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"Marginal Propensity to Consume and the 2008 Financial Crisis: Analyzing Changes in Household Consumption Behavior"

Prof. Audrey De Dominicis

Matr. 287061 Filippo Angiolini

SUPERVISOR

CANDIDATE

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Introduction

Fall of 2008. The bubble burst. The world froze.

In just a few weeks, the world that everyone used to know didn't exist anymore.

All that people used to take for granted vanished.

Any sort of stability was gone.

American families found themselves lost in a crisis that had catastrophic consequences all over the world.

How did this happen? And who let it happen? Who is to blame?

The crisis didn't hit evenly. While some households were able to count on their savings, most didn't. Predatory lenders had already taken advantage of low-income neighborhoods and minorities. And when the housing market collapsed, they lost it all.

This thesis digs into this concept. It wants to trace the sequence of events that led to the 2008 crisis. It wants to analyze responsibilities. At the center of the research lies one question: how did the collapse reshape consumption? And how differently did it hit across various demographics groups? The goal of this thesis is to answers to these questions.

The first chapter will focus on marginal propensity to consume. Central to the chapter are the use of fiscal policy to boost economic growth and possibly recovery and the concept of heterogeneity in MCP, needed to address a fundamental problem: social disparities.

The second chapter will dig deep into the crisis. It reconstructs the storyline of the events that led to the collapse and the main players in this catastrophe. It then describes the financial side of the crisis through the focus on the practices carried out by the banks. It finishes by emphasizing once again how social disparities and predatory lending activities created the condition for such a large-scale crisis.

The third chapter consists of an empirical analysis based on a random-effects panel regression that is carried out to estimate income elasticity and the effect of demographic characteristics, especially the ones concerning social disparity, on consumption.

By adding up these three perspectives, this thesis tries to provide a detailed overview of the 2008 financial crisis, a thorough analysis on consumption with a special focus on marginal propensity to consume and to reveal how social disparities were worsened by the crisis.

Chapter 1 – The Marginal Propensity to Consume

1.1 Marginal Propensity to Consume and its Key Determinants

1.1.1 MPC and Keynes' General Theory

The marginal propensity to consume is the amount by which consumption changes when disposable income increases by an extra dollar. Its value is usually considered between 0 and 1. For example, if a household receives an extra \$100 of income, they are going to spend a part of it and save the rest. If they spend \$65 then their MPC will be of 0.65 as MPC is calculated as follows:

$$MPC = \frac{\Delta C}{\Delta Y}$$

where ΔC is the change in consumption and ΔY is the change in income.

The concept of marginal propensity to consume was first introduced by John Maynard Keynes, when he published “*The General Theory of Employment, Interest and Money*” in 1936. He built his own idea of the consumption function based on three main conjectures:

1. Marginal propensity to consume (MPC)
2. Average propensity to consume (APC)
3. Current income as primary determinant of consumption.

As described in the previous paragraph, Keynes defined the marginal propensity to consume as “*the amount consumed out of an additional dollar of income*” and he established it to be between 0 and 1 as the “*fundamental psychological law, upon which we are entitled to depend with great confidence, (...), is that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income*”¹. He then described how the ratio between consumption and income, called average propensity to consume, falls as income rises. While the average propensity to consume is a static measure that studies the proportion of disposable income that is typically spent by households, marginal propensity to consume is a dynamic measure which analyses the

¹ Mankiw, N. G. (2016). *Macroeconomics* (9. ed.). Worth Publishers.

responsiveness of consumption to changes in disposable income.² Keynes also believed that income is the main driver when analyzing consumption. Unlike classical economists, he didn't give much importance to the role of interest rates as he believed that "*the short-period influence of the rate of interest on individual spending out of a given income is secondary and relatively unimportant*"³. Based on the three conjectures, the Keynesian consumption function is:

$$C = \bar{C} + cY$$

With $\bar{C} > 0$, $0 < c < 1$, where C is consumption, $\bar{C}$ is a constant and c is the marginal propensity to consume. In addition, c needs to be positive since an increase in disposable income creates an increase in consumption and it is often considered to be smaller than 1 since it is likely that consumers will only want to spend a portion of the increase in income and save the rest.

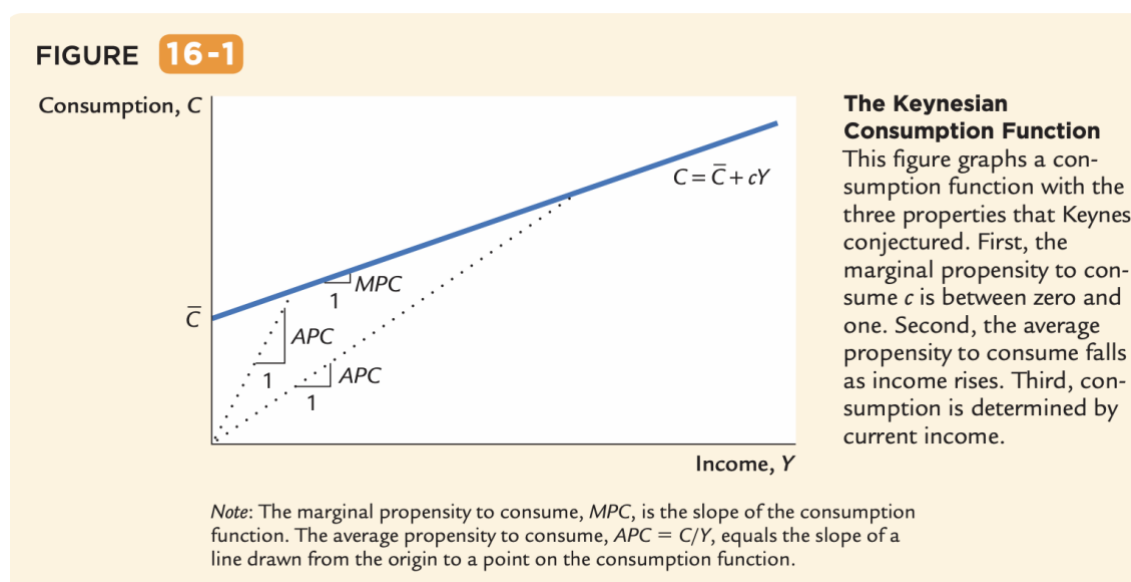


Figure 1 (The *Keynesian Consumption Function*, Mankiw, N.G. (2016). *Macroeconomics* (9. ed.). Worth Publishers.)

The intercept $\bar{C}$ represents autonomous consumption, which is the amount that any household would spend even when income is equal to 0. The marginal propensity to consume is represented by the slope of the consumption function and satisfies the prerequisite imposed by Keynes of lying between 0 and 1. When income increases, consumption rises. In the figure it is

² Testbook. (n.d.). *Difference between APC and MPC*. <https://testbook.com/key-differences/difference-between-apc-and-mpc>

³ See note 1

also shown how the average propensity to consume declines as income increases, confirming Keynes' second conjecture. This concept, which is crucial for the final analysis of this work, will be explored more in the following sections.

1.1.2 Determinants of the MPC

It is impossible to determine a fixed and stable marginal propensity to consume that can apply to the whole population. As it will be analyzed in section 1.4, MPC is highly heterogeneous and varies across different types of households, age groups, genders and ethnicities. The factor that can be studied to determine how to evaluate it and how it can be influenced are many. It is now going to be proposed a division under four main categories, which are:

1. Household economic resources
2. Access to liquidity
3. Expectations and confidence
4. Fiscal Context

The first category is important to understand how income levels and wealth can influence consumption. Households with lower resources (limited income or low accumulated wealth) tend to have a higher marginal propensity to consume since it's likely that if they receive additional income then they would spend it on immediate needs such as groceries, utility bills or rent. On the opposite, higher-income households are already able to cover the essential needs, so they don't have an immediate need of essential goods or services so they may as well choose to save or invest the extra money. The second category is based on the concept of liquidity. As it will be later explained in Chapter 2, liquidity plays a major role for consumption levels. If access to credit is made easier, households can borrow money to protect themselves against future income fluctuations, keeping the level of consumption stable even if they face a decreasing income. On the other side, if access to credit is not available, households won't be able to cover the essential spendings they usually cover, and when they receive an extra income, they will spend it immediately to satisfy their needs, thus increasing their marginal propensity to consume. Similarly, interest rates can affect households' behavior regarding saving and borrowing, affecting the marginal propensity to consume. Expectations regarding the future and consumer confidence are big drivers of consumption. If a stable or increasing income is anticipated for the future, consumers will likely be willing to

spend an additional portion of their income in the present. Uncertainty scares consumers away from spending and pushes them to save more to face possible future repercussions. On this level, government policies play a major role, since they can influence consumers' perceptions and shape short-term consumption choices. As last category, fiscal policies are crucial in determining disposable income and therefore the marginal propensity to consume. Higher taxes lower disposable income, while tax-cuts are enforced to increase the spending behavior. In conclusion, MPC can be influenced by a numerous range of factors, and it is highly heterogeneous among different income classes. The extent of this heterogeneity will be investigated in the last sections of this chapter.

1.2 Why is the Marginal Propensity to Consume Important? A Macroeconomic Perspective

1.2.1 MPC as a Tool for Economic Growth

As it was previously explained, understanding the importance of the marginal propensity to consume is crucial to understand how it shapes the relationship between income and consumption. According to Keynesian theory, consumption is one of the main components of aggregate demand, which is “*measured as the sum of spending by households, businesses, and the government*” and it is “*the most important driving force in an economy*”⁴ and aggregate demand is a key determinant for the gross domestic product growth (GDP). To make it clear, when households increase their consumption, given an increase in income, the demand for goods and services shifts upward, contributing to economic growth. This means that, the higher the marginal propensity to consume, the higher the impact on GDP growth. Nowadays, based on 2023 data, it is known that consumption is the main component of the gross domestic product. For example, in the United States, consumption represents 81.3% of the gross domestic product.⁵ Therefore, it is essential to understand how MPC works for investigating how fiscal policies can be used to improve the economic growth through consumption, especially in times of economic crises.

⁴*What is Keynesian Economics? - Back to Basics - Finance & Development, September 2014.* (2014, August 27). <https://www.imf.org/external/pubs/ft/fandd/2014/09/basics.htm>

⁵ *World Bank Open Data.* (n.d.). World Bank Open Data. <https://data.worldbank.org/indicator/NE.CON.TOTL.ZS>

In times of financial crises, fiscal policies such as tax cuts or stimulus payments are enforced to increase disposable income needed to boost households' consumption. The actual effect of these policies truly depends on the value of the marginal propensity to consume. If the MPC is high, there's a bigger likeliness to spend the additional income, boosting demand for goods and services. In the publication by Sokolova (2022), "*Marginal Propensity to Consume in Recessions: a Meta-analysis*"⁶, which will often be cited in this chapter, it is analyzed how crucial can a fiscal stimulus be during a time of crisis, especially when given to lower-income households. The concept of meta-analysis is important, since it allows to systematically and quantitatively combine results from different studies, to produce a weighted average effect that considers each study's quality and sample size. In the paper it is analyzed how, during times of crisis, when the unemployment rate tends to go up, marginal propensity to consume will go up as well since there will be a higher need for essential goods. So, out of every additional dollar received, a bigger part of it will be consumed. This creates an incentive on the governmental side to use fiscal policies to expand consumption. This is clearly proved in the study by Sokolova, where it is shown how an increase in unemployment of respectively 4% and 8% leads to a marginal propensity to consume that is respectively 19% and 39% higher. In addition, recent studies analyzed how an income shock affects consumption. In the study by Bui et al (2024), that examines MPC and household savings during the COVID-19 pandemic in Thailand and Vietnam, it is described how the marginal propensity to consume is larger for positive income shocks rather than negative income shocks. In fact, "*after receiving an average monthly income, (...) the average Thai and Vietnamese households would spend 26% and 28% of it, respectively*". At the same time, "*in response to an income loss of the same magnitude, the average MPCs for Thai and Vietnamese households is approximately 22% and 26%, respectively.*"⁷ At the same time, the study by Ueda (2025) shows how "*individuals spend 27% of SCP payments in the week of receipt and cumulatively 50% over three weeks*"⁸. The studies together show the importance to target the right households, those with higher MPCs and the importance to be constant with the stimuli to be able to maximize the boost in GDP.

⁶ Sokolova, A. (2022). *Marginal propensity to consume in recessions: A meta-analysis* (Working Paper No. 091222-WP). Washington Center for Equitable Growth.

⁷ Bui, D., Dräger, L., Hayo, B., & Nghiem, G. H. (2024). The marginal propensity to consume and household savings during the COVID-19 pandemic: Evidence from Thailand and Vietnam (Hannover Economic Papers No. 717). Leibniz Universität Hannover.

⁸ Ueda, K. (2025). The reality of consumption: Comparing self-reported and observed marginal propensity to consume. *Economics Letters*, 247, Article 112179.

1.2.2 MPC and Effectiveness of Fiscal Policies

As just said, in times of financial turmoil and crisis, fiscal policies can have a strong impact on consumption and thus on economic growth and potential recovery. If carried out properly, they can stimulate consumption. It needs to be kept in mind that consumption behaviors can change especially when considering different income classes. These policies, therefore, need to be able to be enforced towards the right target. As stated by the Sokolova study stimulus checks, tax cuts have a much bigger impact on lower-income families, as increasing their disposable income, it allows them to cover the essential expenditures they couldn't afford before the additional income received. A specific example of this is represented by Economic Impact Payments released by the United States to contrast the recession created by the COVID-19 Crisis. According to the U.S Department of the Treasury, *“starting in March 2020, the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) provided Economic Impact Payments of up to \$1,200 per adult for eligible individuals and \$500 per qualifying child under age 17. The payments were reduced for individuals with adjusted gross income (AGI) greater than \$75,000 (\$150,000 for married couples filing a joint return). For a family of four, these Economic Impact Payments provided up to \$3,400 of direct financial relief. The COVID-related Tax Relief Act of 2020, enacted in late December 2020, authorized additional payments of up to \$600 per adult for eligible individuals and up to \$600 for each qualifying child under age 17”*⁹. According to the Federal Reserve Bank of Chicago, *“in the two weeks following a \$1,200 stimulus payment in April 2020, consumers increased spending by \$546, implying a marginal propensity to consume of 46%.”* It is also important to notice that *“stimulus recipients who live paycheck-to-paycheck spent 60% of the stimulus payment within two weeks, while recipient who save much of their monthly income spent only 24% of the stimulus payment within two weeks”*. Also: *“spending patterns are quite similar for the second round of stimulus payments in January 2021, with consumers spending 39% of their stimulus payment within two weeks (...)”*. Additionally, they studied that by *“reweighting our data to match the U.S population, ignoring equilibrium effects, and assuming constant MPC for each person, we estimate that the CARES Act’s \$296 billion of stimulus payments increased consumer spending by \$130 billion (...) within two weeks of stimulus receipt”*. Finally, *“a stimulus bill targeted at individuals with the highest MPCs could have increased consumer spending and debt payments by same amount*

⁹ *Economic impact payments.* (2025, February 8). U.S. Department of The Treasury. <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-american-families-and-workers/economic-impact-payments>

at a cost of only \$246 billion”¹⁰. This shows that, however being very effective, especially in the short-run, fiscal policy need to have a precise and specific target who can enhance the result. It’s important to study consumers’ behaviors in response to crisis to understand what kind of interventions are better.

1.3 MPC across Crises: How Consumption Reacts to Economic Crises and Financial Shocks

1.3.1 The MPC Response Across Three Crises: Dot-Com Crash, Great Recession, and Covid-19

This section, taking into consideration three remarkable crises, will investigate how consumers react to financial shocks and how their spending behavior can change. The first crisis is the Dot-Com Crash, exploited in 2002. It refers to “*a rapid rise in the U.S technology stock equity valuations fueled by investments in Internet-based companies during the bull market in late 1990s. (...) Things started to change in 2000, and the bubble burst between 2001 and 2002. (...) It would take 15 years for the Nasdaq (index) to regain its peak, which it did on April 24, 2015.*”¹¹ The second crisis is the 2008 housing bubble burst crisis that will be analyzed in deep in the second chapter. In a few words it led to a “*severe contraction of liquidity in global financial markets that originated in the United States as a result of the collapse of the U.S housing market*”¹² and had devastating effects globally. The third crisis, being different from the others for its nature, since it came out of the blue and didn’t depend on the investors or institutions mistakes, is the COVID-19 crisis. A pandemic hit and froze the entire world. “*It precipitated a devastatingly sharp contraction of economic activity and huge job losses in early 2020, as government restrictions and fear of the virus kept people at home and businesses shut.*”¹³ It is useful to do a comparative analysis of the three to understand to what extent the marginal propensity to consume was affected and how it was affected. In the Dot-Com Crash since the crisis was more contained, the MPC didn’t increase significantly, mostly because it hit mainly the technology sector and there wasn’t any kind of big intervention by the government. This meant no incentive to consume more and as a direct consequence a slower

¹⁰ Heterogeneity in The Marginal Propensity to Consume: Evidence from Covid-19 Stimulus Payment (REVISED February 2021) – Federal Reserve Bank of Chicago. (n.d) <https://www.chicagofed.org/publications/working-papers/2020/2020-15?>

¹¹ Hayes, A. (2024, May 31). *Dotcom Bubble Definition*. Investopedia. <https://www.investopedia.com/terms/d/dotcom-bubble.asp>

¹² Britannica money. (n.d.). <https://www.britannica.com/money/financial-crisis-of-2007-2008>

¹³ <https://www.cbpp.org/research/economy/tracking-the-recovery-from-the-pandemic-recession>

recovery. During the 2008 crisis, the MPC became “20 to 30 percent higher (...) and is positively correlated with the local unemployment rate”¹⁴. The increase was stimulated by fiscal interventions like the Economic Stimulus Act. The stated positive relationship between unemployment and MPC corroborates the finding of Sokolova who estimated a 4 to 5 percent increase in MPC for every additional 1 percent increase in unemployment. For what concerns the COVID-19 recession, as previously stated, there is data showing a MPC of 46% within two weeks from the stimulus payment with households who live paycheck-to-paycheck reaching levels of 60%. In all the cases lower-income households showed a bigger MPC, because of the immediate need to cover essential needs. Again, this indicates how targeting a specific group of households can help boosting consumption to higher levels. It follows a summarizing table with the specific values and the government stimulus checks interventions:

Crisis	MPC (low-income households/ high income households)	Government main interventions
2002	Not relevant / Not relevant	\$38 billions stimulus check
2008	0.38-0.44 / 0.19	\$100-150 billions stimulus check
2020	0.50-0.60 / 0.25-0.30	\$300 billions stimulus check

Table 1 (The table shows MPCs for low- versus high-income households and the size of the main government stimulus check during the 2002, 2008, and 2020 crises)

1.3.2 Effectiveness of Fiscal Policies in Stimulating Consumption

As previously explained, fiscal policies can be extremely effective when trying to boost consumption. And for them to be effective, it is important that policymakers can identify and target the right households. One of the most important factors to consider, when choosing the group, is the marginal propensity to consume. Households with a higher MPC, usually with a

¹⁴ Gross, Tal, Matthew J. Notowidigdo, and Jialan Wang. 2020. "The Marginal Propensity to Consume over the Business Cycle." *American Economic Journal: Macroeconomics* 12 (2): 351–84.

lower income, are more likely to use the additional income received, increasing aggregate demand and thus boosting consumption and helping economic recovery. Higher income households, on the other side, are associated with a lower MPC since they will tend to save or invest the money. This happens because they don't have an immediate need of it. As stated by Parker et Al in the "*Consumer Spending and The Economic Stimulus Payment of 2008*", published by NBER, "*across households, the responses are largest for older and low-income households, groups which have substantial and statistically significant spending responses*"¹⁵.

Analyzing the article "*Fiscal Stimulus Needed to Fight Recessions*"¹⁶ published by the Center on Budget and Policy Priorities, it is possible to understand the effectiveness of the fiscal policies. It also focuses on how it is important to keep recessions "*as short and shallow as possible*" and explains how the "*economy and economists' view have changed since the Great Recession*". They explain the urge for a fiscal policy that is "*implemented as early as possible, directed to individuals and entities who will spend any additional resources they receive quickly*". Most importantly "*its size and duration*" need to "*respond to changing circumstances*". In fact, one of the problems with the 2008 financial crisis is that, even if "*the Great Recession measures were substantial and prevented an even more severe recession, they ended prematurely and were insufficient to promote a robust recovery*". They also suggest the most important policies for effective fiscal stimulus, that can apply to financial crises in general, and the most important are:

1. Providing additional weeks of unemployment insurance and raising the weekly benefit level
2. Raising the maximum SNAP (Supplemental Nutrition Assistance Program) benefit level and ensuring that unemployed adults have access to food assistance
3. Providing state fiscal relief by reducing the percentage of Medicaid spending for which states are responsible
4. Providing cash assistance to people facing economic insecurity through monthly or one-time cash payments that can help address both emergencies and ongoing basic needs, as well as through expansions of refundable tax credits

¹⁵ Parker, J. A., Souleles, N. S., Johnson, D. S., & McClelland, R. (2011). *Consumer Spending and the Economic Stimulus Payments of 2008* (NBER Working Paper No. 16684). National Bureau of Economic Research

¹⁶ Stone, C. (2020, April 16). *Fiscal stimulus needed to fight recessions*. Center on Budget and Policy Priorities. <https://www.cbpp.org/research/fiscal-stimulus-needed-to-fight-recessions>

5. Implementing a subsidized jobs program for low-income workers (this is harder in the circumstance of COVID19, because it needs to wait for the end of the pandemic)
6. Increasing housing assistance to prevent a sharp rise in evictions and homelessness

Again, all these measures are needed to increase disposable income and boost consumption. What is important to consider is that policies need to be able to be long-lasting, otherwise they will only bring an effect in the short-run but to sustain a continued economic growth it is essential to bring results in the long-run.

1.4 Heterogeneity in MPC

In this section it will be analyzed how the marginal propensity to consume changes based on income level, gender, age, instruction and race. It will be based on a study conducted by Zheli He for the Penn Wharton Budget Model and then published by the U.S Bureau of Labor Statistics and the Sokolova paper. Penn paper, based on a strong literature review, which includes the study of the permanent income hypothesis (Friedman, 1957) and key empirical studies (Parker, 1999; Souleles, 2002; Japelli & Pistaferri, 2008) that analyze consumption to transitory shocks, investigates what is the MPC out of permanent income and income shocks and how it differs across gender, race, education and income levels. They found out that, on average, households spend 22.37 cents out of each dollar of income shocks, while a \$1 increase in permanent income drives up consumption by 2.06 cents. The comparison is going to be qualitative as specific numbers change in different studies, but the trends and general outcome are the same.

1. MPC by Income Level: as it has been deeply explained through the whole chapter, lower-income families tend to have a higher MPC compared to higher-income families. This happens because of immediate and essential consumption needs.
2. MPC by Education: households with lower education levels generally have a higher MPC, since they often rely on their current income for their needs and don't have financial knowledge. On the other side, households with higher education level tend to show a lower MPC. This is because, typically, they have a higher income and a better understanding of the financial world, and thus the possibility to do a better financial planning.

3. MPC by Gender: women tend to show a higher MPC. This is mainly because of societal issues such as income inequality and sexism. Compared to a man working in the same position, women, on average from 13% to 18% less, making it harder to plan and save money. On the other side, men generally show a lower MPC.
4. MPC by Race/Ethnicity: white households tend to show lower levels of MPC. On the other side, Black and/or Latinos show a much higher MPC. The spending behavior between the two groups is different, mostly because of a lower financial stability in the second group. Again, this can be driven by current income inequality since often minorities face discrimination in the job market, making their income lower compared to an income of a person in the first group. But it is also based on the historical barriers that minorities had to face, leading to a much smaller wealth accumulation.

Limitations and Conclusion

The main limitation of the chapter is the exclusive analysis of fiscal policy, which includes tax cuts and stimulus checks. The decision was made because it has a direct effect on disposable income and thus on the marginal propensity to consume. This doesn't mean that a well-structured monetary policy (interest-rate adjustments or quantitative easing) or even a coordinated policy mix that combines fiscal and monetary policy wouldn't be effective tools as well in shaping consumption. It will now follow an explanation of how these strategies could be used to maximize the multiplier effect on GDP.

As stated by the IMF, in the short run, since prices and wages do not adjust immediately, changes in the money supply affect production. In a recession government can respond to the overall decline in production and demand, with a monetary policy that goes against the direction in which the economy is headed. It's important to say that monetary policy is often countercyclical, since it leads to *“the desired expansion of output (and employment) but, because it entails an increase in the money supply, would also result in an increase in prices”*.¹⁷

Monetary policy operates with two main instruments:

1. Policy-rate adjustments

¹⁷ *Monetary Policy: Stabilizing prices and output*. (2021, June 15). IMF. <https://www.imf.org/en/Publications/fandd/issues/Series/Back-to-Basics/Monetary-Policy>

2. Open market operations and Quantitative Easing

Policy rate adjustments affect and influence the cost of borrowing in an economy, both for households and firms. Lower interest rates can increase spending in durable goods and home investment. When banks operate through open market operations and quantitative easing, which involves the central bank purchasing government bonds and financial instruments, to reduce interest rates and increase the money supply, they ultimately decrease borrowing costs and increase asset prices, increasing overall spending.¹⁸

Another fundamental option to consider is the policy mix, where two actors, central banks and governments play a joint role. A policy mix is a “combination of measures enacted by both fiscal and monetary policymakers in order to strengthen or stabilize a nation’s economy”. In this collaboration, *“fiscal policy involves spending money and raising money, monetary policy is the control of money supply”*.¹⁹

To conclude, this chapter deeply explained the concept of marginal propensity to consume and its key characteristics. It analyzed how fiscal policy plays a major role in influencing it and its main demographic patterns. In its conclusion it was also added how monetary policy and policy mix can be central in shaping consumption. The next chapter will see a thorough analysis of the 2008 financial crisis, the responsibilities leading to the crisis, its development and the responses to it.

¹⁸Norian, M. (n.d.). Quantitative easing (QE): What it is and how it works.

Investopedia. <https://www.investopedia.com/terms/q/quantitative-easing.asp>

¹⁹Investopedia. (n.d.). Monetary Policy vs. Fiscal Policy: What’s the Difference?

Investopedia. <https://www.investopedia.com/ask/answers/100314/whats-difference-between-monetary-policy-and-fiscal-policy.asp>

Chapter 2 – The 2008 Subprime Crisis: Causes, Consequences, and Policy Responses

2.1 Introduction, Causes and Immediate Consequences

2.1.1 Introduction

The 2008 subprime mortgage crisis was not the result of a series of unfortunate events, but rather the combination of detrimental errors in evaluations, calculations and decision-making with destructive consequences on the global economy. Nassim Nicholas Taleb, defined this crisis as a “black swan”, an event that is impossible to predict due to its extreme rarity but that has catastrophic consequences.²⁰ A few years before, though, specifically in 2005, with his work “Has Financial Development Made the World Riskier?”, Rajan predicted that at that point “economies may be more exposed to financial-sector induced turmoil than in the past”²¹ As stated in the “Conclusions of The Financial Crisis Inquiry Report”²² released by the United States Government in January 2011, “*this financial crisis was avoidable*” and it “*was the result of human action and inaction*”. The Report also talks about how “*The captains of finance and the public stewards of (our) financial system ignored warnings and failed to question, understand, and manage evolving risks*”. “*There were warning signs. The tragedy was that they were ignored or discounted*”. And the consequences of these repeated failures hit hard. “*From a period from late 2007 to mid-2009, 8.4 million Americans lost their jobs, 1 in every 54 homes filed for foreclosure, and the US GDP fell by 4.3 percent*”²³.

What led to this tragedy? The crisis can find its roots in the abuse of subprime mortgages. Banks started using this financial instrument to provide loans to clients, often minorities, who would never qualify for the prime loans, as, given their financial status, would have been unlikely able to repay the debt. In fact, unlike prime loans, “*Subprime mortgages are loans made to borrowers who are perceived to have high credit risk, often because they lack a strong credit history or have other characteristics that are associated with high probabilities of default*”²⁴. To compensate for this default risk, they were characterized by higher interest rates, which

²⁰Buttignol, M. (n.d.). *Black Swan in the Stock Market: What Is It, With Examples and History*. Investopedia. <https://www.investopedia.com/terms/b/blackswan.asp>

²¹Rajan, R. G. (2005). *Has financial development made the world riskier?* (NBER Working Paper No. 11728). National Bureau of Economic Research.

²²Financial Crisis Inquiry Commission. (2011). *The financial crisis inquiry report: Final report of the National Commission on the causes of the financial and economic crisis in the United States*. U.S. Government Printing Office

²³Mian, A., & Sufi, A. (2014). *Quantifying the Effects of the 2008 Recession*. National Bureau of Economic Research.

²⁴Bernanke, B. S. (2007, May 17). *The subprime mortgage market*. Speech at the Federal Reserve Bank of Chicago’s 43rd Annual Conference on Bank Structure and Competition. Board of Governors of the Federal Reserve System.

made them even more difficult to pay back. “*Approximately 80% of U.S subprime mortgages issued in those years were adjustable-rate mortgages*”, meaning that “*the interest rate of the outstanding balance varies across the lifespan of the loan*”²⁵, often structured so that they started at a relatively lower level just to keep increasing and ending up reaching high levels, with “*multi-year highs in mid 2006*”²⁶. Additionally, starting from the early 2000s, the home prices started to grow, and the general perception was that this would have continued indefinitely. This negligence brought banks to approve more loans because even if debts weren’t going to be repaid, they could resell houses for higher prices. It’s important to consider that, the subprime model wasn’t only limited to the purchasing of houses, but it also financed student debt, commercial and industrial activities and car buyers.

2.1.2 Expansion of Subprime Lending, Deregulation, Securitization

Banks played a crucial role in the crisis. Conclusions of The Financial Crisis Inquiry Commission condemn them as they “*focused their activities increasingly on risky trading activities that produced hefty profits*”. The FCIC examination revealed “*stunning instances of governance breakdowns and irresponsibility*”. The conclusion was that “*a combination of excessive borrowing, risky investments, and lack of transparency put the financial system on a collision course with crisis*”. The most important investment banks, such as Goldman Sachs and Lehman Brothers, for example, were operating with extremely high leverage ratios (40:1) and even a small percentage decrease in assets could have wiped out the firms. ²⁷However, if banks had the possibility to engage in such behavior, it means that they were allowed to do it and therefore they can’t be the only institution to blame. A long process of financial deregulation led to the buildup of the subprime mortgage crisis. In 1999 Congress, through the Gramm-Leach-Bliley Act approved the repeal of Glass-Steagall Act. The former, which was first sponsored by Senator Carter Glass and Representative Henry Steagall, and then signed by President Franklin D. Roosevelt in 1933, was firstly designed to “*provide for the safer and more effective use of the assets of banks, to regulate interbank control, to prevent the undue diversion of funds into speculative operations*”²⁸. With the passing of the Gramm-Leach-Bliley Act banks were able again to operate both as commercial and investment banks, being able to engage in a

²⁵ Duke University (<https://predatorylending.duke.edu/business-analysis/evolution-of-mortgage-lending/subprime-lending/>)

²⁶ see note 24

²⁷ see note 22

²⁸ Maues, J. (n.d.). *Banking Act of 1933 (Glass-Steagall)*. Federal Reserve History <https://www.federalreservehistory.org/essays/glass-steagall-act>

broader range of services, highly incrementing risk exposure. In addition, the Commodity Futures Modernization Act of 2000 provided broad regulatory exemptions for over-the-counter derivatives, including financial swaps between institutions.²⁹ This resulted in a larger lack of transparency and thus leaving more room for riskier practices. As described earlier there has been an abuse of subprime mortgages driven by the banks desire to seek short-term profit over anything else. Since all the banks complied with the same perception, the competition between them intensified and this led to increasingly lowered lending standards. This brought to the creation of subcategories of subprime mortgages, the NINJA, NINA and NISA loans. NINJA refers to “a type of high-risk loan issued to borrowers with No Income, No Job, and No Assets”³⁰. NINA loans “are a type of reduced documentation mortgage program where the lender does not require the borrowers to disclose their income or assets as a part of the loan calculations”³¹. NISA loans refer to no income, stated assets loans. These practices created a situation where no kind of financial stability was required to receive the mortgage. This was appealing to borrowers who otherwise would have never had access to the money. But it was attractive especially to the banks, because these loans had high interest rates due to the elevated risk. However, risk didn’t really create concerns for banks as “the traditional banking model, in which the issuing banks hold loans until they are repaid, was replaced by the originate and distribute banking model, in which loans are pooled, tranced, and then resold via securitization”³². Banks started offering an instrument defined as Mortgage-Backed Securities (MBS) to investors, transferring also their risk. Mortgage-Backed Securities are “bonds with cash flow tied to the principal and interest payments on a pool of underlying mortgages”³³. Financial institutions then repackaged these securities into even more complex instruments, called Collateralized Debt Obligations (CDOs). “They are a synthetic investment product that represents different loans bundled together and sold by the lender in the market”³⁴. Investors wanted to buy these products because they offered high returns, and they also trusted the system because credit rating agencies were giving perfect scores (AAA/Aaa) to these instruments. To understand how a AAA/Aaa rating is significant, it’s enough to know that it is the highest possible level out of seventeen possible scores for S&P and Fitch, and out of twenty-one for

²⁹ Chen, J. (2024, July 31). *Commodity Futures Modernization Act (CFMA) overview*.

Investopedia. <https://www.investopedia.com/terms/c/cfma.asp>

³⁰ <https://www.collinsdictionary.com/dictionary/english/ninja-loan>

³¹ CollinsDictionary.com. (n.d.). *Ninja Loan*. In Collins English Dictionary. <https://www.collinsdictionary.com/dictionary/english/ninja-loan>

³² Brunnermeier, Markus K. 2009. "Deciphering the Liquidity and Credit Crunch 2007-2008." *Journal of Economic Perspectives* 23 (1): 77–100.

³³ Adrian, T., & Shin, H. S. (2010). *Liquidity and Leverage* (Staff Report No. 1001). Federal Reserve Bank of New York.

³⁴ Corporate Finance Institute. (n.d.). *Collateralized Debt Obligation (CDO): What it Is & How it Works*. Corporate Finance Institute. <https://corporatefinanceinstitute.com/resources/fixed-income/collateralized-debt-obligation-cdo/>

Moody's, Standard & Poor's, Fitch, and Moody's were the most important credit rating agencies, and investors had no reason not to trust these scores. However, with the unfolding of the crisis, it became clear that the ratings weren't correct, and that the perception of these financial instruments as safe investments was wrong and dangerous for the investors.

How does the system of credit rating agencies work? When they rate any kind of product, it is the client requesting the rating to pay the CRA. This clearly creates a conflict of interest because the client will choose the CRA that offers the highest rating and also because CRAs have the incentive to give higher ratings in order to keep the client. As stated by the U.S Securities and Exchange Commission, "*credit rating agencies are (now) incentivized to inflate their ratings to please their paying client - the issuers - to the potential detriment of investors relying on those ratings to make investors decision. (...) A Senate report that cited testimony from then-CFTC chair Gary Gensler, among others, attributed the rating agencies' errors in part to conflict of interest in the rating process. The SEC staff and the President's Working Group on Financial Markets each reached similar conclusions*"³⁵. In addition, according to The Center for Public Integrity, "*Post-crisis investigations revealed that the rating companies had grown so focused on increasing their market share and boosting their profits that they apparently threw out most analytical standards and gave their seal of approval to bonds whose underlying mortgages would never be repaid*"³⁶. And just to prove how unreliable these ratings were, when it became impossible to hide the evidence, some of these products went from the highest rating (AAA) to the lowest possible rating (CCC) in a one-night period. And from an economic point of view the conflict of interest was convenient for these CRAs. Moody's reported a total revenue increase by 11% from 2006 to 2007³⁷. S&P Global reported a 1.22 billion increase in revenue from 2004 to 2007 which accounted for almost a 28% increase³⁸.

³⁵ Crenshaw, C. A. (2023, June 7). *Statement on the Removal of References to Credit Ratings from Regulation M*. U.S. Securities and Exchange Commission. <https://www.sec.gov/newsroom/speeches-statements/crenshaw-statement-credit-ratings-060723>

³⁶ Kodjak, A. F. (2014, June 18). *Credit rating industry dodges reforms, despite role in financial meltdown*. Center for Public Integrity. <https://publicintegrity.org/inequality-poverty-opportunity/credit-rating-industry-dodges-reforms-despite-role-in-financial-meltdown/>

³⁷ Moody's Corporation. (2008, February 7). *Moody's Corporation Reports Results for Fourth Quarter and Full Year 2007* [Press release]. <https://ir.moody.com/press-releases/news-details/2008/Moodys-Corporation-Reports-Results-for-Fourth-Quarter-and-Full-Year-2007/default.aspx>

³⁸ S&P Global Market Intelligence. (n.d.). *Annual Global Project Finance Default and Recovery Study, 1980–2014*. S&P Global.

2.1.3 Housing Bubble Burst, Defaults and Foreclosures

Between 2000 and 2006 housing prices skyrocketed at an incredible high rate. According to the U.S Federal Housing Finance Agency, the House Price Index grew from 230.12 in the first quarter of 2000 to 379.30 in the last quarter of 2006, reaching its peak in the first quarter of 2007 with a value of 380.72. Between 2000 and 2006 the index increase rate is estimated at an astonishing value of 64.8%.³⁹

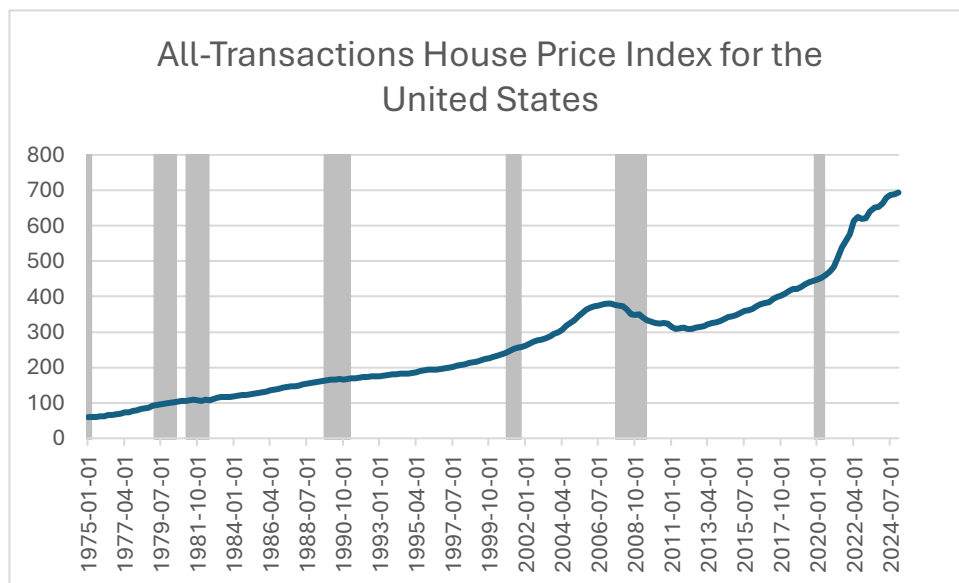


Figure 2 (re-elaboration of the data from “*U.S Federal Housing Finance Agency*” via Fred, Index 1980:Q1=100; shaded areas indicate recessions)

This sudden and out-of-proportion increase was driven by numerous factors. The most important two were the easy access to credit and speculative buying. In the previous paragraphs it was explained how access to lending became extremely easier and didn't require basically any guarantee anymore (see subprime mortgages and especially NINJA loans). In addition, it's crucial to cite how Federal Reserve's monetary policy on interest rate played a main role in inflating the house bubble and helped to shape even more the catastrophic impact the crisis ended up having.

³⁹ Federal Reserve Bank of St. Louis. (n.d.). *All-Transactions House Price Index for the United States (USSTHPI)*. FRED. <https://fred.stlouisfed.org/series/USSTHPIM>

In fact, “following the bursting of the dot-com bubble in late 2000 and the subsequent recession in the US, the Federal Open Market Committee (FOMC) began to lower the target for the overnight FED funds rate, the monetary policy rate. Rates fell from 6.5% in late 2000 to 1.75% in December 2001 and to 1% in June 2003”⁴⁰.



Source: Federal Reserve, Freddie Mac

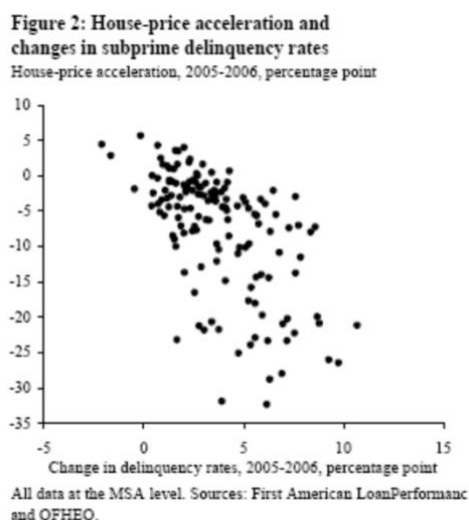
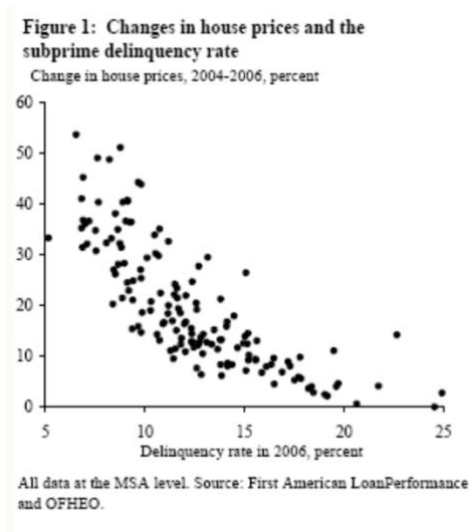
Figure 3 (Fed funds rate, 10-year treasury and 30-year mortgage rate (%), see note 40)

This encouraged both borrowing for homeownership, but it also influenced the other main component: speculative buying. As it was cited, banks had the perception that the housing price increase was going to last indefinitely. This perception was also adopted by investor, and these completely changed the housing market. From 2003 to 2005 the percentage of houses bought as an investment increased from 22% to 28% just fall back to 21% in 2008 and 17% in 2009 after the increasing number of foreclosures and the housing bubble burst.⁴¹ What tricked investors and especially people who got access to subprime mortgages and NINJA loans was the Adjustable-Rate-Mortgage Structure, which was inviting as the first payments were at a low rate, but also unsustainable as the rate reached much higher levels for the following payments. This left borrowers unable to pay their expected share. And by the end of 2006, “when house prices peaked, mortgage refinancing and selling homes became less viable of settling mortgage debt and mortgage loss rates began rising for lenders and investors. In April 2007, New Century Financial Corp., a leading subprime mortgage lender, filed for bankruptcy. (...)”

⁴⁰Mees, H. (2011, March 24). *US monetary policy and the saving glut*. VoxEU. <https://cepr.org/voxeu/columns/us-monetary-policy-and-saving-glut>

⁴¹ National Association of Realtors. (2014, May 8). *2014 Investment and Vacation Home Buyers Survey*.

Because the bond funding of subprime mortgages collapsed, lenders stopped making subprime and other nonprime risky mortgages. This lowered the demand for housing, leading to sliding house prices that fueled expectations of still more declines, further reducing the demand for homes.”⁴² These facts are useful to explain how the market for housing started weakening and to understand the consequences that it brought. After years of strong growth, in 2006 the increase in housing prices started to stagnate and in some places the trend inverted, and prices started decreasing. All the certitudes started to disappear. How were lenders going to deal with a client who couldn’t repay their mortgage now? They couldn’t resell the house at a higher price. At the same time, interest rates rose, making it harder to repay the debt as the ARMs payments became too expensive. The number of delinquency rates, especially for what concerns subprime mortgages, started to escalate as many borrowers failed to pay their obligations and therefore defaulted on their loans. As reported by the Federal Reserve Bank of San Francisco, “delinquency rate in 2006 (...) was 12.2%, with a range from about 3% to 25%. (...) Nearly all metropolitan statistical areas posted increases from 2005 to 2006. The median change was about 3 percentage points, and the largest increase was 11 percentage points”⁴³.



Figures 4/5 (see note 43)

⁴² Federal Reserve History. (n.d.). *Subprime mortgage crisis*. <https://www.federalreservehistory.org/essays/subprime-mortgage-crisis>

⁴³ Doms, M., Furlong, F., & Krainer, J. (2007, June 8). *House Prices and Subprime Mortgage Delinquencies* (FRBSF Economic Letter 2007-14). Federal Reserve Bank of San Francisco. <https://www.frbsf.org/research-and-insights/publications/economic-letter/2007/06/house-prices-subprime-mortgage-delinquency/>

As a result of this process, banks and investors, who held Mortgage-Backed Securities and Collateralized Debt Obligations started suffering huge losses, expanding the range and impact of the crisis who had just started. Systematic vulnerabilities of the financial system started becoming more evident. Despite all these clear signs, there was, yet again, an underestimation of the situation. Federal Reserve Chairman Ben Bernanke on May 17th, 2007, after having partly recognized the problem, forecasting an increase in delinquencies and foreclosures, said: “*Given the fundamental factors in place that should support the demand for housing, we believe the effect of the troubles in the subprime sector on the broader housing market will likely be limited*”⁴⁴. In the first days of August, U.S Treasury Secretary Henry Paulson stated: “*We’ve clearly had a big correction in the housing market. Retail housing was growing for some time at a level that was not sustainable. I don’t see imposing a serious problem. I think it’s going to be largely contained*”⁴⁵. Postponing the actual realization of what was already happening made things much worse. By the second quarter of 2007, the U.S housing market had started worsening. A foreclosure crisis surged. According to RealtyTrac, the leading online marketplace for foreclosure properties, as for year-end data (2007), a total of 2,203,295 foreclosures were filed. The number went up 75% from 2006. Comparing the data from December 2006 to December 2007 there a 97% increase. The number of properties in some stage of foreclosure went up by 79 percent.⁴⁶ Foreclosures increased by 81% in 2008, “with one in every 54 households getting at least one filing notice”. And it went up by 225% from 2006.⁴⁷ As banks foreclosed on delinquent borrowers, they found themselves with an unproportionate number of owned properties. This created an oversupply of bank-owned homes in the housing markets, and the fall in prices accelerated leading to an imminent collapse of the housing market. According to the Federal Housing Finance Agency, “*seasonally adjusted prices fell 8.2 percent from the fourth quarter of 2007 to the fourth quarter of 2008*”⁴⁸. As the home values fell drastically, borrowers found themselves underwater, in a situation where the value of their mortgage was higher than the value of their houses. “*The share of underwater homeowners out of all homeowners with a mortgage rose drastically as, eventually, house prices at the national*

⁴⁴ Forbes. (2007, May 17). *Bernanke believes housing mess contained*. https://www.forbes.com/2007/05/17/bernanke-subprime-speech-markets-equity-cx_er_0516markets02.html

⁴⁵ Reuters. (2007, August 9). *Subprime woes likely contained: Treasury’s Paulson*. Reuters. <https://www.reuters.com/article/us-usa-subprime-paulson-idUSWBT00686520070420/>

⁴⁶ CNBC. (2008, January 29). *Home foreclosures were 79% higher last year*. CNBC. <https://www.cnbc.com/2008/01/29/home-foreclosures-were-79-higher-last-year.html>

⁴⁷ CNN Money. (2009, January 15). *Millions in foreclosure*. CNN Money. https://money.cnn.com/2009/01/15/real_estate/millions_in_foreclosure/

⁴⁸ Federal Housing Finance Agency. (n.d.). *Record home price declines in fourth quarter*. FHFA. <https://www.fhfa.gov/news/news-release/record-home-price-declines-in-fourth-quarter>

*level declined more than 30 percent from their peak-and in some areas of the country, they fell more than 50 percent. By 2010, more than 12 million homeowners-about 1 in 4 with a mortgage-owed more than their homes were worth*⁴⁹. There wasn't any more the possibility to refinance themselves or repay the debt by selling the house at a higher price.

2.1.4 Lehman Brothers and Systemic Collapse

One of the many institutions who were strongly hit, and eventually bankrupted, during the crisis is Lehman Brothers, the fourth largest investment bank in the United States. By 2008, Lehman Brother was in the middle of a serious financial distress, struggling because the weight of mortgage-backed securities and collateralized debt obligations became too much to handle. The subprime mortgage market was decisive in the fall of this bank. On September 15, 2008, with \$639 billion in assets and \$619 billions in debt, the bank filed for bankruptcy. How did such a “giant” of finance end up bankrupt? The company entered the market mortgage-backed securities and collateral debt obligations along with many other firms. They also acquired five mortgage lenders. Out of these five, BNC mortgage and Aurora Loan Services were specialized in Alt-A loans, which didn't require full documentation. At first, it looked like a very good strategic move. Revenues in capital markets increased by 56% from 2004 to 2006. They securitized \$146 billion in mortgages in 2006, increasing the amount of the previous year, and they reported record profits from 2005 to 2007. By the first quarter of 2007, though, the first signs of the housing market bubble burst became evident and defaults on subprime mortgages started to increase. They thought they could contain the risks caused by rising home delinquencies and that they wouldn't have posed any danger to the earnings. With the escalation of the crisis and following the failure of two Bear Stearns hedge funds, Lehman Brothers' stock fell rapidly. They started eliminating mortgage-related jobs and shut down BNC and suspended the activities and Aurora Loan Services. Despite all of this, Lehman Brothers decided to keep their position in the mortgage market, and, in 2007, they underwrote more mortgage-backed securities than any other firm, adding up to a portfolio of \$85 billion. In 2007 they had a leverage ratio of 31. On March 17, 2008, the shares fell by 48% because of the concern that they could have the same destiny, near collapse, of Bear Stearns. On June 7, 2008, Lehman announced a second quarter loss of \$2.8 billions. 2 days later, they reported of having raised \$6 billions from investors. The stock fell sharply again, by 77%, in the first week of September.

⁴⁹ Federal Deposit Insurance Corporation. (n.d.). *Origins of the Crisis* (Chapter 1). FDIC

On September 9, it fell by another 45% after South Korean banks stopped the talks for taking a stake in Lehman Brothers. Credit default swaps rose to a record high of 610 basis points. Hedge fund clients started leaving the company, and short-term creditors started suing it. By September 11, the stock lost another 42%. Talks with Bank of America and Barclays for a takeover started but were unsuccessful. Finally, on September 15, Lehman Brothers declared bankruptcy, after a 93% stock decrease.⁵⁰ Taking a step back, it is important to question why, unlike other institutions like Bear Stearns and AIG, Lehman Brothers wasn't bought by anyone and why the U.S. government didn't intervene to rescue it. The Federal Reserve though, erroneously, that if AIG needed to be saved because its collapse would have caused a "worldwide systemic macro event" with cataclysmic repercussions, Lehman Brothers on the other wasn't big enough to cause such a huge shock. Madelyn Antoncic, who was chief risk at Lehman Brothers between 2002 and 2007, said: *"It's pretty clear in my mind (...) why Lehman should have been let go, because they could have helped themselves, but they failed. Lehman basically put the nail in [its own] coffin"*. In addition, AIG needed to be saved not only for the (bigger) size, but also for its interconnectedness. Antoncic stated: *"If AIG failed, it would trigger a domino effect globally as the insurance giant has provided protections worth more than half a trillion dollars, including \$300 billion to banks in the U.S and in Europe"*. She tried to impose a risk rigor, but the managing directors and senior leaders didn't follow her advice and took more risks.⁵¹ But why did the government decide not to intervene? After having saved Bear Stearns, the U.S Treasury Secretary Paulson was worried about a moral hazard problem. If institutions could count on always being saved, they would just take more risks, and this would create a non-ending loop with government who would have to step an unsustainable number of organizations. But ultimately, Lehman Brothers wasn't saved for, again, an error in estimating the consequences of its failures. The Federal Reserve and the U.S government couldn't determine and estimate appropriately the dimension and catastrophic economic and worldwide impact of the fall of Lehman Brothers. And the consequences hit hard. First the collapse drastically reduced liquidity in international markets and for hedge funds and ruined many customers. The loss of liquidity prevented hedge fund managers from being able to react to dramatic market changes quickly and effectively and this created a downward spiral. Second, immediate impact to emerging markets shows liquidity shocks being more severe for emerging

⁵⁰ Investopedia. (n.d.). The Collapse of Lehman Brothers: A Case Study.

Investopedia. <https://www.investopedia.com/articles/economics/09/lehman-brothers-collapse.asp>

⁵¹ Knowledge at Wharton Staff. (2018, September 28). Not Too Big To Fail: Why Lehman Had to Go Bankrupt Knowledge at Wharton. <https://knowledge.wharton.upenn.edu/podcast/knowledge-at-wharton-podcast/the-good-reasons-why-lehman-failed/>

economies. In addition, it led to a downward spiral for non-financial firms around the world. The supply of external finance for non-financial firms got reduced drastically by the crisis. Third, Europe got hit and suffered direct impacts on Eurozone sovereign spreads. The Analysis of Ashoka, Mody (2009) shows how, after the collapse, it could be noted a sudden increase in sovereign bond spreads of 4 basis points a week, confirming a cataclysmic impact. Fourth, global recessions surged. Banks around the world saw their loan portfolios deteriorating. Eichengreen et al (2012) talks about how at that point the entire global financial system was infected. Lehman's failure froze the international markets system, which ended up extending to the non-financial system because of the unexpected liquidity constraints.⁵²

2.2 Medium and Long-Term Economic Impacts on Wealth, Income Inequality, Socioeconomic and Racial Disparities

2.2.1 Wealth Destruction and Income Inequality

The 2008 subprime mortgage crisis erased years of savings and eliminated trillions of dollars in household wealth. It substantially increased income inequality, disproportionately worsening the situation of middle- and low-income groups. The general economic collapse – housing prices, stock markets, pension funds – led to sharp and destructive decline in wealth, with strong consequences. Facts and numbers can help understanding the magnitude of the loss. *“U.S households wealth fell by about \$16.4 trillion of net worth from its peak in spring 2007 (...) to when things hit bottom in the first quarter of 2009, according to the figures from Federal Reserve. (...) A rebound in the stock market (...) resulted in net worth gain of \$8.7 trillion. (...) That leaves American household wealth \$7.7 trillion less than it was before the recession”*⁵³. *“Much of the lost household wealth came from declines in the value of real estate, which dropped \$6 trillion, or nearly 30% of its value, from the end of 2006 to the end of last year”* (2008). In addition, it's important to notice how *“during the financial crisis that triggered the Great Recession, the S&P 500 index lost 53% of its value from October 2007 to February 2009. The recovery took longer, and it was not until March 2013 that the index returned to its pre-recession peak”*. And *“median wealth plummeted by 44% between 2007 and 2010. (...) Wealth*

⁵² Eichengreen, B., Mody, A., Nedeljkovic, M., & Sarno, L. (2012). How the subprime crisis went global: Evidence from bank credit default swap spreads. *Journal of International Money and Finance*, 31(5), 1299–1318

⁵³ Isidore, C. (2011, June 9). America's lost trillions.

CNNMoney. https://money.cnn.com/2011/06/09/news/economy/household_wealth/index.htm

inequality, after almost two decades of little movement, was up sharply from 2007 to 2010”⁵⁴. Finally, “during 2008, major U.S equity indexes were sharply negative, with the S&P Index losing 37.0 percent for the year, which translated into corresponding losses in 401 (k) retirement plan assets”⁵⁵. It’s important to consider how the effect of the crisis on retirement accounts was not uniform. “The growth in retirement inequality has not been random-the rich have gotten richer and the poor poorer.”⁵⁶Why were middle-and lower-income groups affected the most? Because generally, disposing of less wealth than higher-income people, they tend to concentrate most of it on housing, which as it was thoroughly described, lost a substantial part of its value during the recession. Also, following the same reasoning they had less financial diversification. And finally, because, having a smaller quantity of liquid assets, it was harder for them to find a way to contrast and protect themselves from, financial shocks. The hit that the middle-and lower-income households wealth got was deep and long lasting.

2.2.2 Socioeconomic and Racial Disparities

It wouldn’t be fair not to do an additional distinction when considering who was more affected by the crisis. The Great Recession amplified disparities for minorities who were first involved in predatory lending techniques by the banks and then destroyed by the strength of the crisis. In the paper *Racial Segregation and the American Foreclosure Crisis* (J.S. Rugh and Douglas S. Massey) it is well explained how “*residential segregation created a unique niche of minority clients who were differentially marketed risky subprime loans that were in great demand for use in mortgage-backed securities that could be sold on secondary markets.*” And they also conclude that “*segregation was an important contributing cause of the foreclosure crisis, along with overbuilding, risky lending practices, lax regulation, and the bursting of the housing price bubble*”. The paper also proves with data analysis evidence that “*Simply put, the greater the degree of Hispanic and especially black segregation a metropolitan area exhibits, the higher the number and rate of foreclosures it experiences*”⁵⁸.

⁵⁴ Parker, K., & Fry, R. (2020, March 25). More than half of U.S. households have some investment in the stock market. Pew Research Center. <https://www.pewresearch.org/short-reads/2020/03/25/more-than-half-of-u-s-households-have-some-investment-in-the-stock-market/>

⁵⁵ VanDerhei, J. (2009, February 23). The impact of the recent financial crisis on 401(k) account balances (EBRI Issue Brief No. 326). Employee Benefit Research Institute.

⁵⁶ Economic Policy Institute. (2016). State of American retirement: Economic analysis and conclusions. Economic Policy Institute.

⁵⁸ Rugh, J. S., & Massey, D. S. (2010). Racial Segregation and the American Foreclosure Crisis. *American Sociological Review*, 75(5), 629–651. <http://www.jstor.org/stable/20799483>

Other relevant data show how homeownership rate for black households decrease from 49% in 2004 to 44% in 2010, compared to a 2% decline for white households.⁵⁹ Another important statistics to compare and understand the difference impact can be find by the analysis of the Pew Research Center that states: “*from 2005 to 2009, inflation-adjusted median wealth fell by 66% among Hispanic households and 53% among black households, compared with just 16% among white households*”⁶⁰ Over the same period Hispanic families saw a 66% decline in median wealth. Recovering from these huge losses wasn’t easy and took longer than non-minorities people. Job losses were concentrated in industries where there was a high minority employment. And finding a job became more difficult during and after the crisis and unemployment data from 2009 show how it was harder for Blacks and Hispanics to work and thus to find a job. In fact, according to the Bureau Labor of Statistics, if in 2009 the unemployment rate for white people was 8.7%, on the other side it was at 16.0% and 12% for Blacks and Hispanics, increasing to 18.4% and 13.8% in 2010.⁶¹

2.2.3 Credit Constraints and Consumption Patterns

The 2008 financial crisis made accessing credit become harder. The crisis led to a credit crunch, with banks that tightened their lending standards, making it difficult for households and businesses to finance their activities through loans. Borrowing became more expensive, as banks couldn’t sustain to lend money indiscriminately to anyone who needed money and wanted to limit their loans to verified and safe clients. As a result of the previous policies, “*U.S household consumption declined sharply in late 2008. (...) Personal consumption expenditure, which had peaked above 95 percent of disposable income in 2005, fell below 92 percent by the second quarter of 2009*”⁶². Consumption patterns changed drastically in a situation of financial turmoil. Limited access to liquidity led also to a decrease in the purchasing of durable goods because consumers lost their confidence in a stable or positive market. Psychology played a big role in this situation. The fear for the perceived imminent start of a new Great Depression hugely impacted spending. Even though people still had the same jobs, reading and hearing the

⁵⁹ Fry, R., & Brown, A. (2016, December 15). *In a recovering market, homeownership rates are down sharply for blacks, young adults*. Pew Research Center. <https://www.pewresearch.org/social-trends/2016/12/15/in-a-recovering-market-homeownership-rates-are-down-sharply-for-blacks-young-adults/>

⁶⁰ Brazile said 53 percent of black wealth has disappeared. (2011, August 24).

PolitiFact. <https://www.politifact.com/factchecks/2011/aug/24/donna-brazile/brazile-said-53-percent-black-wealth-has-disappear/>

⁶¹ U.S. Bureau of Labor Statistics. (2011, October 5). *The Great Recession and the long climb back*. U.S. Department of Labor. https://www.bls.gov/opub/ted/2011/ted_20111005.htm

⁶² International Monetary Fund. (2010, January 15). *U.S. consumption after the 2008 crisis* (Staff Position Note No. 10/01)

negative news led to a strong concern for a new economic catastrophe, pushing people to save more to be able to face a possible future crash. Investing money in significant expenditures was now considered extremely dangerous. “*Auto sales in high-debt countries dropped by 40 percent during the recession*”⁶³. But the cut in spendings didn’t only apply to durable goods but also to non-durable goods and groceries. It’s always important to note how different income groups are affected in a different way by a crisis. As said earlier, higher income households – having diversified investments – had an easier and quicker recovery, while medium-and low-income families found it hard to find a way out. They had to face an unexpected loss of wealth. All the value at their disposal or most of it (their house) just lost its worth. And, with stricter lending policies by the banks, the access to credit became harder. In addition, many workers were laid off because of budget needs. This brought to a substantial and prolonged decrease in consumption capacity.

In the long run, households changed their financial behavior, shifting to a more conservative and risk averse one. Households started paying more attention to their saving and tackled debt reduction to rebuild a financial stability⁶⁴. This shift brought good results in terms of financial safety and stability, but at the same time a smaller consumption contributes to a much slower financial recovery.

2.3 Government and Central Bank Response Policies

To stabilize the economy, a strong intervention by the government and central bank was needed. Financial markets were down, many businesses had to fill for bankruptcies, too many people lost their jobs and consumption drastically declined. Especially medium-and lower-income people were hopeless, the world as they knew it before the crisis didn’t exist anymore. The government and the central bank had to work together to try to stabilize the situation. Government and the central bank had to adopt strategies to stimulate consumption, the first through fiscal policies, the second through monetary policy. And that’s what they did. Government, through Congress, passed the American Recovery Reinvestment Act (ARRA) aiming at creating new jobs and reducing taxes. In fact, it was a “*fiscal stimulus legislation passed by the US Congress to alleviate the Great Recession of 2008. It included a wide range of federal spending initiatives aimed at improving the economy, from creating new jobs to*

⁶³ Chicago Booth Review. (2012, October 1). *Consumption Crunch: Debt-burdened households are behind sharp cuts in consumption spending*. <https://www.chicagobooth.edu/review/consumption-crunch> chicagobooth.edu

⁶⁴ Dynan, K. (2012). *Is a household debt overhang holding back consumption?* Brookings Papers on Economic Activity, 43(1), 299–362. Brookings Institution.

relieving the tax burden on working families”⁶⁵. At the same time the Federal Reserve “*reacted to the deepening crisis in the fall of 2008 not only by opening emergency liquidity facilities, but also by reducing policy interest rates to close to zero and taking other steps to ease financial conditions. (...) Also acted to shape inflation expectations through various communications*”⁶⁶. Despite these initial efforts, who will be analyzed later in this chapter, the crisis brought long-lasting consequences, making institutions face difficult economic challenges. Recovery was delayed by high unemployment rates, stagnant and decreasing wages and a drastically lowered consumer confidence in investment activities. It doesn’t come as a surprise that the Congressional Budget Office labeled the crisis as “*the most severe financial crisis since the Great Depression of the 1930s*”⁶⁷ And also a moral hazard concern, as defined earlier, came up. What was the cost of saving institutions? Was it merely the momentaneous economic cost? Or it would have led to institutions taking more risks in the future because they knew they could count on being rescued? What would be the result of not saving an institution? Was it its simple failure or would it involve other institutions who were counting on the failed one? It was hard to find an answer to this question. The Lehman Brothers case showed how interrelated financial and non-financial institutions are and how the failure of Lehman froze the world economy. But at the same a signal of strength was needed to reduce future willingness to increase risks. The Government played a crucial role in shaping the recovery. As cited earlier the American Recovery and Reinvestment Act, signed by Barack Obama in 2009 was a \$787 billion stimulus package aimed at stimulating the economy though creating the conditions for an increased consumption. Its main areas of focus were the creation of new jobs and investment in public projects. It’s extremely important to know that it also “*earmarked expenditures for nationwide healthcare, infrastructure, and education improvements and targeted tax cuts, tax credits, and extended unemployment benefits to families*” Tax Relief and Other Benefits received the largest amount of money, \$260 billion. The bill brought both positive and negative reactions. A moderated one was the one of Paul Krugman who recognized how “*the stimulus had helped the economy to start expanding again, with the gross domestic product (GDP) growing at a faster-than-expected rate at the time. However, the pace of GDP growth was not robust enough to reverse unemployment in the years to come.*” (see note 65) It’s hard to assess the actual and

⁶⁵ Investopedia. (n.d.). *American Recovery and Reinvestment Act of 2009 (ARRA)*. [https://www.investopedia.com/terms/a/american-recovery-and-reinvestment-act.asp#:~:text=Act%20\(ARRA\)%3F-The%20American%20Recovery%20and%20Reinvestment%20Act%20of%202009%20\(ARRA\)%20was,tax%20burden%20on%20working%20families](https://www.investopedia.com/terms/a/american-recovery-and-reinvestment-act.asp#:~:text=Act%20(ARRA)%3F-The%20American%20Recovery%20and%20Reinvestment%20Act%20of%202009%20(ARRA)%20was,tax%20burden%20on%20working%20families)

⁶⁶ Kohn, D. L. (2010, May 13). *The Federal Reserve’s policy actions during the financial crisis and lessons for the future* [Speech]. Board of Governors of the Federal Reserve System.

⁶⁷ Congressional Budget Office. (2010). *Estimated macroeconomic effects of the American Recovery and Reinvestment Act* (CBO Publication No. 21491).

effective results of this stimulus, as it doesn't exist any kind of close scenario where this bill wasn't introduced. What is known is that real GDP took four years to recover the losses from the recession, while unemployment took eight. Another important program actualized by the government was the Troubled Asset Relief Program (TARP). As stated by U.S Department of the Treasury, "*Treasury established several programs under TARP to help stabilize the U.S financial system, restart economic growth, and prevent avoidable foreclosures*"⁶⁸. Initially Congress authorized \$700 billion for TARP which later were reduced to \$475 billion by the Dodd-Frank Wall Street Reform and Consumer Protection Act. It focused on 5 areas: stabilizing banking institutions, restarting credit markets, stabilizing the U.S auto industry, helping struggling families avoid foreclosure and stabilizing the American International Group. The most funding was received by the first, with approximately \$250 billion committed.

Another crucial role was played by the Federal Reserve. With a collapsing economy and a frozen liquidity, the priority of FED was to bring back the liquidity to the financial system and to prevent the fall of other financial institutions. As stated by the Board of Governors of the Federal Reserve System, tools used by FED to address the crisis can be divided into three groups. The first set of tools "*involve the provision of short-term liquidity to banks and other depository institutions and other financial institutions. (...) A second set of tools involved the provision of liquidity directly to borrowers and investors in key credit markets. (...) As a third set of instruments, the Federal Reserve expanded its traditional tool of open market operations to support the functioning of credit markets, put downward pressure on longer-term interest rates, and help to make broader financial conditions more accommodative through the purchase of longer-term securities for the Federal Reserve's portfolio.*"⁶⁹

One of the most adopted policies by the Federal Reserve was the quantitative easing. "*It is a type of monetary policy by which a nation's central bank tries to increase the liquidity in its financial system, typically by purchasing long-term government bonds from the nation's banks and stimulating economic growth by encouraging banks to lend or invest more frequently*"⁷⁰. In this case FED purchased large quantities of mortgage-backed securities and long-term Treasury securities. The final goal was lowering long-term interest rates, increase liquidity and thus consumption, and stabilize the house market. As for every policy, there were positive and negative considerations about its effects. Some concerns were raised how it could lead to wealth

⁶⁸ U.S. Department of the Treasury. (n.d.). *Troubled Asset Relief Program*. <https://home.treasury.gov/data/troubled-asset-relief-program>

⁶⁹ Board of Governors of the Federal Reserve System. (n.d.). *The Federal Reserve's response to the financial crisis and actions to foster maximum employment and price stability*. Federal Reserve. https://www.federalreserve.gov/monetarypolicy/bst_crisisresponse.htm

⁷⁰ see note 18

inequality, as it benefitted mostly higher income households rather than medium-and lower-income ones. In a speech before the European Commission, Paul Krugman stated that unfortunately, quantitative easing produces some reduction in risk-spreads but that it takes a lot of intervention to produce modest effects.⁷¹ Overall, FED's action definitely played a role in the creation a new financial stability and in strengthening investor confidence but failed to address some others issues in the economy such as income inequality.

The 2008 financial crisis was an unexpected, devastating financial shock that hit the entire world. Repeated human mistakes led to catastrophic consequences. Eventually, governments and central banks managed to stop the collapse and start a recovery, but income and racial inequalities were brought to a very deep level. Demographic patterns became even more evident.

In the next chapter, it will be carried on an empirical analysis that will study how changes in consumption associate with the change in income and across the different demographic groups.

⁷¹ Krugman, P. (2009, March 17). *Competition, coordination, and the crisis* [Speech transcript]. Conference on Industrial Competitiveness, European Commission, Brussels.

Chapter 3- Empirical Analysis of Consumption Changes in Demographic Groups

3.1 Research Objectives and Hypothesis

The main goal of this chapter is to analyze how U.S household consumption is affected by income shocks, specific demographics characteristics and interaction between the demographics. The study covers a period that goes from 2007 to 2011. The demographics taken into consideration are gender, education level, employment status and ethnicity.

The final output will be given by a random-effects panel regression that will be used to test the following hypothesis:

1. Consumption responds less than proportionally to income changes. This is related to the marginal propensity to consume (analyzed in Chapter 1) as it measures how a change income is associated with a change in consumption (according to theory it needs to be smaller than 1)
2. There is an “unemployment effect”, meaning that liquidity constraints related to unemployment will negatively affect consumption
3. *Ceteris paribus*, female, less educated and minority households consume less

3.2 Data Sources and Methodology

To build the final dataset of this empirical analysis that was used for the panel regressions, the starting data was extracted from the PSID (Panel Study of Income Dynamics), released by University of Michigan Institute for Social Research. This study has been continuously collecting data covering, among others, employment, income, wealth and expenditures from a starting nationally representative sample of over 18,000 individuals living in 5,000 families in the United States. The specific data that was extracted for this research comes from the PSID-SHELF, 1968-2019, Beta Release Data Set which originally contains more than 3,500,000 observations.

The key variables that were analyzed are:

1. id: household identifier
2. year: survey year (2007, 2009, 2011; 2011 was used as “CRISIS” to identify the effects of the crisis)

3. Consumption (CON): total expenditures, real dollars, US. The log value was used to reduce measurement disproportions with other variables.
4. Income (INC): total income, real dollars, US. Used to analyze income. The log value was used to reduce measurement disproportions with other variables.
5. Sex (SEX): gender. It was created a dummy variable (0= Male; 1=Female)
6. Ethnicity (ETH): Respondent's ethnicity. It was created a dummy variable (0= White; 1= Black)
7. UN: Respondent's employment status (0= Employed; = Unemployed)
8. Education Level (EDU): Respondent's maximum educational level. It was created a dummy variable (0=Less than HS; 1= Post HS)
9. Interactions:
 - $\text{inter_sex_un} = \text{SEX} \times \text{UN}$
 - $\text{inter_ethni_un} = \text{ETH} \times \text{UN}$

After dropping all the missing values, the following are the descriptive statistics of the sample size:

Variable	<i>Obs</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>Min</i>	<i>Max</i>
CON	30,764	1.0863	.7259576	3.0337	1.4751
INC	30,637	1.1220	.9745018	.3106836	1.5984
SEX	30,783	.5648572	.4957837	0	1
Crisis	30,783	.3333333	.4714122	0	1
UN	30,783	.3251145	.4684252	0	1
inter_sex_un	30,783	.2120001	.4087316	0	1
inter_e~i_un	29,25	.1096752	.3124898	0	1
EDU	30,783	.5997141	.4899642	0	1
ETH	29,25	.3073504	.4614038	0	1

Table 2 (descriptive statistics of key variables)

The model used is a panel random effects regression, to capture variability between periods and subjects:

$$CON_{it} = \beta_0 + \beta_1 INC_{it} + \beta_2 SEX_{it} + \beta_3 Crisis_{it} + \beta_4 UN_{it} + \beta_5 inter_sex_un_{it} + \beta_6 inter_ethni_un_{it} + \beta_7 EDU_{it} + \beta_8 ETH_{it} + u_i + \epsilon_{it}$$

3.3 Findings

The following table reports the estimation of the regression:

<i>CON</i>	<i>Coefficient</i>	<i>Std. err.</i>	<i>z</i>	<i>P>z</i>	<i>[95% conf. interval]</i>
<i>INC</i>	.3831773	.0037617	101.86	0.000	.3758045 .3905501
<i>SEX</i>	-.0216354	.0091846	-2.36	0.018	-.0396369 -.0036339
<i>Crisis</i>	-.0095377	.0045134	-2.11	0.035	-.0183839 -.0006915
<i>UN</i>	-.0973628	.0115648	-8.42	0.000	-.1200293 -.0746963
<i>inter_sex_un</i>	.0074838	.013642	0.55	0.583	-.019254 .0342216
<i>inter_ethni_un</i>	-.0887336	.0140046	-6.34	0.000	-.1161822 -.061285
<i>EDU</i>	.1310614	.007627	17.18	0.000	.1161128 .14601
<i>ETH</i>	-.110202	.0102116	-10.79	0.000	-.1302164 -.0901877
<i>_cons</i>	6.572.626	.043587	150.79	0.000	6.487.197 6.658.055

Table 3 (panel random effects regression output)

Interpretation

Income Elasticity (INC): a 1% increase in income is associated with a 0.38% increase in consumption, other things being equal

Gender (SEX): female headed households consume 2.2% less than male headed households with the same baseline starting point.

Crisis effect (Crisis): in 2011 consumption was 0.095% less than the previous years. This could be associated with the fact that the crisis created a precautionary behavior in consumers and led them to save more.

Unemployment (UN): for unemployed-headed households consumption falls by 9.7% compared to an equal but employed-headed household

Education (EDU): A post-HS headed household consumes 13% more than non-Hs or less headed household, other things being equal. More educated people tend to have better jobs and thus more accumulated wealth which supports a higher baseline of consumption

Ethnicity (ETH): black headed households consume 11.02% less than white headed households, other things being equal

Interactions (inter_sex_un; inter_ethni_un): female x unemployed has a non-statistically significant value. Black x unemployed headed households suffer an extra 9% reduction in consumption, other things being equal.

Hypothesis results:

Consumption responds less than proportionally to income changes: confirmed (1% increase in income is associated with a 0.38% increase in consumption)

There is an “unemployment effect”, meaning that liquidity constraints related to unemployment will negatively affect consumption: confirmed (unemployment headed households consume 9.7% less than employment headed households).

Other things being equal, female, less educated and minority households consume less: confirmed (female headed households consume 2.16% less than male headed households, post HS consume 13.11 % more than HS or less, black headed households consume 11% less than white headed households). The interaction term minority x unemployed showed an additional drop in consumption of 8.87% for unemployed black headed families.

3.4 Limitations and Future Research Directions

1. Being a survey-based data set, it is possible that there is a measurement bias. Income and consumption are self-reported, and this could very well distort the income elasticity estimation.
2. The analysis covers a limited time span, and the dataset values don't cover 2008 and 2010. For future research the panel could be extended to be able to catch also medium- and long-term effects.
3. Only a few variables were taken into consideration. For future research more variables could and should be added to the analysis. It could be important to consider wealth,

health status (especially in the US since it could be associated with elevated costs) and access to credit.

4. The analysis only covers the US since it is the focal point of the 2008 financial crisis, but to dig more into how consumption reacts to financial shocks and how demographics characteristics affect consumption, the analysis could be opened to more countries and more crises.

This is a simple model. It can be considered as the starting point for a much broader analysis. In its current form, it is already able to give useful insights and preliminary results that show that the research direction is right and that there is ground for more precise estimations by applying corrections to the just cited limitations.

Conclusion

This thesis has studied how the marginal propensity to consume, the shock of the 2008 financial crisis and demographics heterogeneity shaped U.S household's consumption behavior during the Great Recession.

In particular, Chapter 1 focused on the Keynesian theory of the marginal propensity to consume, which was then used to analyze how much MPC can vary across different households. It was shown how, generally, lower income, less educated and minority households have higher MPCs because an increase in income is often used to address immediate needs. It was then studied how a targeted can be crucial in boosting economic growth and recovery.

Chapter 2 does a deep analysis of the causes, responsibilities and consequences of the crisis. It also analyses the financial dynamics and processes behind it, by focuses on the explanation of securitization and predatory lending practices. It then studies the collapse of one of the most important financial institutions of the time, Lehman Brothers, and how its fall had a global impact and froze the world economy. The crisis erased trillions in household wealth, especially for Black and Hispanics households, and it deepened social disparities. The chapter also focus on the Government and FED's response and the practices and tools that were used to fight the recession.

Chapter 3 presents a panel random effects regression (during the 2007-2011 period), using Panel Study of Income Dynamics (PSID) data, to analyze how consumption is affected by income and specific demographics. It was found that a 1% increase in income is associated with an increase in consumption of 0.38%, *ceteris paribus*. During the time that was analyzed, unemployed households spent 9.7% less than employed households, black households spent 11% less than white households, female households spend 2.2% less than male households. On the other side, a higher level of education (specifically post HS education) was associated with higher consumption (13.11% more).

Although being a simple model, it is useful to get a good picture of the situation and shows good preliminary results that lay the groundwork for a more detailed and precise analysis, by also correcting the limitations that were cited.

