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Financial market segmentation, stock market volatility and the role of monetary policy

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ABSTRACT

We study a segmented financial markets model where only the agents who trade stocks encounter financial income risk. In such an economy, the welfare-maximizing monetary policy attains the novel role of redistributing the traders' financial market risk among all agents in the economy. In order to do that, optimal monetary policy reacts to financial market movements; it is expansionary in bad times for the financial markets and contractionary in good ones. In our quantitative exercise, a dividend shock generates different policy responses and consumption paths among the optimal and the 2% inflation targeting policy. The latter implies large distributional welfare losses and risk sharing losses of similar magnitude with those generated by business cycle fluctuations. In addition, the optimal monetary policy does not minimize stock price volatility and implies lower inflation volatility than other commonly used policies.

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1. Introduction

Should financial market developments be a matter of monetary policy? This is a widespread concern among central bankers, especially aggravated by the 2007–2009 recession. The Federal Reserve and central banks of other developed countries seem to follow expansionary policies in response to financial market distress.[1] Previous literature regarding how a monetary authority should respond to asset market advances focuses on policy responses to asset price changes (e.g., Bernanke and Gertler, 2000, 2001; Cecchetti et al., 2001; Faia and Monacelli, 2007; see Gilchrist and Leahy, 2002 for a review on the topic). This paper studies new aspects of the interaction of the monetary authority with the stock market. Specifically, we develop a cash-in-advance model and study the distributional and risk-sharing implications of an optimal, welfare-maximizing monetary policy in the presence of segmented financial markets. In a quantitative exercise we find large welfare losses resulting from following a 2% inflation targeting policy instead of the optimal one. We also find risk sharing losses similar in magnitude with a natural benchmark, associated with the welfare cost of smoothing business cycle fluctuations. In addition, we address the question of whether the optimal policy entails lower fundamentals originated stock price volatility when compared with other, widely used monetary policy rules. We find that this is not necessarily the case.

Financial market segmentation is well documented (Mankiw and Zeldes, 1991; Guiso et al., 2002; Vissing-Jørgensen, 2002) and previously used in monetary models as an apparatus for studying the liquidity effect (Alvarez et al., 2001), forms

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[1] E.g., the Federal Reserve consistently decreased the federal funds rate target for almost every meeting from August 2007 until the end of 2008, after which the target was too low to further decrease it. See Bernanke (2009). Also, the marginal lending facility of the European Central Bank has been consistently decreasing through 2008–2009.

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of non-neutrality of money (Williamson, 2005, 2006) and a positive inflation target (Antinolfi et al., 2001).[2] Our model is based on two implications of financial market segmentation. First, as previous literature points out (Grossman and Weiss, 1983; Rotemberg, 1984; Lucas, 1990; Fuerst, 1992; Alvarez et al., 2001; Williamson, 2005, 2006), monetary policy's actions diffuse in the economy through the financial system, affecting those who are connected to the financial system and those who are not in a different manner. During open market operations the Federal Reserve interacts with large financial institutions, directly affecting financial market participants, yet affecting non-participants indirectly through price adjustments. For example, a monetary expansion benefits those who are at the receiving end of the expansion, i.e., the financial market participants. However, because it increases prices, it hurts those who are not connected to the financial system. Thus, monetary policy has distributional effects.[3,4] Second, segmentation implies that only a fraction of the population is connected to the financial system, so that only a fraction of the population is subject to financial income risk. Although agents' heterogeneity with respect to their connection to the financial markets has been addressed in previous models (Grossman and Weiss, 1983; Rotemberg, 1984; Lucas, 1990; Fuerst, 1992; Alvarez et al., 2001; Williamson, 2005, 2006), agents heterogeneity in terms of their financial risk holding has not yet been explored and introduces additional considerations for monetary policy.

Specifically, these distributional effects that monetary policy exhibits under stock market segmentation affect the way financial income risk is shared between financial market participants and non-participants. This happens automatically, through monetary policy's usual operation. Our model studies how a monetary authority that cares equally about every agent, connected or not to the financial markets, becomes risk sharing, redistributing the financial risk among all agents in the economy. Financial markets' distress translates into lower dividend income; monetary policy optimally expands and benefits financial market participants. However, expansionary policy increases the price of the consumption good, decreasing the consumption of those who do not participate in the financial markets. By contrast, monetary policy optimally tightens whenever financial markets flourish and dividend income is higher than expected. Such a reaction reduces the financial market participants' consumption; it also makes the consumption good more affordable, increasing the consumption of non-participants. Answering the question asked above, whether and how monetary policy should respond to stock market advances, this paper suggests that optimal monetary policy should be expansionary in bad times for the financial markets and contractionary in good times. This result assigns to monetary policy the novel role of redistributing risk among heterogeneous agents; in this case among financial market participants and non-participants.

We address the importance of the above mechanism quantitatively. We compare the optimal monetary policy with a 2% inflation targeting policy. We find that compared to the optimal policy, the 2% inflation targeting policy induces large losses for those who do not participate in the financial markets and large gains for those who do participate. We find large welfare effects which highlight the distributional role of monetary policy. Isolating the risk-sharing gains of optimal monetary policy, we calculate them to be at the order of magnitude of the gains from smoothing the business cycle, which we regard as the benchmark for our analysis. In addition, we find that the two policies respond in the opposite direction after a dividend shock. For example, after a negative dividend shock the optimal monetary policy becomes expansionary in order to redistribute resources to the financial market participants. On the contrary, the 2% inflation targeting policy becomes contractionary in order to keep inflation at its target. The consumption paths implied are also different across the two policies.

Motivated by recent work on the response of monetary policy to the stock price (Bernanke and Gertler, 2000, 2001; Cecchetti et al., 2001; Gilchrist and Leahy, 2002; Faia and Monacelli, 2007) we study this relationship in our model. We find that the optimal monetary policy responds to the stock price due to its risk sharing consideration; it becomes expansionary in response to a stock price increase. The 2% inflation targeting policy is also responsive to a stock price increase; however, it is over-expansionary compared to the optimal policy. We further investigate the role of monetary policy in our model and compute stock price volatility and inflation volatility implied by the optimal monetary policy rule; we compare these volatilities with those implied by the constant money supply, inflation targeting and nominal interest rate peg policy rules. There is vast finance literature related to one or more of this model's elements, studying stock price volatility (Allen and Gale, 1994; Guo, 2004; Guvenen and Kuruscu, 2006; Chien et al., 2011). We abstract from other issues this literature has considered (e.g., endogenous participation, idiosyncratic shocks or heterogeneous preferences), in order to focus on the importance of monetary policy regimes in generating stock price volatility. We find that the optimal monetary policy does not necessarily produce lower stock price volatility compared to the other policy rules and thus, stock price volatility should not be an integral part of monetary policy. Furthermore, the policy that minimizes stock price volatility also reduces welfare.

In addition, our findings suggest that contrary to previous literature (Bernanke and Gertler, 2000, 2001) that does not account for financial market segmentation, the inflation targeting policy is not associated with minimal stock price volatility. Optimal monetary policy in our model does however associate with inflation stability; it produces half the inflation

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[2] For its empirical importance see LandonLane and Occhino (2008) and Mizrach and Occhino (2008).

[3] Early work on the distributional effects of monetary policy involves models that are not very tractable (Grossman and Weiss, 1983; Rotemberg, 1984), although important attempts to obtain tractability resulted, contrary to this paper, in models that suggest limited role for monetary policy (Lucas, 1990; Fuerst, 1992).

[4] There is, of course, large literature exploring the distributional effects of inflation (Erosa and Ventura, 2002; Doepke and Schneider, 2006). In addition, recent work studies monetary policy regimes and the distributional effects that the resulted inflation has (Meh et al., 2010). However, here we are exploring direct distribution effects that monetary policy exerts.

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