Our paper is also connected to recent quantitative equilibrium models of mortgage and housing markets with heterogonous agents (e.g., Favilukis, Ludvigson, and Van Nieuwerburgh (2017); Kaplan, Mitman, and Violante (2016); Greenwald, Landvoigt, and Van Nieuwerburgh (2018); Guren, Krishnamurthy, and McQuade (2018); and Wong (2018)). Such models can provide many valuable insights, including the quantitative assessment of various effects. Unlike these papers that use computational tools developed in the quantitative macroeconomics literature, we follow the structural industrial organization literature. The advantage of macroeconomic models is that they capture general equilibrium effects, which are absent from our model. On the other hand, we build a credit market framework with supply and demand functions that can be directly estimated using microdata. Moreover, we allow for substantially richer heterogeneity across consumers which can be directly linked to microdata. This rich heterogeneity allows us to speak to the distribution consequences of different policies. On the supply side our approach allows for rich strategic choices of banks and shadow banks, as well as their strategic interactions in the market.

Finally, our paper is related to recent work focusing on various forms of bank-like activities taking place outside the traditional banking system and studying the implications of such shifts (e.g., Gennaioli, Shleifer, and Vishny (2013); Adrian and Ashcraft (2016); Moreira and Savov (2017); Ordonez (2018); and Begenau and Landvoigt (2018)). Among this recent work, Koijen and Yogo (2016) analyze the implications of the reinsurance market, which allows regulated insurance companies to move some of their liabilities to shadow reinsurers. Drechsler et al. (2017) and Xiao (2018) show that when the federal funds rate rises, banks widen the spreads they charge on deposits and deposits flow out of the banking system towards the uninsured shadow banking sector, thereby affecting the transmission of monetary policy. Unlike these papers, which focus on the consequences of deposits flowing between the traditional and shadow banks, we study the consequences of capital requirements, conforming credit limits, and unconventional monetary policy that operate independently from the deposit channel. In doing so, we study the impact of equilibrium interaction of shadow banks with traditional banks on quantity, price, and allocation of mortgage credit, as well as on bank stability.

VI.B Conclusion

Our findings have a number of implications. First, policy analysis of financial intermediation critically requires simultaneously analyzing the impact of the policy on both banks and shadow banks, and accounting for their equilibrium interaction. Any regulation that affects a part of the intermediation market spills over to other markets through competition, and affects which products are offered by which firms and which part of the household income distribution is impacted, as well as equilibrium prices. This observation does not only apply to the residential mortgage market—the focus our study—but to any credit market with a large presence or possible entry of shadow banks with off-balance-sheet lending options. Policy analysis has been moving in this direction somewhat (e.g., the Minneapolis Plan). Unlike these current approaches, we develop one based on a comprehensive model which accounts for the industrial organization of financial intermediation, as well as the changing business models of banks. This framework serves as a starting point for even richer policy analysis.