

Quantitative Easing's Effects on the U.S. Housing Market

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Abstract. As the housing bubble burst in the United States, the buildup of subprime lending led to the Global Financial Crisis. The Federal Reserve desperately slashes interest rates to reverse the economic recession, but the Zero Lower Bound significantly hindered the policy's future effectiveness with concerns of an existing liquidity trap. As a result, the unprecedented Quantitative Easing became the policymakers' last resort. Through the large-scale purchases of financial assets including mortgage-backed securities (MBS) and government bonds, the Fed attempts to stimulate the economy through reserve creation and instilling downward pressure on future interest rates. This literature review discusses how QE specifically affected the U.S. housing market during the GFC. An analysis is conducted on various social aspects and stakeholders by identifying the various channels through which QE is transmitted. The signaling, bank lending, and refinancing channels all suggest that MBS had the greatest effect on market expectations, bank behaviors, and consumer spending. As a result, many were many spillover effects into real estate, notably on asset prices, employment, and investment. Even though literature has criticized QE's ineffectiveness and its potential drawbacks, the unconventional monetary policy certainly played an essential role in preventing a worse outcome and effectively demonstrating its ability to reduce interest rates, generate wealth, and revive the economy.

Keywords: Quantitative Easing, Real Estate, Global Financial Crisis.

1. Introduction

The Global Financial Crisis of 2008 was spurred by the defaults of poor-quality mortgage-backed securities (MBS) that were supported by subprime lending in the United States. In response, the Federal Reserve quickly reduced interest rates to 0.25%. Amid the recession, conventional monetary policies were exhausted as the Zero Lower Bound was reached. An alternate method is needed to further stimulate the economy. Quantitative Easing (QE)—also generally known as Large Scale Asset Purchases (LSAP)—became the Fed's primary policy tool. Theoretically, the purchases of long-term government and mortgage-backed securities would impose a downward pressure on interest rates, thereby increasing the aggregate economic activity via boosting investment and consumption.

In response to the GFC, the Fed greatly expanded its balance sheet assets from only \$800 billion in Treasury notes in December 2007 to nearly \$4.5 trillion at the end of 2014. Historically, the Fed initiated 3 rounds of QE. QE1 kickstarted in November 2008 with the Fed in total purchasing \$1.25 trillion in mortgage-backed securities (MBS) and \$500 billion in agency and Treasury securities. QE2 in November 2010 was a continuation of QE1 with the additional acquirement of \$600 billion in long-term Treasuries. Meanwhile, Operation Twist starting in September 2011 saw the Fed exchanging \$600 billion in short-term to longer-term securities. Initiated in September 2012, QE3 aimed to provide further relief to the housing market via monthly purchases of \$40 billion MBS; this value was later increased to \$85 billion [1].

This literature review summarizes previous research evaluations on the extent of QE's effectiveness in alleviating the housing market during the GFC. Section 2 outlines QE's three transmission channels—signaling, bank lending, and refinancing—and compares their extent in reducing mortgage rates and easing liquidity. Section 3 identifies the secondary consequences of QE on the American economy in the aspects of housing prices, investment, employment opportunities, and wealth inequalities. The key finding in the transmission channels is that the direct purchases of MBS in QE1 and QE2 were the most influential in conveying its state goals, increasing bank lending quantitatively and qualitatively, and benefitting households via mortgage rate reductions and

refinancing increases. Responses in the real estate market were widespread, however; while there were immediate effects on wealth creation and employment, some studies have also suggested the effects may stretch over a longer period, most notably for investment.

2. QE's Transmission Channels

2.1. Signaling Channel

The signaling channel is the Fed's key method of communication to the public. During periods of recessions or lack of confidence, the Fed must convey the message that it will commit to keeping long-term interest rates low for financial markets. Bhattarai et al. model this theory and identify the effects of signaling via incentive structures. One of the two key findings was that by holding on to large quantities of assets, the Fed has the incentive to dampen future short-term interest rates, or else it would suffer from balance sheet losses itself [2]. This was elaborated by Hancock and Passmore. They discovered that markets readily infer upon the direct messages the Fed conveys during QE announcements regarding its future policies and actions. Nevertheless, they found that the Fed's accumulation of MBS had a greater significance in lowering mortgage rates than changes in market expectations. In addition, such effects are dependent upon the Fed playing a primary role in the mortgage market by holding considerable MBS shares [3]. Meanwhile, Wang delves into the Fed's messages by individually analyzing the effects on the mortgage market of each of the 35 Quantitative Easing statements. By comparing the 30-year mortgage rate, Treasury rate, and MBS yield before and after each event, he concludes that in comparison with further news, new rounds of QE programs dramatically reduced mortgage rates and thus were the most impactful. Furthermore, the reduction in mortgage rates was more significantly impacted by MBS purchases than by Treasury securities. [4].

2.2. Bank-lending Channel

QE's purchase of MBS also positively shifted the behaviors of banks. Several researchers have analyzed the effects in terms of lending volume, lending standards, and risk-taking behavior. Papers commonly exploited the differences in banks' portfolio holdings of MBS and used this heterogeneity to evaluate the extent of such impacts. As a result, there is a consistency in the findings that QE1 and QE3—programs involved in the Fed's purchases of MBS—had a greater effect on banks that had large proportions of MBS in their portfolios.

First, banks increased their volumes of lending. Rodnyansky and Darmouni calculated the different exposures of commercial banks to QE by evaluating the MBS-holdings-to-assets ratio. Upper quartile banks holding 12% of MBS were found—in contrast to counterparts of median fractioned banks at 5%—to increase their lending by 3% after QE1 and 2% after QE3. Meanwhile, QE2, which only involved Treasuries, did not have a significant differential impact. The study concludes by emphasizing the importance of targeted assets in the transmission of QE over quantity [5]. Chakraborty et al. took a different approach. By tracking the behavior of banks during the rounds of QE, the impact was quantified in that every dollar of purchased MBS resulted in loan increases of 3.63 cents. That means the Fed's purchase of \$1.75 trillion in MBS indicates an additional \$63.53 billion in loans. They also discovered the existence of crowding out as Commercial and Industrial (C&I) lending decreased by 1.22 cents (34% in scale) per dollar of MBS purchase. Thus, MBS purchases with the intention of mortgage origination may create unintended investment effects [6].

Additionally, banks were found to have decreased lending standards and increased risk-taking behaviors. Rather than measuring the lending quantity, Kurtzman et al. analyzed their quality. Using data from internal risk assessments and confidential data from loan officers, a weak correlation is identified between lending standards and volumes. This implies that banks while increasing their lending also conduct riskier loans for a reach of greater yield. The lowered borrowing costs are estimated to have obtained a similar result as a 1% decrease in the Federal funds rate [7]. Dhital et al. built upon Rodnyansky and Darmouni's research and found similar increases in bank lending (3% to 4% more relative to counterparts). In addition, the interest coefficient for riskier loans was positively

and statistically significant for most real estate, C&I, and consumer loans in QE1 and QE3. This implies that banks extend riskier credit as a response to reserve increases during the two periods. Interestingly, for C&I lending, while Chakraborty et al. found that MBS purchases decrease borrowing volume, this article argues banks also are willing to take more risk when supplying these loans [8].

2.3. Refinancing Channel

Quantitative Easing's favorable reductions in mortgage rates are designed to induce mortgage refinancing. By refinancing, individuals can increase their savings via payment reduction. Although refinancing seems to produce positive outcomes, limitations also exist due to credit disparities.

Fuster and Willen identify the immediate results of QE announcements. Firstly, contrary to conventional theory, they found a wide range of rate reductions of up to 0.4% to 0.1% increase. Their reasoning was due to the variation in loan size and credit score. Secondly, an immediate boost in borrower activity with borrowing nearly doubling in terms of applications and originations. However, such an effect was not observed in the purchase mortgage market, suggesting that QE did not lead to increased home buying. Thirdly, QE significantly shifted borrowers' characteristics as refinancing activity was in correlation with high credit scores. Nevertheless, the bottom quartile of FICO scores had a success rate for mortgage refinance 50% higher than before QE [9]. Results by Maggio et. al on the refinancing channel conform with the claim made in previous channels that the effects of LSAPs depend heavily upon the type of purchased assets. That means a huge portion of eligible mortgage originations was involved in purchases of GSE mortgages during QE1. Their primary findings on refinancing activity are positive. In terms of quantity, a sizeable effect was observed as QE1 increased mortgage refinancing origination by more than \$600 billion; the reduced interest payments correspond to increased savings and equity extractions, increasing consumption by \$76 billion. A further finding estimates the Fed's MBS purchases—rather than interest rate reductions—were directly attributable to the refinancing opportunities [10].

On the other hand, Burya and Davitaya point out the inefficiencies of monetary policies as the result of differences in credit scores of mortgage refinancing. They explain the paradoxical phenomenon of low-credit borrowers benefitting from refinancing yet refinancing less often due to mortgage market constraints on opportunities due to credit criteria. Using monthly loan-level data of fixed-rate mortgages, their refinancing model indicates the significance of heterogeneity in credit results in the impact of aggregate consumption to be 11% lower than the presence of only heterogeneity in mortgage rates. Therefore, this implication also suggests how the refinancing channel may experience inefficiencies due to borrowing constraints [11]. Meanwhile, Beraja et al. study the regional differences of mortgage refinancing on the distribution of housing equity. Their results find a similar limitation with Burya and Davitaya as areas that are the least hit—where housing prices declined minimally—experienced the most significant declines in interest rates; this was mainly due to the presence of local economic activity. This unequal distribution of monetary stimulus resulted in metropolitan statistical areas (MSAs) engaging in more refinancing activities and increases in consumption. Therefore, while it is essential to observe the changes in refinancing and spending on aggregate levels, regional disparities hinder the effectiveness of monetary policies to reach the most depressed regions [12].

3. QE's Social Impacts

3.1. Housing Prices

While it is intuitive that QE drives up housing prices through the expansion of monetary reserves and liquidity in financial markets, relatively few pieces of literature have explored the relationships between unconventional monetary policies and real estate valuation.

Lyytinen evaluates the impact of Quantitative Easing on housing prices. This was primarily determined through a distinction of the transmission channels QE and conventional monetary policies

operate in. In their model, 32 macroeconomic series were controlled and datasets were divided into two periods: before and after December 2008 when the GFC began. Unsurprisingly, effects on house prices were only found in the second period. The price reversal effect of the QE is mainly due to the Fed's support in terms of content and magnitude, as the direct purchase of residential MBS in millions had provided stimuli for the mortgage market, allowing more lending and refinancing behaviors. Finally, a comparison between the US and Euro areas was made, where there were minimal effects on house prices found in the latter, possibly due to the less aid provided by the European Central Bank. A remark was also made on the commercial sector, where fewer responses were seen due to it only being targeted in 2021 [13].

Huston and Spencer further examine the effectiveness of QEs in boosting asset prices. Their study reveals that with the purchase of LSAPs, the measurement of monetary aggregates indicated substantial increases in equity and housing prices. In particular, the purchase of MBS had a clearer more direct impact on wealth creation through housing price increases [14]. Similarly, Jawadi and Sousa focus on QE's effects on wealth allocation. Their principal result is that the Fed's reserve expansion induces a positive shock that boosts asset prices, which includes housing prices. This was largely due to the portfolio balancing effects where banks increased their risk exposure in their investments in real estate [15].

Gabriel and Lutz presented a different argument. Aligning with previous criticisms on the refinancing channel failing to reach the unemployed and negative equity households, the fact that housing prices fell another 10% from 2008 to 2011 was evidence that QE did not set off an immediate housing recovery. Instead of immediately bidding up prices, they did find that subprime areas benefitted from reduced foreclosures through the prevention of negative equity and a negative shock to employment. They found that QE reduced the percentage of homeowners with negative equity from peaking at 26% to 5%; meanwhile, QE1 independently stimulated the employment-to-population ratio in subprime counties by 1.25%. Thus, even though the recovery of home prices was sluggish and not immediate, the Fed still found their monetary policies reaching subprime households by reducing their risk of foreclosure [16].

3.2. Investment

The effects of QE on housing investment were found not to be immediate, primarily because of the differences between asset purchases and conventional monetary policies. For instance, Gelfer and Gibbs assess the effects of LSAPs on financial markets. Their general conclusion is that while policies had a positive effect on output, consumption, and inflation, a lack of effect on real investment was found. Purchasing assets does not always result in more actual investment because financial assets and the real economy are intermediated financially [17]. In addition, Rahal research on the housing market found similar results. By taking a different approach by identifying the immediate responses of unconventional monetary policy shocks on housing markets, he found that housing prices have a crucial role in influencing the amount of residential investment. Additionally, both monthly and quarterly data imply that residential investments demonstrate a prolonged yet stronger response than house prices, possibly due to the length of conveyancing processes associated with construction and real estate transactions [18].

3.3. Employment

Since one of the Fed's key economic goals is to maximize employment, measuring the changes in the unemployment rate reflects the economic performance over time. Likewise, the strength of the housing market is closely aligned with the economy as housing services, spending, and employment account for large portions of the total.

Luck and Zimmermann explored QE's impact through the bank-lending channel on employment. They explain that employment increases should be the result of a boost in demand and consumption. The separation of credit supply for firms and households had different effects in QE1 and QE3. In particular, increases in mortgage refinancing and lending volume in QE1 affected employment in the

non-tradable goods sector; however, when comparing the employment growth between exposed and unaffected counties, the authors concluded a lack of distinctive effect QE1 had on the overall employment. On the other hand, QE3 had a greater emphasis on C&I lending and commercial mortgages. This time, a 0.4% higher employment growth was found during the comparison. Therefore, it can be inferred that QE1's non-tradeable increase is spurred by household wealth and consumption. In contrast, QE3's net increase is the result of an increase in loans supplied that generated investment activities [19].

Wu and Xia measure the unemployment rate reductions of QE when monetary policies reach the zero lower bound. They introduce the concept of a shadow rate, which is a modeled nominal interest rate that is not bounded by the ZLB. Unemployment was used by them as a macroeconomic measure of the extent of the Fed's stimulation. The results were twofold: first, a negative 0.15% bank rate results in a 0.1% decrease in the unemployment rate; second, the Fed's QE program resulted in an estimated 1% decrease in the unemployment rate in December 2013, more effective than the 0.13% in 2009 and previously observed [20].

3.4. Wealth Inequality

One of the concerns many have regarding QE is how it exacerbates inequality. While theoretical predictions of QE on wealth inequality most frequently discuss price increases in assets such as stocks, there seems to be distributional effects otherwise in the housing market.

Montecino and Epstein conducted research on the extent of inequality as a result of QE. They compared the distributional effects of QE through the asset price, employment, and refinancing channels. After comparing the income quantiles before and after the QE period, they found that while the employment and mortgage refinancing channels have an equalizing effect, the asset appreciation and returns channels were extremely disequalizing and led to modest increases in inequality. Mainly, they criticized the Fed and Treasury for not acquiring a better method to help lower-income households refinance their loans and the lack of innovative ways to boost employment rather than through inflating asset prices [21].

Bivens has a more optimistic view as he deems equalizing effects due to employment and housing. He highlights the fact that housing accounts for a far greater portion of middle-class households' assets than it does for wealthy households. Therefore, rising house prices decrease inequality since home equity accounts for a sizable portion of middle-class wealth. Specifically, he quantifies this impact and suggests that the 7% increase in housing prices due to LSAPs boosted middle-class wealth and likely offset a significant portion of the disparities from stock and bond price increases for the top 1% [22].

Furthermore, Lee explains why the phenomenon of a widening wealth gap for the top decile (10%) and a reduced Gini index seem to both exist. This is due to how the top decile primarily obtains wealth from equity in the form of businesses and assets, while the bottom 80% rely upon labor as the main source of income. As a result, even though income and consumption shares for the top decile grew by 0.17 and 0.06 percentage points respectively, the 1.5% reduction in the unemployment rate from 2009 to 2015 decreased, on average, the income and wealth Gini indexes by 0.04 and 0.05 percentage points. Interestingly, the author also compared QE to conventional monetary policy and found that inequality was better off, essentially due to how lower rates only benefit debtors at the cost of making middle-class savers worse off [23].

Finally, Li and Zhang elaborate on how QE aggravated racial inequality. By focusing on the housing market, they identified differences between white and minority holds. In terms of mortgages, there exists a significant difference in mortgage originations and refinancing between races. A proposed explanation of this racial gap was based on the Survey of Consumer Expectations and the National Survey of Mortgage Originations. Important findings included that minorities borrow less due to their overestimation of mortgage rates than whites; they are also less knowledgeable regarding financial literacy (e.g., refinance availability or mortgage processes) [24].

4. Conclusion

Ever since reaching the Zero Lower Bound, Quantitative Easing has become one of the key unconventional monetary policies in Central Banks' toolkits. The Federal Reserve was no exception. As the Global Financial Crisis saw the collapse of home prices, credit markets, and significant bank failures, QE thankfully played a critical role in preventing further downturns.

Most importantly, the housing market saw a reduction in foreclosures and asset depreciation as QE effectively decreased mortgage rates and improved liquidity in the economy. This literature review was able to suggest how the macro-economy was able to benefit from increased asset prices, employment, and investment activities via QE's channels. Financial markets experienced optimism and stability via the Fed's commitment to sustaining low-interest rates; commercial banks increased their lending volumes and risk-taking activities as MBS yields fell; households benefitted from the reduced mortgage rates, increasing their refinancing activities and consumption.

Overall, while concerns over QE's immediate spillovers and generated inequalities exist, past literature has generally found positive outcomes of QE programs, especially in depressed housing areas during the GFC. Future research and reviews can analyze the role QE played in the recent COVID-19 pandemic or may conduct a comparative analysis regarding the differences in QE by different central banks.

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