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Monetary/Fiscal policy mix and agents' beliefs <sup>☆</sup>Francesco Bianchi <sup>a,b,c,\*</sup>, Cosmin Ilut <sup>a,b</sup><sup>a</sup> Duke University, 213 Social Sciences Building, Box 90097, Durham, NC 27708, USA<sup>b</sup> NBER, 1050 Massachusetts Ave., Cambridge, MA 02138, USA<sup>c</sup> CEPR, 33 Great Sutton Street, London EC1V 0DX, United Kingdom

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## ABSTRACT

We estimate a model for the US economy with monetary/fiscal policy mix changes. Monetary policy accommodated fiscal policy through the '60s–'70s leading to high inflation. Monetary policy changed with Volcker, but inflation dropped only when fiscal policy and agents' beliefs about fiscal backing switched; successful disinflations require fiscal backing. If the monetary authority had always led or if agents had been confident about this switch, the Great Inflation would not have occurred. The policy change explains why, in the '80s, inflation dropped, debt-to-GDP reversed, output fell, and inflation persistence and volatility declined. Absent this change, inflation would have remained high for fifteen years.

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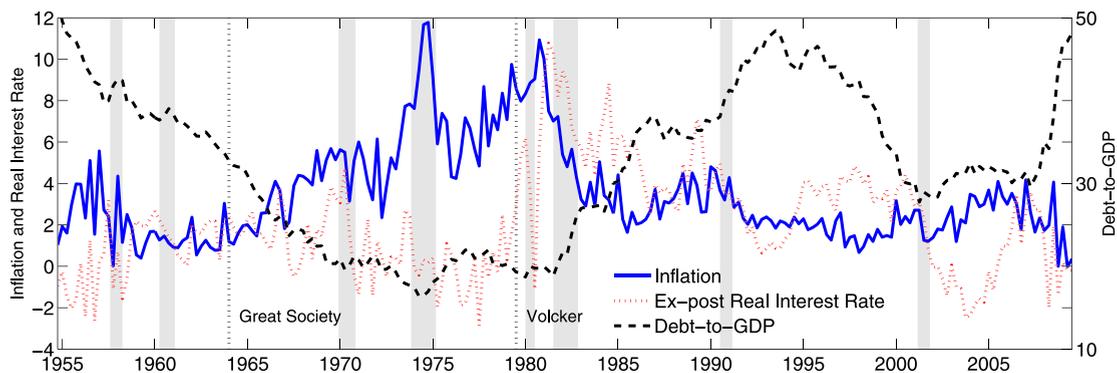
## 1. Introduction

Central bankers seem particularly aware of the potential risks linked to the lack of fiscal discipline. The former Fed Chairman Ben Bernanke claimed that *[t]he primary cause of the Great Inflation, most economists would agree, was over-expansionary monetary and fiscal policies, beginning in the mid-1960s and continuing, in fits and starts, well into the 1970s. The fiscal expansion of this period had a variety of elements, including heavy expenditures for the Vietnam War and President Johnson's Great Society initiatives. Monetary policy first accommodated the fiscal expansion, and then [...] began to power the inflationary surge on its own (Bernanke, 2003).* Nevertheless, when economists have studied the evolution of inflation and output over the past sixty years, the role of fiscal policy has often been neglected. This is despite the fact that in many of the general equilibrium models that are routinely used to analyze the effects of monetary policy, the central bank is able to control inflation only under the assumption that the fiscal authority is committed to adjusting primary surpluses in order to stabilize debt. As

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**Fig. 1.** Annualized quarterly inflation, real interest rate, and debt-to-GDP ratio over the sample 1954:Q3–2009:Q4. The gray shaded areas represent the NBER recessions, while the two red vertical lines mark President Johnson's first ever public reference to the Great Society (May 1964) and the appointment of Paul Volcker (August 1979). Inflation is measured taking the log-difference of the GDP deflator, the ex-post real interest rate is computed taking the difference between the FFR and realized inflation in the following period, while the debt-to-GDP ratio is obtained taking the ratio between the stock of debt held by the public and annualized GDP. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

effectively shown by [Leeper \(1991\)](#), when this commitment is absent, model dynamics in a rational expectations general equilibrium model depend on the parameters characterizing the joint behavior of the monetary *and* fiscal authorities and policy interventions can have perverse and surprising effects. This has induced economists such as [Cochrane \(1998, 2001\)](#) and [Sims \(2011\)](#) to conjecture that the *original sin* that led to the rise of inflation in the '70s should be sought out in the conduct of fiscal policy during those years.

In this paper we provide empirical evidence for a simple, intuitive story of a joint monetary and fiscally-driven rise and fall in inflation. This interpretation of the data uses the available information from fiscal observables to favor a structural model in which fiscal imbalances produce inflationary pressures that would be absent if the fiscal authority were fully committed to stabilizing debt. This interpretation of the data is parsimonious: due to cross equation restrictions, fiscal expenditure shocks not only affect the fiscal variables in isolation, but also contribute to the large and upward trending inflation of the 1960s and 1970s. As a result, this view of the Great Inflation and its conquest does not rely on latent shocks such as movements in the exogenous inflation target or sunspot shocks. Inflation ended when both monetary and fiscal policies changed in the early '80s, whereas previous disinflationary attempts were unsuccessful because they were not backed by the fiscal authority. In this respect, our paper provides a unified theory for the run-up of inflation, the failed disinflationary attempts, and the final success in bringing inflation down. We will also show that this interpretation of the data is consistent with outside-the-model evidence, which includes inflation expectations as well as historical narratives on the delicate balance of monetary and fiscal policies.

We will show that when the whole monetary/fiscal policy mix is allowed to change, two important results arise. First, during the 1960s and 1970s the fiscal authority was the leading authority, whereas the opposite is true starting in the early 1980s. Second, and most important, changes in policymakers' behavior play a key role in explaining the rise and fall of inflation when conducting counterfactual simulations. This is in sharp contrast to previous studies that conduct counterfactual simulations focusing exclusively on monetary policy, such as [Sims and Zha \(2006\)](#), [Bianchi \(2013\)](#), and [Fernandez-Villaverde et al. \(2010\)](#). In these studies replacing Burns with Volcker would have implied only a minor reduction in inflation in the '70s and removing the appointment of Volcker in August '79 would have only slightly delayed the return of inflation to the steady state. This is because different monetary policy regimes only affect how the burden of adverse shocks is redistributed between output and inflation. Instead, when the entire policy mix is modified, a series of fiscal shocks that are inflationary under a fiscally led regime are completely neutralized when the monetary authority is the leading authority.

[Fig. 1](#) contextualizes the events highlighted by [Bernanke](#), reporting the evolution of inflation, ex-post real interest rate, and debt-to-GDP ratio over the period 1955–2009 together with the first reference to the Great Society initiatives ever made by President Johnson (May 1964) and the appointment of Paul Volcker as Fed Chairman (August 1979). Some stylized facts can be identified. First, over the first half of the sample trend inflation increased steadily, while the debt-to-GDP declined smoothly. During this time inflation was very persistent and volatile and real interest rates were low. Then, in the early '80s, a few quarters after the appointment of Volcker, inflation experienced a sudden and sharp drop that coincided with a deep recession and a jump in real interest rates. At the same time, the debt-to-GDP ratio started increasing steadily, until the early '90s. Since then, inflation has been stable and its movements have been mostly at high frequencies.

We reinterpret the events described above in light of an estimated micro-founded Dynamic Stochastic General Equilibrium (DSGE) model in which the monetary/fiscal policy mix and the volatility of the structural shocks are subject to regime changes. As in [Sims and Zha \(2006\)](#), movements across regimes are potentially recurrent and controlled by two independent Markov-switching (MS) processes. However, in our model agents are aware of the possibility of regime changes and they form expectations taking them into account. We then solve the model using the methods developed by [Farmer et al. \(2009, 2011\)](#). Specifically, we allow for a total of three policy regimes and two volatility regimes. In order to capture the

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