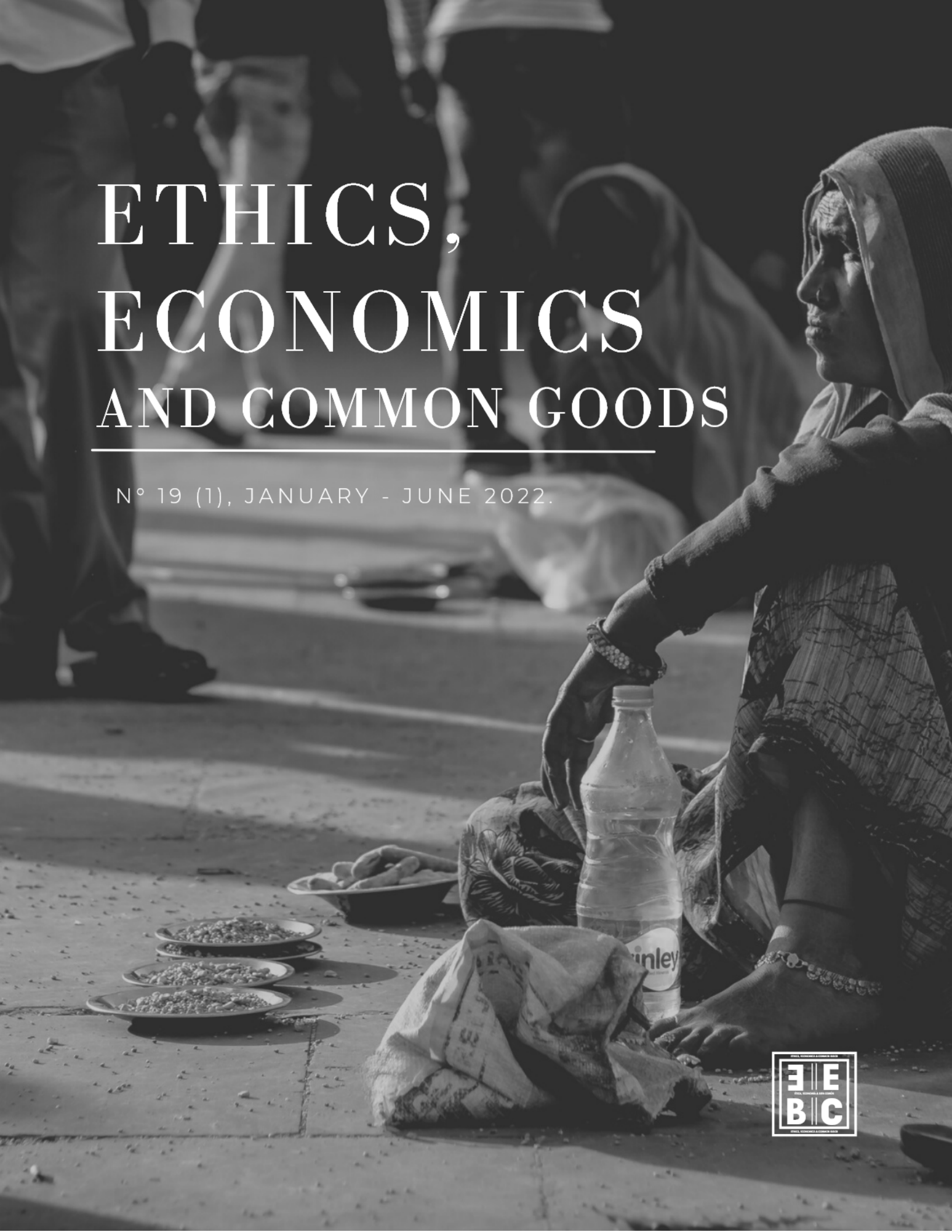

ETHICS, ECONOMICS AND COMMON GOODS

N° 19 (1), JANUARY - JUNE 2022.

Ethics, Economics and Common Goods, n. 19, Jan-Jun 2022, is a peer-reviewed, open access, scientific research journal, edited and published in electronic format, semi-annually. Website: ethics-and-economics.com. E-mail: alejandro.gutierrez@uteq.edu.mx. Reservation of rights to the exclusive use of the name: in process. ISSN: in process. Responsible editor: Manuel Alejandro Gutiérrez González. Co-editor: María Teresa Herrera Rendón Nebel. **Date of last modification: 29-07-2022.** The concept of the published article is the responsibility of each autor and does not necessarily represent the position of the editor of the publication.

ISSN: in process

ETHICS, ECONOMICS AND COMMON GOODS

N° 19 (1), JANUARY - JUNE 2022.

January - June 2022

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Ethics, Economics and Common Goods Journal aims to be a space for debate and discussion on issues of social and economic ethics. Topics and issues range from theory to practical ethical questions affecting our contemporary societies. The journal is especially, but not exclusively, concerned with the relationship between ethics, economics and the different aspects of the common good perspective in social ethics.

Social and economic ethics is a rapidly changing field. The systems of thought and ideologies inherited from the 20th century seem to be exhausted and prove incapable of responding to the challenges posed by, among others, artificial intelligence, the transformation of labor and capital, the financialization of the economy, the stagnation of middle-class wages, and the growing ideological polarization of our societies.

The journal Ethics, Economics and the Common Goods promotes contributions to scientific debates that combine high academic rigor with originality of thought. In the face of the return of ideologies and the rise of moral neopharisaisms in the Anglo-Saxon world, the journal aims to be a space for rational, free, serious and open dialogue. All articles in the journal undergo a process of double anonymous peer review. In addition, it guarantees authors a rapid review of the articles submitted to it. It is an electronic journal that publishes its articles under a creative commons license and is therefore open access.

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Further details regarding this paragraph are given in the Editorial Notes.

ESENTIAL IDENTIFICATION

Title: Ethics, Economics and Common Goods
Frequency: Semi-annual
Dissemination: International
ISSN online: in process
Place of edition: Mexico
Year founded: 2003

DIRECTORY

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The Case for Fed Cooperation in Monetary Policy: The Federal Reserve and the Prisoner's Dilemma

Received: January 14th, 2022 I Accepted: June 7th, 2022

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ABSTRACT

During the Global Financial Crisis the US Federal Reserve rejected calls from critics in the EME and elsewhere to be more aware of spillovers and externalities and instead to conduct a coordinated and cooperative monetary policy. This article analyses the 2015 Mundell-Fleming lecture in which former Chairman Ben Bernanke defends Fed policies and rejects cooperation as offering better outcomes. I argue that the model and analytical framework Bernanke used in this defense are inadequate – casting doubt on Fed policies – as they do not incorporate the lesson of the Prisoner's Dilemma that a cooperative choice can often provide the optimal solution. Relying on the work of the late philosopher Robert Nozick I trace this deficiency to a failure to include evidentiary and symbolic expected utilities in the Fed's decision-making approach.

Keywords: Federal Reserve, monetary policy, Prisoner's Dilemma, currency war, Robert Nozick.

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Introduction

The meetings of central bankers and monetary authorities during the Great Financial Crisis were characterized by disputes over alleged 'spillovers' from Fed policies and whether better coordination would have prevented them. There were calls for more cooperation in the monetary system from finance ministers and monetary theorists. Although the criticisms died down as the crisis ebbed, the fundamental question of the merits of more cooperation on monetary policy remained unresolved. However, with the pandemic crisis and a much expanded version of the same Fed policies that led to spillovers problems - Quantitative Easing (QE) and Zero Interest Rate Policy (ZIRP) - the monetary system imbalances again have emerged. And now as the Fed is embarking on Quantitative Tightening and raising policy rates the issues of imminent EME spillovers and potential benefits of cooperation again arise.

With the controversy unsettled, I revisit a seminal moment in the post-GFC discussion over cooperation involving the main pro and con contestants. I look back at the highly prestigious 2015 Mundell -Fleming lecture by former Fed Chair Ben Bernanke in which he lays out his most complete argument as to why in his view coordination in monetary policy cannot and will not work. In this important but insufficiently remarked upon occasion, Bernanke uses a game theoretic model to defend the Fed policy actions and argue his case against monetary policy cooperation. A close analysis of the lecture remains relevant as Fed opposition to monetary policy coordination while acting as de facto central banker to the world remains the case. So Bernanke's arguments and the model used to make his case still stand as serious impediments to any serious consideration of cooperation in the global monetary arena.

This paper is in the genre of critical discourse analysis. (Weiner, 2017) My objectives are to draw out the philosophical grounds and highlight the weaknesses of Bernanke's anti-cooperation argument. I set the context of the lecture with a summary review of the criticisms of Bernanke by fellow central bankers - who had complained that he was acting with selfish policies - and by researchers such as Helene Rey and others – who cast the Fed as a reckless hegemonic central bank. In Part 1, I provide a brief background of the dispute in the monetary arena. I then parse the Bernanke speech and unpack his argument in defense of his anti-cooperation stance. The close textual analysis reveals that Bernanke has become entrapped in the rational actor conundrum made famous in the Prisoner's Dilemma game theory construct. In Part 2, I show how in his attempt to escape the rational actor dilemma, Bernanke makes dubious assumptions about causation and expected utility. The analysis not only questions his justification for dismissing calls for coordination; it calls into question his economic reasoning and decision-making approach.

Part 1

Background of the Monetary Policy Dispute

There is much history behind the monetary dispute that came to a head in Bernanke's 2015 Mundell-Fleming speech. (Bernanke, 2015a) Briefly, in dealing with the financial crisis of 2007–2012, the US Federal Reserve responded with the then unprecedented but now familiar Zero Interest Rate Policy (ZIRP), which took policy interest rates to the zero bound, and with Quantitative Easing, which greatly expanded the Fed balance sheet, eventually by a factor of 6X to over $4.5 Trillion. Monetary experts raised red flags about the consequences of such extreme experimental policies. (Krichene 2008)(Neely, 2011)(Ghosh et al., 2012)(Fratzscher et al., 2013) A chorus of criticisms emerged from finance ministers and central bankers asserting that the damaging 'spillovers' hitting the emerging markets especially hard due mainly to Fed policies. There were also calls from many quarters, including the World Bank and the Bank for International Settlements officials that coordinates central bank actions, for greater coordination to avoid these negative consequences. (White, 2012)(Trotman, 2015)

Bernanke responded with repeated denials of responsibility for spillovers, asserting that Fed policies were not the cause of the harmful effects and basically ignoring the calls for more coordination in monetary policy. So by the time of the Mundell Fleming speech in 2015 Bernanke had been a target of criticism and involved in the coordination dispute for many years.

As an example of the Bernanke critics and the EME perspective, we look at Guido Mantega, Finance Minister of Brazil, perhaps the most outspoken critic of the Bernanke and the Fed at the onset of the crisis. Mantega was a key figure in the dispute and what he had to say was important to this analysis because Bernanke himself tabs him as his major antagonist in the 2015 MF lecture.

Mantega had begun in 2010 accusing the Fed of launchinga 'currency war'. (Wheatley and Graham, 2010) In 2011 he began formalizing his criticisms in his official International Monetary Fund Statements in which he was not only speaking for Brazil but as delegated representative of many other EME countries as well, including at various times Colombia, Dominican Republic, Ecuador, Guyana, Haiti, Nicaragua, Panama, Suriname, Timor-Leste, and Trinidad and Tobago.

Mantega first made the case that the Fed policies were creating major problems for many emerging and periphery countries around the world.

> *Major reserve currency issuing countries continue to resort to ultra- expansionary monetary policies, the primary trigger of many of today's economic woes. Excessive liquidity contributes to rapid credit expansion and asset price booms, as well as oil and other commodity price bubbles. Rises in oil and commodity prices increase the cost of living, especially for the poorest. [Emphasis added](Mantega, 2011)*

Mantega also made the case in the IMF official statement that the reserve currency central banks (speaking here of the Fed) were too beholden to domestic politics.

> *Domestic political constraints have been too easily invoked by reserve currency issuing countries as a reason for adopting ultra-expansionary monetary policies, but this does not change the fact that these policies generate spillovers. (Emphasis added] (Mantega, 2011)*

In 2012 Mantega ratcheted up his public rhetoric, criticizing the Fed for "a selfish policy that weakens the efforts for concerted action" and for "reignit[ing] the currency wars with potentially drastic consequences for the rest of the world." (Zhang, 2012)

Mantega reiterated and expanded this general message in the following years in his 2012, 2013 and 2014 IMF official statements, again speaking on behalf of many other countries. He went on to emphasize the imbalance in the harms and benefits of the Fed policies, citing the fact that the EME economies were paying a high price for US-centric monetary policies but without any of the benefits promised by the Fed. (Mantega, 2012, 2013, 2014)

Echoing and lending credence to Mantega's criticisms were claims registered along the way by fellow central bank governors Ragduram Rajan of India, (Rajan, 2013) Zhou Xiaochuan of China, (Inman, 2010) Governor Amando Tetangco of the Philippines (Zhang, 2012) and United Nations official and former Finance Minister of Colombia José Ocampo who in various forms all raised questions about the negative externalities of the Fed's unprecedented expansionary monetary policies. (Ocampo, 2012, 2017)

Throughout this period, news accounts describe Bernanke as basically ignoring the mounting criticism and accumulating supportive research and continuing to deny Fed responsibility. 'Fed Chief 'Ben Bernanke Denies US Policy behind Record Global Food Prices,' (Blackden and Wilson, 2011) referenced the Bernanke position "that advanced-economy monetary policies are not the dominant factor behind emerging market capital flows." (Bernanke, 2012) Further, Bernanke argued, "[i[t is not at all clear that accommodative policies in advanced economies impose net costs on emerging market economies.' [Emphasis added](Bernanke, 2012) "[T]he *linkage* between advanced-economy monetary policies and international capital flows *is looser* than is sometimes

asserted." [Emphasis added](Bernanke, 2012) "My reading of the recent research makes me skeptical that these policy differences are the dominant force behind capital flows to emerging market economies." (Bernanke, 2013) The point of the detail on the Bernanke responses is to give some sense of Bernanke's dismissive attitude despite the volume of credible criticism of Fed policies.

For Bernanke the determinant factor was not US policies, rather the problem rested with the EME themselves: "the effects of capital inflows, whatever their cause, on emerging market economies are not predetermined, but instead depend greatly on the choices made by policymakers." (Bernanke, 2012) "I think it's entirely unfair to attribute excess demand pressures in emerging markets to US monetary policy, because emerging markets have all the tools they need to address excess demand in those countries. They can, for example, use monetary policy of their own." (Harding and Rappeport, 2011) Instead of seeing any negative effects, Bernanke pointed to the aggregate global benefits of Fed policy. "This policy not only helps strengthen the US economic recovery, but by boosting US spending and growth, it has the effect of helping support the global economy as well." (Bernanke, 2012) (Reuters, 2012)

The general picture at the time of the 2015 Mundell Fleming lecture then is of a significant number of critics of Bernanke and considerable credible research in opposition to the Fed crisis policies blaming them for the resulting spillovers and economic woes. The critics' perspective stood in sharp contrast to Bernanke's very different view and tensions were evident over his dismissive attitude to their evidence and arguments.

Parsing the Bernanke 2015 Mundell Fleming Lecture

Bernanke's Mundell-Fleming IMF Lecture in 2015 was entitled "Monetary Policy and The International Economy." This prestigious lecture was seen as the occasion for a retrospective review of the unprecedented Fed policies during the Great Financial Crisis. It was a chance for Bernanke to finally respond to critics, perhaps providing explanations, justifications or substantive concessions to the EME critics on spillovers, and possibly even admitting responsibility for negative consequences of Fed policy actions, or even advocating cooperation in some circumstances. These hopes were not realized and in the speech Bernanke attempted to once and all put to rest the calls for more cooperation by the US in monetary policy.

> *In setting up his argument against cooperation, Bernanke poses the question this way. "Is there any scope for cooperation, coordination, to address the problem of the currency war?" (Bernanke, 2015a, 10) The history of the dispute explains why he posed the question of cooperation in terms of the currency war. Here, recall that Bernanke had been accused by Mantega and others years before in 2010 for reigniting a currency war. Bernanke goes on in the speech to identify Mantega as one of the leading critics to whom he will address his arguments. Several foreign policymakers had accused the Fed of choosing policies that would weaken the dollar and thereby unfairly increase US competitiveness thus engaging in "currency wars," "a phrase used most prominently by Brazilian finance minister Guido Mantega in 2010 following the Fed's introduction of a second round of quantitative easing." (Bernanke, 2015b, 1)*

It is important to understand what is left out of the currency war description that Bernanke provides. He characterizes it as a deliberate weakening of the dollar to gain an advantage in trade. As will be seen, this characterization was an incomplete and misleading description of Mantega's currency war criticism. Indeed, competitive devaluation for trade advantage is one feature and purpose of competitive easing or a currency war. But there are other broader understandings as well and those are what Mantega clearly had in mind. Currency war, used more broadly in the way Mantega uses it, refers to a situation where a central bank engages in expansionary monetary policies to achieve domestic policy goals. It is not necessarily overtly intending to depreciate the value of the domestic currency. Rather, it seeks to reduce unemployment and stimulate the economy to achieve targeted employment or economic growth objectives in order to satisfy domestic political pressures. These were in fact the goals and outcomes of the Bernanke policies. So this accusation of currency war in its broader understanding was a fair criticism by Mantega and unworthy of dismissal by Bernanke.

It is important also to understand why Bernanke narrowly characterizes Mantega's position, making his currency war criticism only about trade advantages. With a simplified definition he thereby could narrow the 'expected utility/disutility' analysis in his simplified model in order to focus on the one outcome of 'currency depreciation.' Bernanke could then make an argument that Mantega is only worried about one thing, depreciating the Brazilian currency and thereby increasing the exports of Brazil. And he would go on in his model assumptions to interpret Mantega's comments as only about trade and criticizing the Fed for trying to depreciate the U.S. dollar to cheapen US exports to disadvantage Brazilian exports. Thus Bernanke says in the MF lecture "…what matters to Brazil or to the EME emerging market, what matters is what happens to their (cheaper) exports…" (Bernanke 2015a, 7) Or as Bernanke stated it more technically, "[i]t's the variance of emerging market output minus emerging market exports," and generalizing with no further evidence, Bernanke ascribes his narrow characterization of Mantega to the entire EME, concluding, "[so] that's exactly what the emerging market cares about." (Bernanke, 2015a, 11,12) And thereby Bernanke dismisses nuance and detail in the EME criticisms and reduces the scope of EME claims generally to make it all about the supposed intent of Brazil to increase exports. But that isn't all that Mantega and the EME cared about - and never was.

By ignoring the thrust of the Mantega (and other EME) criticisms on expansionary policies, spillovers, bubbles, and economic woes, Bernanke has dismissed Mantega's and other critic's more extensive 'expected disutility' calculations. Recall that Mantega's 'expected disutility' claims were much broader. He was not only focused on Brazil or on exports. Over the years, Mantega had made numerous statements, where he was speaking as an IMF delegate not only for Brazil but for eight other EM countries as well. It was not about exports. He accused Bernanke Fed policies of "potentially drastic consequences for the rest of the world" (Zhang, 2012) and referred to the general concerns of economic woes and harms to the poor. In his IMF statements Mantega made

his broader concerns very clear. He was criticizing the Fed for spillovers broadly defined and for pursuing self-interested domestic objectives rather than globally- focused coordinated policies.

However, Bernanke chose not to deal with Mantega's official IMF complaints of spillovers to the rest of the world or with the call for concerted action. This would undermine the simplifying assumption that Mantega was only acting in his (Brazil's) own self-interest. This assumption was key to the simplified rational actor game theory model that Bernanke intended to refer to in his MF speech to argue against monetary policy cooperation, which was to be the main thrust of Bernanke's argument. Bernanke thus reduced this criticism of Mantega to only a single motive of seeking trade advantage to increase Brazil exports and then Bernanke generalized this motive self-interest to all emerging markets - "that's exactly what the emerging market cares about."

With this definitional maneuver, Bernanke has the straw man that he needs to set up his game theory model in the MF speech. Thus, on the basis of his own narrow assumptions regarding Mantega's and Brazil's motives (and the motives of all emerging markets) Bernanke has collapsed all expected utilities and disutilities into the single variable – trade advantage - that he chooses to deal with. Bernanke then proceeds to use his model to conclude that coordination is not realistic.

> *Now I hope all of this [coordination] strikes you the way it strikes me as being pretty much pie in the sky here. The idea that, for example, the US would not lower interest rates as much as it would otherwise do it because it's concerned about Brazil's export performance doesn't strike me as particularly realistic …and it would be, in addition, very hard to actually police, monitor particularly I don't think in practice there's a whole lot of room here for coordination. (Bernanke, 2015a, 14,15)*

The reasons that Bernanke gives in arriving at this conclusion provides the clues and insights to his 'expected utility' blind spots. Examining and parsing the language of his concluding comment closely, one sees that what Bernanke thought was 'pie in the sky' and 'unrealistic' was the possibility that the US would ever be willing to act against maximizing its own self-interest.His exact words, for the US to "…lower interest rates as much as it would otherwise do it out of concern for Brazils export performance" is 'unrealistic.' Just as 'unrealistic' in Bernanke's mind is the idea the emerging market countries (like Brazil) would act other than in a purely self-interested manner to maximize trade. Thus, in Bernanke's model the emerging markets only care about their exports and the US only cares about the lowest interest rate. Both are thus assumed to be exclusively and resolutely self-interested – and apparently according to Bernanke justifiably so. No wonder Bernanke sees coordination as unrealistic. These statements reveal Bernanke's larger beliefs about the use of rational actor, self-maximizing assumptions in gaming out scenarios and then using them to set and defend his monetary

policies. For Bernanke, the monetary policy arena appears to consist of ongoing battles between rational maximizing central bankers, in constant competition - and potential conflict. This is the bedrock assumption of the rational actor methodology that makes his reduced form models work. It is important to note what kind of assumption this is. This presupposition of Bernanke is not really about economics or a fact about the world. This is purely a philosophical assumption about political and sociological realities that is the foundation of the rational actor school of thought. So indeed it is a currency war of sorts from Bernanke's viewpoint.

A description of the crisis dispute as a currency war appeared in 2010 in Korea Times news articles reporting on central banker meetings at the time the original criticisms were being made by Mantega. In these articles an increasing number of experts worried that the currency war involving the world's economic powerhouses is developing into a prisoner's dilemma scenario.

> *This currency war has arisen as the lagging recovery in advanced nations such as the U.S. has led to renewed reliance on quantitative easing policies, ... [and] has morphed into what may even be called a currency war. ... this clearly will create a kind of prisoner's dilemma in which all countries stand to lose. (Kim Tae-Joon, 2010)*

This newspaper reference prompts a deeper inquiry into the logic and dynamic of a currency war as a Prisoner's Dilemma (PD) confrontation. What one finds is that although Bernanke did not explicitly refer to it in the Mundell-Fleming speech, this Prisoner's Dilemma is basically the framework Bernanke had in mind in setting his model up. The Prisoner's Dilemma construct thus provides a lens for assessing the soundness of the Bernanke claims that cooperation is unrealistic and pie in the sky.

First, prior to looking at the MF lecture, it must be understood what this reference to Prisoner's Dilemma connotates. Formally, the Prisoner's Dilemma is a game theory presentation that highlights the conflict between two parties who are both attempting to maximize their relative positions, showing how both inevitably lose out by sticking with a self-maximization objective. The article in the Korea Times then is basically suggesting that the monetary and financial officials throughout the world were coming to recognize that the failure of the US to cooperate was leading to a lose/lose situation for itself and for everyone else. This lose/lose outcome is why the monetary experts from the Brookings Institute to the BIS had been asking for more cooperation during the crisis.

One finds in the analysis that as the centerpiece of his MF argument for dismissing cooperation as an optimal alternative and refuting the Mantega et al. criticisms Bernanke constructs a two party, 'game theory' decision model that looks and sounds similar to a Prisoner's Dilemma set up. But his model is in actuality quite different as he cannot really use a true Prisoner's Dilemma set up because that would show the irrationality of the non-cooperating rational actor and end up endorsing cooperation as the preferred optimal choice. Since Bernanke had the opposite objective in his argument -wanting to

show that cooperation is 'pie in the sky' and unrealistic, thereby proving his case that cooperation in monetary policy doesn't work - he ends up miscasting the assumptions and changing from the traditional PD model. So there are significant differences between Bernanke's and the true PD set up and they have to do with his artificially constrained and deficient accounts of causation and "expected utilities." In analyzing his argument and highlighting the differences between his model and the true Prisoner's Dilemma construct we come to understand the deficiencies in Bernanke's economic reasoning process and how he gets tied up by his highly constricted view of causation and 'expected utilities' in the irrationality of non-cooperation. As I try to show, his model is not sound empirically - or theoretically. This is where we take up the close philosophical analysis of the MF argument.

I first provide a more detailed background on the Prisoner's Dilemma construct and then proceed to demonstrate the differences from Bernanke's model set up. In this set up I rely on the work on rationality and the Prisoner's Dilemma of the late philosopher Robert Nozick in his book Nature of Rationality. (Nozick, 1993, 50-59)

Recasting Bernanke's IMF lecture in the Prisoner's Dilemma Framework

The Prisoner's Dilemma is a familiar form of game theory structure that helps to illuminate the advantages of the rationality of group maximization (coordinated optimization) over the self-interested maximization of individual rational actors (egoistic maximization). In simpler terms, the Prisoner's Dilemma game theory presentation demonstrates the irrationality of always pursuing maximizing self-interested actions over a coordinated maximin. (Nozick, 50)

Table 1.
The familiar Prisoner's Dilemma setup looks something like this [17]

		C'	Prisoner 2	D'B	
		a		b	
	C	Neither Confess - P1 -2 yr. ; P2 - 2 yr		P2 Confesses - P1 Does not P1 -12 yr. ; P2 - 0 yr	
Prisoner 1		c		d	
	D	P1 Confesses – P2 Does Not P1 – 0yr, ; P2- 12 yr		Both Confess: P1- 10yr. ; P2 - 10yr	

Source : Auteurs

[17]The traditional narrative is the following. Two criminals have been caught and the sheriff gives each a choice of either to confess (where he would get a lighter sentence) or not to confess (where his sentence is greater.) If both take the maximizing choice (of confessing) then both receive heavy sentences (Block d). BUT if both refuse to confess the cumulative sentence is far less (Block 'a'). The choice is between an action where the actor has a chance to achieve the individual maximum payoff (Dominant Action) by not cooperating and an action where each actor makes a sacrifice and receives a lesser individual benefit but the sacrifice allows the other player to benefit as well. So there is a higher overall payoff in the Cooperative Choice of Block a. One can see from the diagram that both selecting the rationally maximizing Dominant Action leads to both receiving maximum sentences with the result that both actors forego an attainable better situation. The PD offers a generic framework for demonstrating that an apparently "rational" action, as defined by egoistic maximization, is not always rational if alternative cooperative options are taken into account.

Parsing Bernanke's Mundell-Fleming speech, it can be shown how he uses roughly the same sort two-party game theory framework to analyze and then dismiss cooperation. In Bernanke's use, the US and Brazil are the two prisoners; the Fed monetary policy (policy rates and QE) and Brazil's currency exchange rates/exports are the two tradeoffs.

Indicators of the Prisoner Dilemma framework are evident throughout Bernanke's discussion of the model that he constructed to answer the question he posed to himself on currency war and coordination. As the Mundell Fleming speech has a lengthy discussion and Bernanke makes numerous references to the model, I will use excerpts as examples to show his use of the PD-like framework. For example, in order to set up the Dominant and Cooperative choices, Bernanke states that he lays out the currency war problem in terms of a 'maximum conflict' and a 'maximum coordination' in order to achieve a 'social optimum' – all terms that are suggestive of the PD set-up. In Bernanke's exact words, "I'm going--to get maximum conflict and therefore, maximum ability for coordination to get benefits." (Bernanke, 2015a, 11) Then Bernanke purports to run the model to find the 'social optimum.' As Bernanke puts it in the lecture, "All right, you can solve the--you can find the *social optimum* and ask basically what combination of currency exchange rates and interest rates gives you the *social optimum*." [Emphasis added](Bernanke, 2015a, 12) If there is a lingering question of whether Bernanke has the Prisoner Dilemma in mind, a clear indication of Bernanke's thinking comes when he wraps up his discussion of the model. Bernanke makes the statement "there would be strong incentives to defect" (Bernanke 2015a, 14) from the cooperative solution. The term 'defect' is, as noted, a key term of art in the game theory and PD lexicon, indicating a rejection of the Cooperative choice. This is classic Prisoner Dilemma terminology. However, as we will see as the discussion proceeds below, Bernanke's application in the MF lecture is actually a distortion of the PD lesson and principles.

The table below uses quotes from Bernanke's lecture with the PD interpretation in in italics. (Bernanke 2015a, 12-15)

Table 2.
Quotes from Bernanke's lecture.

Bernanke's terms	Recast in Prisoner Dilemma Terminology
1. "And it turns out there is a small potential gain"	1. *improvement in social optimum*
2. "which would involve essentially the US not easing quite as much as it would otherwise like to"	2. *this would be the US taking the Cooperative choice over the Dominant choice in the PD framework*

3. "so that output in the US is actually a little bit below potential"	3. *"potential" being the maximum self-interest solution that would have been achieved with the Dominant Choice*
4. "And in exchange, it turns out the emerging market allows its currency to appreciate just a bit more than it otherwise would given the US interest rates"	4. *"In exchange, allowing the currency to appreciate more" means the EME reciprocates by taking the developing country cooperative C' choice*
5. "So there is a small potential gain from cooperation at least in this model"	5. *'small potential gain' means 'a small improved social optimum'*
6. "there would be strong incentives to defect"	6. *Defect' a term of art rejecting the Cooperative and taking the Dominant self-interested choice.*
These excerpts illustrate how a game theoretic framework informs Bernanke's thinking in his MF model. They indicate that Bernanke is thinking in terms of the Prisoner Dilemma framework even though he doesn't explicitly use the term in his MF speech.	

Source : Auteurs

Based on this parsing, I would suggest that the Korea Times description of the currency war situation as a Prisoner's Dilemma is basically the way that Bernanke was likely seeing the situation not only at the time of the news article but later as well when he presented the MF lecture in 2015. However, there are significant differences between Bernanke's model assumptions and those of the actual Prisoner's Dilemma framework. A strong indication of the difference is that, contrary to the PD hypothesis encouraging cooperation, when Bernanke runs his model he comes to the opposite conclusion, finding that cooperation is unrealistic.

So taking his assumptions into account, in terms of a Prisoner's Dilemma matrix Bernanke's simplified model might look something like the following.

Table 3.
Bernanke's simplified model[18]

		C'	EM	D'	
		A		B	
US	C	**Both parties sacrifice and trust to achieve jointly social optimal** *US Interest rates* 1.5% *US Exports* 2.5% *EME* 3.2/$ (R) *US unemp* 5% *US inflation* 1.75% *EME Exports* 2.25%		**EME achieves individual self-maximum** *US Exports* 1.8 *EME* 3.6 /$(R) *US unemp* 6% *EME Exports* 2.8%	
	D	c		D	
		US Fed achieves individual self-maximum *US interest rates* 1% *US GDP (Exports)* 3.2 *EME* 3.0/$ (R) *US unemp* 4.5% *EME Exports* 1.75 *US inflation* 2%		Neither party sacrifices nor trusts – and achieves jointly sub-optimal *US Growth (Exports)* 1% *EME* 3.8/$(R) *US unemp* 8% *EME Exports* 3.2 *US inflation* 1%	

Source : Auteurs

According to the model assumptions that Bernanke presents in the lecture, under the cooperative choice in Block a, "the US doesn't ease interest rates as much as it otherwise would, so it loses a little bit in output relative to potential output." I indicate this by having the US GDP (Exports) growth at only 2.5% and not 3.2%. This concession allows the EME to have a slightly weaker currency (3.3 /$R vs. 3.0/$R) and slightly higher exports (2.25% vs 1.75%) than under the US maximizing Dominant Choice. Specifically, the US doesn't reduce rates policy all the way to the zero lower bound (and it implements

[18] Explanation: The US Dominant, self-interested choice is in Block c, domestic policies all optimal; US interest rates low – 0 to.15%; US unemployment 4.5%; US inflation at target 2%; US GDP (Exports) high 3.2; And for that it would be willing to inflict harm on the EME with currency high 3.0/$ (R) and EME Exports low 1.75. The EME Dominant, self-interested choice is EME currency weak 3.6 /$(R); EME GDP (Exports) 2.8%. And to achieve that they would inflict US unemployment high 6.5%; and US Growth (Exports) 1.8%.

only half its Quantitative Easing program) such that it only lowers the unemployment rate to 5.25 % (slightly above traditional NAIRU estimates), instead of the 'maximum' employment goal ofunder 4%unemployed. Also less accommodative (favorable to US interests) ZIRP and QE are implemented so the inflation target is lower - 1.5% and not 2%. These assumptions thus reduce the global capital surges and the spillovers (expected disutilities) that Mantega and others have criticized the Fed for causing. These acts of cooperation by the US elicit a stronger EME currency. As the EME proxy for the currency benefits of a less accomodative Fed, I use the Brazilian currency, the Real as a reasonable proxy to generally represent the currency behavior for the EME as a whole. As to an estimate of the actual EME sacrifice, I generally follow Bernanke's model condition, namely, that "… the EME appreciates its currency a little bit more than it otherwise would." (So I have it that in a gesture of cooperation, Brazil aims for a higher exchange rate of R3.4/$ instead of R3.8/$. Under the assumption that a higher exchange rate also means reduced Brazilian exports, this is a sacrifice.The Bernanke model condition has it that Brazil (as proxy for the EME) "loses export levels relative to what it otherwise would." As a hypothetical index number to show a relative loss of exports (the sacrifice) for the EME, I use 2.25 instead of a maximizing 3, representing a 25% (steep) sacrifice in export levels. So with both parties cooperating in my hypothetical model, a social optimum of 2.8% global GDP growth is achieved, although neither party achieves a maximum individual benefit. The above matrix is a reasonable interpretation of the two party game theoretic envisioned in Bernanke's stated assumptions and conditions. Block 'a'is the Cooperative choice and involves a mutual sacrifice. Blocks b and c are individual maximization choices. The U.S. has higher unemployment under '*a'* than it would under '*c*'and thus it sacrifices GDP output and employment. Likewise, the EME makes a sacrifice as it would have been beneficial for the EME to take '*b*' over '*a*' because with the weaker exchange rate the EME exports and employment would have been higher. So both the U.S. and the EME make sacrifices and achieve a social optimum. Block '*d* 'is essentially the global recession scenario where both sides lose.

Under a standard PD analysis the US would rationally choose the Cooperative option and make a sacrifice to achieve a social optimum. However, here is where Bernanke's analysis in the lecture takes a turn away from PD. Having gone all through this exercise, Bernanke then makes the following observation: if the Fed takes the cooperative action "the US is a little bit worse off than it otherwise would be." (Bernanke 2015a, 13) This simply notes and confirms the sacrifice of the cooperative choice. But then he offers a puzzling follow up. "If (the US) "doesn't gain *[presumably relative to where it would be in a self-interested choice]* …it's not -- this is not a way to improving cooperation." [Parentheses material added] (Bernanke 2015a, 13) But that goes against the point of PD where not gaining provides the possibility for a cooperative social optimum. So it seems after apparently setting it up in a Prisoner's Dilemma framework, Bernanke then abandons the whole Prisoner's Dilemma framework and rationale, basically saying here that he thinks an outright gain by the Fed relative to maximizing (Block *c*) is necessary 'to get the US tocooperate.' To think otherwise would be unrealistic and pie in the sky.

This is puzzling. But there is another lingering question with abandoning the PD. The cooperative choice should have been attractive to the US – and the US incentivized to make the compromise – because of the possibility of a worst outcome for the US if both parties decided not to cooperate, namely, the massive disutilities hypothesized in Block d wherein each country and the global economy are harmed. Bernanke does not discuss this eventuality in the lecture nor does he apparently seriously consider it in his model.

What might the explanation be for this turn in Bernanke's line of thinking? He has abandoned the Prisoner's Dilemma analysis and was not compelled by the logic of the PD game theoretic to refrain from the Dominant self-maximizing choice. He has summarily concluded that cooperation is unrealistic and pie in the sky. He seems not to be worried about the downside of Block d as a negative incentive to cooperate. How is this explained? What follows is speculation as Bernanke is not fully clear about his assumptions and thought process on this point. One possibility is that he thinks the EME can be expected to make – or will be forced to make - a sacrifice relative to its optimal choice and cooperate with the US anyway. And this is perhaps an assumption in his model. There is a hint in the paper he wrote formalizing his lecture that this is the case. Bernanke introduced a Stackelberg leader assumption in the model that he constructed for the Mundell/Fleming paper. Under Stackelberg, he makes the assumption that the other countries have to follow the US lead and take it as a 'given.'

> *I assume that US policy sets iUS and fYUS and that EME takes US policy as given—think of the Fed as a Stackelberg leader. (Bernanke 2015b, 14)*

The reference to Stackelberg is quite revealing.The Stackelberg leadership model is a strategic game in microeconomics "in which the leader firm moves first and then the follower firms move sequentially." One important condition is "[t]he follower must have no means of committing to a future non-Stackelberg leader's action..." (Wikipedia, 2022) So as Bernanke postulates, once the leader makes a move, it is a 'given' that the others must follow.

On this basis I propose a possible explanation for Bernanke's dismissal of cooperation that might make sense from the standpoint of a truly Dominant party - like a hegemonic leader of the monetary system. As a globally dominant institution, controlling the dominant transactional and reserve currency, maximization is perhaps always the most 'rational' move. Bernanke might see the Fed as always holding the dominant hand (McKee, 2015)(Kennedy et al., 2013) and thus believes he does not need to make a sacrifice or cooperate in order to achieve a maximizing outcome as others will be forced to follow his lead. This idea of a truly Dominant hegemonic Fed, in virtual control of the monetary arena, comports with the compelling analyses of a body of research that has demonstrated the Fed to be in hegemonic control of the global monetary system. (Rey,

2015) (Rey and Agrippino, 2021) (Gourinchas 2019) (Gopinath et al., 2020) In line with the Stackelberg assumption, the other members of the system must follow and essentially must 'cooperate'- taking the Fed action as a given – in their own best interest. This being the case, in the PD sort of construct the Fed would not see itself as an unwitting prisoner in the monetary game. Rather the Fed is actually more like the sheriff or jailer and as such it defines the choices and also determines the outcomes. This might explain why a sacrifice of interest would always appear irrational and pie in the sky to a hegemonic, truly dominant rational actor.

This line of reasoning ultimately begs the question of whether the all-powerful Dominant Party can ultimately avoid the worst case outcome premised in block d of a global recessionary outcome due to its not cooperating. Is it possible the worst outcome was only postponed? The negatives for the global economy and the Dominant Party of a non-cooperative stance may now be just emerging. This issue is far beyond the scope this paper. But consider one example. The US dollar debt of the EME made possible by the 'capital surges' of QE and the low interest rates of ZIRP is now in the trillions. The potential for a wave of EME sovereign and corporate credit defaults has long been a concern of the Bank for International Settlements if rates were to rise and liquidity were to be cut off, as now seems the case with Fed policy. (Blackstone, 2010)(McCauley et al., 2015) (BIS Annual Report 2016) The worst case of Block d left over from the global financial crisis may only now be realizing these warnings and confronting the US and global economy.

Why was Bernanke unable to take the PD logic and lessons and the potential benefits of cooperation into account?

Based on his statement above characterizing cooperation as unrealistic, Bernanke has concluded that there is no evidence in this situation b y which a policy decision maker could be induced to make a sacrifice - take less and cooperate - so the other party could also achieve a modicum of its objectives and an overall socially optimal outcome could be attained. He basically does not believe in or account for the possibility of the two parties jointly realizing that it would be better for both if they sacrificed a bit and cooperated in order to avoid a worse outcome for each. What is it about Bernanke's reasoning process that leads him to this position? I propose a possible explanation of Bernanke's seemingly irrational uncooperative stance. Bernanke has a deficient theory of causation which leads almost logically to a deficient account of expected utilities.

Adopting the metaphor of the "accordion effect" used in philosophical discussions of causation one might see how Bernanke works from a constricted notion of causality. The accordion represents the causality image of an action's consequences being "squeezed down to a minimum or else stretched out." (Feinberg 1970, 146)(Atwell, 1982)(Bratman, 2006) Certain types of inquiry, such as legal or moral inquiries, properly have narrow, "squeezed down" conceptions of causality as they are looking to assign culpability. In

economic science, where the objective is to understand what has happened and predict what is going to happen - a full and complete account of all consequences is needed.

We have seen from the various quotes above how Bernanke only considers the consequences the Fed directly controls and intends to bring about. Bernanke does not consider the broad causal effects of Fed actions and consequences on the actions of subsequent actors. Nor does he look at the consequences of actions taken by subsequent actors in response to the initial actor's action. As an economic scientist, Bernanke incorrectly adopts the "squeezed down" version. The Fed is supposed to be about maximizing expected utilities and minimizing expected disutilities so considering all the potential consequences is essential in any robust expected utilities analysis. This constricted view inhibits the Fed from taking all the related facts and potential utilities into consideration when making the policy decision. It is clear what this narrow view of causality does to Bernanke's causal expected utility analysis so important to resolving the Prisoner's Dilemma in favor of a coordinated social optimum. It can readily be seen how the failure to consider the effects of one's actions on others narrows one's calculations of causal and symbolic utilities and results in the miscalculation of the Prisoner's Dilemma. The squeezed down view results in the Fed's ignoring the potentially beneficial expected utilities of joint, coordinated or cooperativeactions with other central bankers. The disagreements over the advantages of cooperation thus to some degree come down to whether causation determinations involve a 'stretched out' description to incorporate the consequences (utilities and disutilities) visited upon others and what actions they may take in response.

One consequence of Bernanke's "squeezed down" version of causation is that he only subscribes to a minimalist account of utilities, technically termed 'Causal Expected Utilities' (CEU). This is the topic to be discussed in next section but the basic point is that in only looking at CEU, he is able to more easily limit the evidence of the benefits of mutual sacrifice and cooperation.

Part 2

Bernanke's misunderstanding of cooperation: the Prisoner's Dilemma and the narrow concept of Expected Utilities

To show the problems with a narrow account of expected utilities I rely on a study by the late philosopher Robert Nozick (Nozick, 1993, 41-63) which helps in showing why Bernanke is not acting rationally in his squeezed down version of causation. To put it simply, it results in Bernanke looking only at causal expected utilities and thus denying a role for cooperation in the global monetary system. Nozick helps to demonstrate why openness to cooperation--always considering whether to eschew the dominant self-maximizing choice-- is actually the more rational decision (and monetary policy)

strategy.The Bernanke monetary policy dilemma of the Global Financial Crisis (where benefits to the US often meant harms to the EME) represents a contemporary real-life dilemma pitting a Dominant maximizing choice against a possible Cooperative alternative. By presenting a comprehensive account of expected utilities (and disutilities) and showing why it is essential that the cooperative action always be weighed and considered in order for a decision to be truly rational, Nozick's framework allows us to demonstrate the deficiencies in Bernanke's mode of economic reasoning and policy-setting. Nozick's insightful analysis of expected utilities - though positively reviewed as a guide to practical action (Hurley, 1994, 65) - has apparently not been applied to real life situations where a true Prisoner's Dilemma sort of situation actually exists and where real cooperative and dominant choices are in conflict with real consequences.

Among economists, rationality is standardly measured as the extent to which one's actions can be expected to lead to 'maximizing utility.' Thus properly defining utility maximization, strategizing how it is to be achieved and assessing the probability of success are the critical components of a rational decision. Nozick argues in essence that expected utility as used by most economists is too narrowly defined and that is why cooperation is often overlooked as the rational option. His idea is that maximizing the expected utility value of a decision-–what Nozick refers to as the maximal Decision Value (MDV)--actually consists of three utility components, Causal Expected Utility, (CEU), Evidential Expected Utility (EEU) and Symbolic Expected Utility (SEU). The truly rational decision consists of maximizing all three – in the total Decision Value. (Nozick, 45-49)

Causal Expected Utility (CEU) refers to utilities (or beneficial outcomes) that are 'directly affected or influenced' by the initial actor. The dependence of an expected outcome on the initial action has to be the result of direct influence and cannot be merely circumstantially influential. Under CEU, the actor is only able to use direct causality explanations to identify the probabilities and utilities of each option's possible outcomes in determining its expected utility. CEU is generally considered the exclusive focus of the rational actor school of thinking and is associated with the Dominant Choice of the Prisoner's Dilemma framework. Demonstrating direct causality is difficult in many real life circumstances so expected utilities are automatically constrained under the CEU account. The upshot is there is a reduction in the number of outcomes which the decision-maker needs to consider. CEU fits with the narrow squeezed down account that fits with Bernanke's view of causation. The problem is that many positive and negative utilities are left out.

Evidential Expected Utility, EEU, has to do with all utilities that are circumstantially, statistically or probabilistically correlated with or connected to the initial action. Under EEU, the actor has to also take into account and calculate the utilities (and disutilities) of extrinsic factors (including intermediary actors) that it has not directly 'influentially determined' or caused in order to accurately assess the utilities a potential action. EEU is associated with the Cooperative Choice in the Prisoner's Dilemma.

Nozick's demonstration is designed to show that CEU by itself is not always adequate in achieving the optimal outcome (leading to the PD dilemma) and that EEU is an equally important Total Decision Value component. As Nozick has it, "there is no one best principle" between CEU and EEU (Nozick, 46), both must be taken into account in determining and maximizing the total Decision Value. Furthermore, Nozick shows that there is a third utility component in maximizing the Decision Value, what he calls the Symbolic Expected Utility (SEU), that is ignored in many analyses. Nozick shows how SEU represents an independent utility component and furthermore supports the CEU and EEU as well. The SEU helps to take into account non-material utilities having to do with maintaining relationships and trust and thus is especially important to adopting an attitude to cooperation and concern for jointly optimal or common good outcomes.

Symbolic Expected Utility

Symbolic utility incorporates the utility of tangible and intangible benefits that arise from what is symbolized by the meaning of actions and communications. (Nozick, 48-50, 54-57) This initially sounds a bit abstract, but Nozick demonstrates that people act on and benefit from SEU all of the time. For example, the actor might want to portray a certain image of himself/herself or of his/her institution as effective or responsive, then an action has symbolic utility if it symbolizes the person or institution as being effective and responsive. (Nozick, 49, 54,55) As a specific example from the GFC, the forward guidance policy statement of " doing whatever it takes" draws on the concept of symbolic utility. A statement is a symbolic utility in that it provides concrete evidence (indicating that the institution is, in fact, actually an institution to be counted on, thus projecting an image as being the kind of entity to be counted on to take similar actions in the future. It follows then that the symbolism can also have a causal (CEU) consequence. A Symbolic Utility thus can turn into a Causal Expected Utility or Evidentiary Expected Utility providing evidence to other actors to predictably take certain actions in response to and relying on the initial (symbolic) action of the initial actor. To put it in terms relevant to our present argument, the idea is that an actor having a reputation or image as a cooperative actor can give rise to cooperative responses from other parties; likewise an uncooperative actor yields uncooperative responses. The reasoning is as follows. If the initial actor demonstrates a consistent cooperative attitude, then others are "caused" or "influenced" to cooperate knowing they can count on their counterparties to do the same. This proposition is exemplified and empirically verified in the famous Axelrod tit-for tat exercise discussed below.

As a specific example relevant to our fact situation, there may be considerable symbolic utility for Bernanke in being thought of (or having the FOMC thought of) as a cooperative or trusted global actor in monetary policy matters. In fact, a cooperative reputation in certain situations seems important to Bernanke. He consistently cites the benefits to the global economy of Fed policy actions, wanting other central bankers to think he is acting on behalf of the entire global economy.

The SEU analysis shows that by failing to weigh the symbolic utility of a cooperative person who has proven he/she can be trusted to be fair and concerned about the common good – and importantly, the effects of such symbolism on causal utilities by causing others to adopt a similar posture – a decision maker fails to take into account important features of the world as it actually works. Consider the question– why should the Dominant Party care about the spillover costs in the EME and take them into account? The answer is there is a negative symbolic utility of failing to be fair and other-regarding in one's actions. This is a significant disutility or cost to the Dominant Party expressed in such terms as loss of image, credibility and respect that it ignores at its own peril.

Nozick's basic proposition is that if all three forms of expected utility have some probability of producing utility value, then it stands to reason that "rationally" they should all be included in the calculation to obtain the highest total Decision Value (MDV.)

Bernanke and Causal Expected Utility

CEU causation requires in assessing a utility that an action 'actually influence or affect which state obtains.' In other words, one basically has to show that one's action has a direct causal influence over the circumstances and actions of others in order to count the outcome as an expected utility. Bernanke indicates at several points that he only takes into account the strict causal connections of CEU. Examples of relying on CEU would be Bernanke's talk of discounting causality because 'linkages being loose' and 'Fed actions are not the determinant' cause.

Another example of his reliance only on CEU causation is his outright rejection of many of the researcher statistically generated findings – such as by the BIS and by Rey et al. - presumably because they are correlation studies, circumstantial in nature and not evidence of direct causation. However, the studies by Rey, BIS and many other researchers had amply demonstrated through their standard statistical methodologies that the spillovers in the EME were highly correlated to - and thus could reasonably and probabilistically have been considered as 'caused' by the Fed.

Still another indicative example from the MF speech showing his reliance on direct causation of CEU would be where Bernanke says in the lecture that a coordinated act "… would be, in addition, very hard to actually police, monitor particularly." 'Police and monitor' is obviously a very strict requirement of direct influence. In PD terms, since Prisoner A (the Fed) cannot by stipulation 'affect or influence' the cooperative actions of Prisoner B (the EME), then in Bernanke's view, the cooperative choice cannot effectively be considered an option.

A digression

There seems to be an inconsistency in Bernanke's position. He holds that Fed policy action is 'not determinant' and "the EME has monetary policy of their own," so the Fed

does not necessarily cause their actions. However, recall that in the model that he constructed for the Mundell/Fleming lecture he makes the assumption that the other countries have to follow the US and take US policy as a 'given.' "I assume that US policy sets i^{US} and fY^{US} and that EME takes US policy as given—think of the Fed as a Stackelberg leader." (Bernanke 2015b, 14) If the Stackelberg leadership assumption means that the followers must take the leader firm moves as a 'given,' the followers' actions are directly influenced and in that sense determined by the Fed. So it seems Bernanke prefers CEU for his models but on the other hand rejects the idea of the Fed as the determinative, causative, hegemonic actor that Rey and other researchers have shown the Fed to be – with all that entails.

Evidential Expected Utilities and Probabilistic Causation

In social science inquiries, it can be very difficult to identify and demonstrate direct connections between events given the broad scope of human activity that contributes to final outcomes in the economic sphere. Statistical techniques are routinely used to uncover evidence hidden in data and suggesting strong probabilistic linkages between an initial act and the expected utility (or disutility.) The EEU has no requirement of an actual demonstration of direct causal influence. EEU has it that outcomes can be probabilistically connected and dependent on the initial act and that this dependency is measurable even if no direct causal relationship is (as yet) even known to exist. (For example, forecasting regarding probability of future events from past events is the point of the correlation studies.)

A strong correlation is strong EEU evidence in optimizing utilities. Bayesian and other statistical methodologies in this way count in establishing or estimating the probability of evidential expected utilities (and disutilities.) The upshot is that reliable evidence of the probability can be adduced by both parties in the PD and under EEU it can be rationally acted upon. By thus validating the expected utilities of EEU, one might also be able to validate the potential preference of the cooperative choice in the PD matrix – and of the possible optimality of cooperation in monetary policy.

Referring back to the context of the GFC, many researchers had shown that Fed policy actions do have significant probabilistic relationships to negative outcomes – to expected disutilities - in the EME. (Feldmann, 2017) Under the EEU concept, the evidence of these expected disutilities should have led the Fed to consider the other parties' predicament and out of this could have arisen the appeal of the cooperative choice, without any direct causal influence needing to be shown. So in the PD framework, Nozick would say that even with no direct influence, if there is a probability of a dependency (an EEU) between the two actors and their actions -- and thus some probability that participant A would act rationally, that is, cooperatively--then it is rational for Participant B to also consider acting cooperatively as the way to achieve the social optimum. This evidence of potential benefit is available to both parties (and both

know this), so each would (rationally) likely be thinking the same thing about the advantages of cooperation. The participant does not have to directly "cause" the other to act a certain way and can reasonably rely on the other party's own calculation of Evidential Expected Utilities and the realization of the advantages of joint rationality and of cooperation prevailing. This is how rational actor maximization and the Dominant Choice are defeated and why the Cooperative Choice is rationally taken in the Prisoner's Dilemma situation. As Nozick would conclude, this demonstration shows why one has to take the EEU and the cooperative choice into account in assessing and maximizing the Decision Value in order to be rational.

The appeal and strength of the cooperative choice without direct influence has been empirically verified. The Axelrod Tit for Tat (TfT) game theory experiments demonstrated the irrationality of discounting actions not directly caused (EEU and SEU) in the effort to maximize or optimize utilities. (Axelrod, 1981) This simple strategy of cooperating first won over all other programs by eliciting cooperation from others who 'learned' to cooperate by seeing it as advantageous. The conclusion was the success of TfT can be interpreted as further evidence of the deficiency of self-maximizing strategies in situations where cooperative strategies are possible.

The question addressed by the Axelrod experiments is what strategies work best in an iterated, interactive Prisoner's Dilemma environment with a long series of interdependent decisions among participants (very much like the monetary system.) A cooperate first (TfT) strategy won each time in these experiments. The cooperative initial act was found to have symbolic utility. The Axelrod game theory experiments mix together the causal, evidential and symbolic utilities and support the Nozick argument that symbolic actions (providing evidence of expected utilities) – showing a willingness to cooperate first- can have causative (or evidential and symbolic) effects.

This TfT strategy works in situations with many confrontations over a large number of iterations. (Kreps et al., 1982) The evolution of cooperation requires that the parties have a sufficiently large chance of meeting again so they have a stake in their future interaction. (Axelrod, 1981) This works in the monetary system where the process is ongoing with monetary policies adjusted often and competitive currency values adjusting by the minute. None of the parties 'lose' with finality and there are always opportunities for new moves. The monetary arena is quintessentially a field of perpetual Prisoner's Dilemma decisions in which the TfT cooperative strategy could work.

These sorts of evidentiary correlations (and implicitly the mutual benefits of EEU and cooperation) are a large part of the research work produced during and post-GFC. As we have seen, so far Bernanke has largely rejected that research and the evidence of expected utilities (and disutilities.) In rejecting EEU Bernanke is failing to take into account an optimal joint utility – a greater common good -- achieved through cooperative actions that is evidentially highly probable. This means, he is not maximizing the expected utilities and minimizing disutilities and thus per the Nozickian PD analysis, not acting rationally.

CEU vs EEU vs SEU – payoffs and penalties

The above discussion establishes the theoretical foundation for CEU, EEU and potential cooperation in the Prisoner's Dilemma. The key question is when – or under what empirical conditions – does the EEU/cooperative choice become the preferred choice? (Nozick, 53) Nozick acknowledges the fact that cooperation might not always be the best option. The CEU self-maximizing choice may be valid in certain circumstances. Nozick's idea is that if the probability of the expected utility payoff is significant enough in the cooperative (EEU) choice or the probability of penalty is high enough in the Dominant Choice, then the Cooperative Choice is considered the rational choice. This proposition is empirically verifiable in studies showing that people do change their decision principle from Dominant Choice to Cooperative Choice as payoffs or penalties – utilities - are raised (or lowered) to the point they are advantageous (or disadvantageous) enough to warrant a change in decision principle. As Nozick might put it, the actors use their 'common sense' about the discovered character of the world.

So based on the above analysis I develop another PD decision matrix that attempts to take into account all the variables of CEU, EEU and SEU utilities. The scenarios reflect the various payoffs and penalties associated with the Cooperative and Dominant Choices. It would use the same structure that I constructed of Bernanke's original model (Table 1) simply putting in a more complete range of variables based in representative realistic numbers taken from the financial crisis. A clear-cut example of the probability of a high payoff for the Cooperative Choice and a high penalty (in spillover costs) for taking the Dominant Choice, influencing the actors to take a cooperative decision on EEU grounds, is in the potential loss to the global economy and thus to the US in terms of lower GDP growth (and unemployment.) The matrix would also include variables representing the Evidential Expected Disutilities, those 'externalities' and 'spillovers' that the EME, BIS and Helene Rey et al. have argued to be attributable to Fed policy and should have been taken account of in the Fed decision. This matrix takes into account more factors representing a more realistic way of looking at the Fed monetary policy decision (with lower expected utilities or higher expected disutilities) for not cooperating and higher expected utilities (lower expected disutilities) for cooperating. To make the general point here I simply assign a hypothetical lump sum score for all of these spillovers-–or disutilities--and give it a relative weighting as it is experienced in the EME based on degree of internalization of costs (cooperation) by the Fed. For example, if some of the spillovers were internalized by the Fed (as requested by Rey and EME critics, and evidenced by EEU) the score would be a positive score of 150. If all spillovers were internalized per the EME request it would be a positive score of 300. The Fed failing to internalize any spillover costs at all causes disutilities of a negative -400. Obviously, in this brief example the actual numbers cannot be fully represented as they would be in a full empirical study in a real decision setting. (Feldmann, 2020) Bernanke might still see little advantage in the Cooperative Choice. The Dominant Party's inclination to act in its own self-interest is very strong and thus the incentive to defect is high. Those adopting the Bernanke point of view might simply say the assignment of costs and decision

options are not realistic as the spillover costs (the high penalty)are insufficient to force any change in its conclusions about the EME situation. The other possible response from the Dominant Party taking the Bernanke view is why should it care about significantly higher extra costs in the EME, its only real responsibility is to its charter and domestic mandate. However, if the Fed were to not care about such concerns, then it may quickly find itself no longer the trusted reserve currency manager. so there is another expected utility and disutility for Bernanke and cooperation sceptics still to consider about why the Fed should care about its image and impact on others – Symbolic Expected Utility. Therefore. I assign positive and negative scores for symbolic utilities and disutilities.

The matrix is constructed on Nozickian premises, that all decision principles, CEU, EEU and SEU "should be considered as legitimate and given their respective due" and "…our principles of rational decision [should] contain parameters to fit the discovered character of the world in which they are made." (Nozick, 45) This is basically what Mantega, et al. are asking of Bernanke and of the monetary theorists who think as he does and heavily rely on abstract models.

The challenge that this critique poses is to construct a decision model in which taking the Dominant Choice produces high costs and disutilities and taking the Cooperative Choice produces a reduction in those costs and a collective high payoff. This can be done with the voluminous research Rey and Rajan and many other studies have brought out. These disutilities would include currency volatility, capital surges from QE liquidity, increased leverage and debt in the banking system, the excessive corporate bond and sovereign debt issuances, asset price bubbles, the commodity/subsistence food price booms and potential high inflation (and recession, or both.) There is also the political risk factor of potential EME governmental collapse and populace backlash. To make the general point I simply assign a hypothetical lump sum score for all of the symbolic utilities and disutilities of SEU and SED. With a full range of variables, instead of the EME being just worried about trade and exports, this decision matrix better represents the "character of the world" that the EME and BIS argue should be taken into account in the Fed decision.

So a more expanded Prisoner's Dilemma matrix taking the point of view of the EME or Fed critics' standpoint might look something like the following:

Table 3.
Prisoner's Dilemma matrix taking the point of view of the EME or Fed critics' standpoint

		C'	EM	D'	
		a		b	
US	C	**Both sacrifice and trust to achieve jointly social optimal** Global Grth 2.8% *EME* 3.4/$ (R) US unemp 5.5% *EME Exports* 2.25 EME no spillovers 150 SEU rep coop 100		**EME achieves individual self-maximum** Global Grth 2.0% *EME* 3.8 /$(R) US unemp 7% *EME Exports* 3 EME no spillovers 300 SEU rep 100	

	D	c		d	
		US achieves individual self-maximum Global Grth 3.5% *EME* 3.0/$ (R) US unemp 4.5% *EME Exports* 1.5 EME spillovers minus 300 SEU rep coop minus 100		Neither party sacrifices nor trusts – and achieves jointly sub-optimal Global Grth 1.5% *EME* 2.6/$(R) US unemp 8% *EME Exports* 2 EME spillovers minus 400 SEU rep minus 100	

Source : Auteurs

The cooperative choice presenting all evidentiary and symbolic utilities certainly looks more appealing in this matrix. Note the large negative contrast between Block *'a'* (both taking Cooperative) and Block *'d'* (both taking Dominant) and the incentive to defect – *'b'* and *'c'* - only moderately gaining. This is the sort of realistic model that the Fed could and might use in analyzing policy options and making its decisions, not the simplified and basically unrealistic model of the sort that Bernanke produced for the IMF lecture. A major difference from the basic matrix is that in dismissing Mantega's and other critics' 'spillover' and other evidence of negative outcomes to the EME (of -300 or -400), Bernanke did not count the many 'expected disutilities', thus throwing off the 'net' effective utilities calculation. As pointed out several times, Bernanke has discounted relevant and important evidentiary information of evidentiary disutilities (EED) under his squeezed down theory of causation. Bernanke also did not account for Symbolic Utilities and Disutilities in his matrix. In dismissing Ocampo, Mantega and Rajan and many others' calls to be fair and other regarding, and to take account the harm to the poorest countries and peoples, there is a very sizable symbolic disutility.

The matrix also did not take into account the high negatives (disutilities) that the EME itself would experience - namely, high inflation and asset price bubbles - when they take what he considers to be their preferred Dominant Choice of a lower currency exchange rate. Furthermore, this matrix (Table 1 does not) takes into account the fact that the EME disutilities would likely eventually redound to the serious disadvantage of the US and Fed because the negatives for the EME (some of the largest economies in the global economy) also hurt the global economy. I include this negative factor simply as a lower global growth. I would contend that all of these add up to precisely the sort of 'high penalty' situation in which Nozick points out that the resolve to follow only CEU would waffle and thus it would be more rational to consider the probability of EEU, SEU and cooperation. For Nozick, it becomes *irrational* not to take all utilities EEU and SEU into account when the penalties are probable and significant. So in the context of the

Bernanke vs EME dispute, we see an illustration of Nozick's general point that by setting the potential negatives for the dominant choice high enough then the decision maker becomes extremely uncomfortable with only the CEU principle. (Nozick, 44) Even granting some deficiencies in the researcher findings as Bernanke alleges in the M/F speech, the volume of the evidence presented by Rey and others seems to represent at the very least an important component of the "discovered character of the world" that Bernanke did not take into account. So even granting a general skepticism of cooperation, any credence or probability at all given to empirical findings of EEU and SEU would produce a sufficient degree of probability of a high penalty situation for the Dominant Choice of PD that would logically merit a consideration of the cooperative choice.

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Concluding Thoughts

In digging into the 2015 Mundell Fleming lecture, this essay has attempted to unpack and critique Bernanke's argument against cooperation. Contrary to Bernanke's assertion, cooperation is not necessarily unrealistic. The Fed as the hegemonic central bank should lean into cooperation to maximize all expected utilities. However, the critique that I have presented suggests Bernanke has a bias against cooperation rooted in preexisting rationality presuppositions. Bernanke committed to his way of doing economics and will not chance anything that threatens the rationality assumptions that he believes are fundamental to contemporary economic science. "Although economists have much to learn from this crisis, I think that calls for a radical reworking of the field go too far." "I don't think the crisis by any means requires us to rethink economics and finance from the ground up. . . ." (Bernanke, 2010) To the contrary, I would submit that achieving social optimums and avoiding negative outcomes in the monetary policy arena will require a thorough rethinking and reworking of the rational actor paradigm currently prevailing in economic science.

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ETHICS, ECONOMICS AND COMMON GOODS

N° 19 (1),
JANUARY - JUNE 2022.