A New Theory of Consumption: How Debt Has Changed Spending Habits

Jenny Hennum
Lake Forest College, hennumjs@lakeforest.edu

Follow this and additional works at: http://publications.lakeforest.edu/seniortheses
Part of the Economics Commons

Recommended Citation

This Thesis is brought to you for free and open access by the Student Publications at Lake Forest College Publications. It has been accepted for inclusion in Senior Theses by an authorized administrator of Lake Forest College Publications. For more information, please contact levinson@lakeforest.edu.
A New Theory of Consumption: How Debt Has Changed Spending Habits

Abstract
In light of evolving conditions and consumer behavior, traditional economic models have failed to account for the impact of debt on consumer spending behavior, leading to the formation of inaccurate predictions regarding economic policy. Therefore, in response, this thesis will create a model, which incorporates the impact of debt (increasing and repayment) on the spending behavior of individuals over their lives. At its center, the new model proposes a new consumption equation, through the introduction of the concept of available income, to account for the increase in debt during the earlier years and the repayment in the later years of one's life. From this model, it can then be argued that borrowing generally leads to a negative net change in real GDP, and thus will have negative implications for the economy as a whole. This will further help to foster insights regarding the recent ineffectiveness of fiscal policy.

Document Type
Thesis

Distinguished Thesis
Yes

Degree Name
Bachelor of Arts (BA)

Department or Program
Economics

First Advisor
Carolyn Tuttle

Second Advisor
Kent R. Grote

Third Advisor
James Marquardt

Subject Categories
Economics

This thesis is available at Lake Forest College Publications: http://publications.lakeforest.edu/seniortheses/81
Lake Forest College Archives

Your thesis will be deposited in the Lake Forest College Archives and the College’s online digital repository, Lake Forest College Publications. This agreement grants Lake Forest College the non-exclusive right to distribute your thesis to researchers and over the Internet and make it part of the Lake Forest College Publications site. You warrant:

- that you have the full power and authority to make this agreement;
- that you retain literary property rights (the copyright) to your work. Current U.S. law stipulates that you will retain these rights for your lifetime plus 70 years, at which point your thesis will enter common domain;
- that for as long you as you retain literary property rights, no one may sell your thesis without your permission;
- that the College will catalog, preserve, and provide access to your thesis;
- that the thesis does not infringe any copyright, nor violate any proprietary rights, nor contain any libelous matter, nor invade the privacy of any person or third party;
- If you request that your thesis be placed under embargo, approval from your thesis chairperson is required.

By signing below, you indicate that you have read, understand, and agree to the statements above.

**Printed Name**: Jenny Hennum

**Thesis Title**: A New Theory of Consumption: How Debt Has Changed Spending Habits

This thesis is available at Lake Forest College Publications: [http://publications.lakeforest.edu/seniortheses/81](http://publications.lakeforest.edu/seniortheses/81)
LAKE FOREST COLLEGE

Senior Thesis

A New Theory of Consumption: How Debt Has Changed Spending Habits

by

Jenny Hennum

April 25, 2016

The report of the investigation undertaken as a Senior Thesis, to carry two courses of credit in the Department of Economics, Business, and Finance

__________________________  _________________________
Michael T. Orr  Carolyn Tuttle, Chairperson
Krebs Provost and Dean of the Faculty

______________________________
Kent Grote

______________________________
James Marquardt
Abstract

In light of evolving conditions and consumer behavior, traditional economic models have failed to account for the impact of debt on consumer spending behavior, leading to the formation of inaccurate predictions regarding economic policy. Therefore, in response, this thesis will create a model, which incorporates the impact of debt (increasing and repayment) on the spending behavior of individuals over their lives. At its center, the new model proposes a new consumption equation, through the introduction of the concept of available income, to account for the increase in debt during the earlier years and the repayment in the later years of one’s life. From this model, it can then be argued that borrowing generally leads to a negative net change in real GDP, and thus will have negative implications for the economy as a whole. This will further help to foster insights regarding the recent ineffectiveness of fiscal policy.
This thesis is dedicated to my wonderful and loving family. Without their love and support throughout my education, this thesis would not have been possible.
Acknowledgments

From the bottom of my heart, I would like to thank all of the wonderful Economics, Business, and Finance professors at Lake Forest College for providing me with the sufficient knowledge and skills necessary to complete this thesis, as well as I would like to thank the College itself for allowing us, as students, the opportunity to express and showcase our thoughts through the creation of a Senior Thesis. Most importantly, I owe a special thank you to Professor Tuttle for not only agreeing to be the adviser for this thesis, but for also helping me to craft the overall idea for it, and so much more. As her efforts extended far beyond simply that of being my thesis adviser, I am incredibly appreciative of all of the time and effort that she put into meeting with me every week, and thoroughly reading and providing feedback on my drafts. Her consistent support and encouragement throughout the entire process motivated me to put forth my greatest efforts. Additionally, I would also like to thank Professor Grote and Professor Marquardt for agreeing to be a part of the thesis committee, and for reading my drafts along the way. I cannot even begin to express my thanks to Professor Grote for all the time and effort that he put into carefully reading and providing detailed feedback on all of my drafts. His comments and perspective allowed me to add another dimension to this thesis. Finally, I would like to thank my family and friends for both helping to proof read my drafts and for providing me with a great deal of support during the process. No words can simply express my gratitude to all of these people for making this thesis possible. I only hope that others can experience the same joy in reading it, as I did in writing it.
# Table of Contents

Abstract......................................................................................................................i

Dedication..................................................................................................................ii

Acknowledgments.....................................................................................................iii

Table of Contents......................................................................................................iv

List of Figures............................................................................................................v

Chapter 1: Debt, Spending, and a New Lifestyle.........................................................1

Chapter 2: Credit Boom..............................................................................................9

Chapter 3: Modelling Consumption..........................................................................31

Chapter 4: A New Theory of Consumption...............................................................50

Chapter 5: The Lifecycles Hypothesis.......................................................................66

Chapter 6: Debt and the Macro Economy.................................................................82

Chapter 7: How Debt Has Changed Spending and the Economy.........................107

Bibliography.............................................................................................................123
List of Figures

Figure 1: Mortgage Debt Over Time.................................................................15
Figure 2: Total Student Loan Debt Outstanding Over Time.............................19
Figure 3: Percent of Balance 90+ Days Delinquent by Loan Type......................23
Figure 4: Percent of 90+ Day Delinquent Student Loans.................................23
Figure 5: Mortgage Delinquency Rates Over Time...........................................26
Figure 6: Short-Run AD-AS Model.................................................................84
Figure 7: Long-Run AD-AS Model.................................................................84
Figure 8: IS-LM Model.......................................................................................86
Figure 9: Short-Run AD-AS Irresponsible Type..................................................88
Figure 10: AD-AS at Full Employment Conservative Type...............................90
Figure 11: Recession AD-AS Irresponsible Type................................................90
Figure 12: Inflationary AD-AS Irresponsible Type.............................................92
Figure 13: IS-LM Irresponsible Type.................................................................94
Figure 14: Short-Run AD-AS Conservative Type..............................................96
Figure 15: AD-AS at Full Employment Conservative Type...............................97
Figure 16: Recession AD-AS Conservative Type...............................................98
Figure 17: Inflationary AD-AS Conservative Type...........................................99
Figure 18: IS-LM Conservative Type...............................................................100
Figure 19: Short-Run AD-AS Responsible Type...............................................102
Figure 20: IS-LM Responsible Type...............................................................103
Figure 21: AD-AS at Full Employment Responsible Type.................................104
Figure 22: Recession AD-AS Responsible Type...............................................105
Figure 23: Decrease in Consumption under Keynesian Model............................113
Figure 24: Decrease in Consumption under New Model………………………………..114

Figure 25: Fiscal Policy under New Model……………………………………………….115
Chapter 1 Debt, Spending, and a New Lifestyle

From the moment we are born, we are bombarded by an abundance of persuasive consumer messages, commanding us to spend, telling us exactly what to buy, and why we cannot live without certain products. With people spending money left and right, and many even lavishing in the lifestyles of the rich, we grow up automatically inclined to accept such phenomena as a normalcy. Yet, in such a strong commercialistic economy as America’s, excessive spending behaviors have not only come to be regarded as normal, but have also come to define the economy, as evidenced by the fact that consumption currently accounts for roughly two thirds of America’s Gross Domestic Product, or GDP. For this reason, it is no wonder why many economists and politicians have become infatuated with the current patterns of consumer spending when it comes to both being able to anticipate future economic conditions, and in being able to form appropriate fiscal policies. With that being said, while it may seem that such excessive consumer spending would manifest itself into a higher US GDP, making this situation every economist’s dream come true, jumping to such a hasty conclusion would ignore the bigger picture. Particularly, there is a much more powerful force at work here, for which such excessive spending behavior can be attributed to. That is, the ability to borrow, or the ability of consumers to spend money that they do not yet have. Counter to many popular beliefs about debt, this thesis will show that this ability to borrow will actually have negative implications for consumer spending, and therefore the economy, in the long term. Even though at the onset, the presence of debt may allow consumers to indulge and spend vastly beyond their means.

When it comes to the ability to borrow, it is no secret that debt has become a significant part of our economy and spending habits. Whether we are at the store
shopping for groceries, living in our mortgage-financed homes, or going to class
everyday under the payments of our student loans; we have become accustomed to using
debt to aid our spending. In some cases we may even begin to ponder how our lives
would be drastically different without the ability to borrow. In fact, according to the
Board of Governors of the Federal Reserve System, current statistics state that for every
$1 of monthly disposable income held by an average household, about $0.10 of this is
used to pay off debt, evidencing just how pertinent household debt is to spending
(Federal Reserve Bank of St. Louis 2015). These numbers continue to grow, as will be
seen in the next chapter.

The real question, however, remains as to just how these impending amounts of
debt outstanding in the economy will influence consumer spending behavior in the long
term, and therefore how these long term changes in consumer spending will impact GDP,
or the economy, as a result. Though, in attempting to answer this question, we quickly
realize that we currently lack such traditional economic models, which allow us to predict
the impact that these rising levels of household debt will have on consumer spending and
on the economy as a result. This is primarily due to the fact that traditional economic
models of consumption have failed to encompass this aspect, making them an inaccurate
means of representing and predicting consumer behavior. In spite of this current lack of
an applicable traditional model, this thesis will strive to create an economic model, based
on traditional ones, which does account for the ability of debt to influence consumer
spending behavior. Above all, this influence will be addressed according to both debt’s
ability to initially increase consumer spending behavior by increasing the total amount of
income available to the consumer, and its ability to later decrease consumer spending
behavior by restricting the total income available to the consumer when they are forced to
pay off their debt. Once this model has been created, it will then be used to confirm that in the long term, the consumer’s lifetime consumption will actually decrease as a result of paying back a larger amount on their debt in the form of interest and principal payments, than they were lent to spend in the first place. As a result, it can be shown that this decreased consumption will translate into a decrease in GDP due to the consumer’s use of debt. Therefore, to take this a step further, it can be concluded that debt will not only negatively influence consumer spending and the economy, but will also warrant the need for stronger fiscal policy. As current fiscal policies are created according to traditional economic models, it is easy to see why past fiscal policies may have been ineffective.

First and foremost, to create this model, this thesis will begin by reflecting upon the primary motivation for investigating the influence that debt has on spending and the economy as a whole.

This will start in Chapter 2, in which the powerful, and potentially destructive, influence that debt can have on the economy, will be divulged. This will predominantly be illustrated through a brief overview of the Financial Crisis of 2008, in which debt played a prominent role in both fueling the housing bubble, which eventually imploded, and in exacerbating the losses that consumers suffered on homes as a result. Additionally, by analyzing both past and current trends in mortgages, student loans among other influential factors, and the delinquency rates on mortgages and student loans, we are then able to render the true implications behind these trends. As the trends in the amount of outstanding mortgage debt leading up to the crisis mimic the current spike in outstanding student loan debt, this makes such trends a cause for concern. Even though these trends in mortgages and student loans can be attributed to different factors, it is still apparent that they may have the potential to create another financial crisis. This therefore provides
sufficient motivation for being able to predict the impact that debt has on spending and the economy. In summary, these results not only show just how dangerous the excessive use of debt can be, but also stipulate the need to be able to predict exactly how debt can influence spending and the economy, in order to avoid future crises and in order to be able to create appropriate tools, such as fiscal policy, to combat such negative economic outcomes. To do so, however, in an effort to avoid some of the major criticisms of traditional models, first these traditional models and their criticisms will be assessed in the following chapter.

To best address and avoid some of the criticisms faced by traditional economic models of consumption in the creation of the new model, Chapter 3 will give a brief overview of some of the most prominent economic theories of consumption, in addition to providing criticisms to both justify the creation of the new model and to be able to improve upon such criticisms in the formation of the new model. To give a refined outline, among the most eminent of these theories, Keynes’ *Absolute Income Hypothesis*, as will be discussed, describes consumption as being dependent on income and savings, assumes that individuals could only spend or save their income, and assumes that one could not spend more than their disposable income. This is obviously not true in the case that one is allowed to borrow, however. Likewise, some other theories discussed in the chapter include Fisher’s *Theory of Intertemporal Choice*, which projects Keynes’ current income assumption onto the expected future income; Friedman’s *Permanent Income Hypothesis* and Modigliani’s *Life-Cycle Hypothesis*, which were also formed under similar prospects; Robert Hall’s *Random Walk Hypothesis*, which regards long term consumer behavior as unpredictable; and David Laibson’s *Pull and Instant Gratification theory* of consumption, which describes consumer spending behavior according to a
natural consumer bias to prefer to spend now rather than later. Furthermore, in critiquing these theories, the most significant aspects of these critiques, as will be reviewed, include their failure to account for debt’s influence on spending behavior, their exclusion of the impact of interest rates in the models, and in their unrealistic assumptions that consumer preferences are consistent over time. These criticisms and models then form the basis from which the new model of consumption is created in the subsequent chapter.

Finally, in Chapter 4, the new model of consumption, which is referred to as the Lifestyles Hypothesis, will be presented. In the chapter, this will begin with the introduction of the concept of available income, which is described as the total amount of funds available to the consumer to be consumed, where a new variable D, or the maximum amount one can borrow, will be included in the equation. In addressing the fact that debt does not only initially lead to an increase in the total amount of funds available to the consumer to spend, but also decreases the total amount of funds available to the consumer to spend when they begin to pay back both the interest and principal on their debts, available income is defined to describe a consumer’s income in two separate periods. More precisely, this will include being defined for an earlier period, which accounts for this increase in the amount of available funds, and a later period, which accounts for the decrease in the amount of funds available to the consumer. From these concepts, available income equations will then be created, where these equations will then be used in the traditional Keynesian consumption equation to replace disposable income, and therefore form new earlier and later period consumption equations, as a result. In application, these consumption equations for the earlier and later periods are then plugged into the multiplier equation to give the predicted real GDP for both the earlier and later periods. Then by subtracting the earlier period from the later periods, the
results are used to show that, under the assumptions of the model, borrowing will hurt the economy in the long term. As we only begin in Chapter 4 by introducing a simplified model, which assumes that the earlier and later periods are only one year in length each, and that interest is always simple; the model is further expanded on in the succeeding chapter.

Following in the path of Chapter 4, Chapter 5 will then introduce a more complex version of this model by creating elaborative equations, which account for the ability of the consumer to spend more than one year in each period, for the possibility of simple or compound interest rates, for the addition of retirement period consumption, and for the difference in the influence that debt will have on spending for different kinds of consumers. In addition, under the assumption that the earlier, later, and retirement periods make up the totality of one’s life, these equations are then added together to produce a lifetime consumption equation. This will then be used to demonstrate that the presence of debt leads to a decrease in consumption relative to if one had not borrowed. In elucidating the effects that debt has on consumption for different types of consumers, or in other words the impact that borrowing will have on economies comprised of a majority of each different type of consumer, it is then further assumed that the economy consists of three different types of consumers. These are presumed to include a conservative type, a responsible type, and an irresponsible type. Using these three types of consumers to create lifetime consumption equations for each type, these equations are then used to determine that economies consisting of a majority of responsible consumers will exhibit the largest decrease in consumption relative to the conservative type of consumer, while under strict assumptions the irresponsible type will have the opposite impact. In conclusion, as we note that the statistics show that the most borrowers fall under the
characteristics of the responsible type of consumer; these results are then used to predict the impact on consumption as a result of our current economy. The true economic effects according to the lifetime consumption equations of each of these types of consumers, however, are conveyed in the ensuing chapter.

To exemplify the economic impacts for each type of consumer, Chapter 6 will use the IS-LM model and the Keynesian model of AD-AS, under different economic conditions, to illustrate the predicted impact of borrowing on real GDP, prices, and interest rates. This will be done through the application of these new lifetime consumption equations, in comparison to a starting point on the graph, at which it is assumed that the consumer did not borrow at all. Subsequently, this is used to show that the result of consumers borrowing is a large decrease in real GDP and interest rates, particularly under the conditions of our current economy. As will be demonstrated, these results can also be carried across all different types of economies. Nevertheless, using these models, it will also be shown graphically that, in the excessive case, such trends even have the ability to create recessions. These results can be summarized in terms of their influence on the economy and their implications for the formation of fiscal policy, in the final chapter.

Collectively the results of Chapters 2-6 will be summarized in Chapter 7. Taking the economic implications of Chapter 6 a step further, it is then revealed that borrowing leads to magnified changes in consumption. Therefore, as a result, using the AD-AS model, it can be shown that even stronger fiscal policies, will be necessary in order to counteract the resulting magnified decrease in real GDP. From this it is also inherent as to why traditional fiscal policies may be ineffective.
In hindsight, as it may or may not seem intuitively obvious at this point as to why debt is such an important aspect in assessing consumer spending and the well-being of the economy, ascertaining its significance will be the exact purpose of the next chapter. Hence, by the end of the next chapter, as well as this thesis, the answer to this question, along with many others, should be clear. More specifically in the chapter that follows, the answer will be asserted through one of the most prominent examples, which is that of the Financial Crisis of 2008.
Chapter 2 The Credit Boom

Starting with a boom and ending with a crash, the reign of terror brought about by the Financial Crisis of 2007-08 will undoubtedly go down in American history as one of the greatest economic disasters of all times. Stripping many of their jobs and leaving others without homes, its detrimental impact on both the well-being of the American consumer, and the economy is unbearable and will remain unforgettable, leaving scars for generations to come. As it is clear that America will neither be ready nor willing to deal with such a similar catastrophe any time soon, or ever for that matter, in great attempts to prevent the repetition of such an anomaly, many have recently contemplated and analyzed the various components which nurtured its creation. While such causes have been greatly debated, at the heart of this controversy is the eminent role that household debt played in fostering the housing bubble, and exacerbating the losses that resulted from the housing market crash. Of even more significance, literature surrounding this controversy has also addressed the potential for large amounts of household debt to actually create such economic crises and recessions. This makes examining debt’s role in the facilitation of economic crises, along with the historical trends in debt and delinquencies, essential in determining debt’s significance to the economy and spending, as well as in determining whether current trends in household debt should raise concern.

In specific, the analysis of these current trends in household debt will be tailored towards mortgage debt and student loan debt, as these forms of debt account for the two largest proportions of household debt, with mortgages accounting for the largest proportion. Furthermore, as the recent Financial Crisis serves as a pertinent example as to just how increasing levels of household debt were able to influence spending and the economy, and potentially aid in the creation of the recession, this example will be used to
demonstrate the impact that previous trends in mortgage debt had on spending in the economy. Following from this, the current trends in student loan debt and delinquencies, along with the reasoning behind them, can be compared with that of mortgage debt and delinquencies both leading up to and following the crises. More specifically, by analyzing the current trends in household debt and delinquencies, along with their reasoning, and comparing them to those of mortgages preceding the Financial Crisis, we can determine whether any similarities are exhibited, and thus, if these trends warrant concern. As we will see, these trends indeed make debt a growing cause for concern. To do this, however, first we will begin by evaluating debt’s contribution to the Financial Crisis from an economic perspective, and how the presence of debt aided the formation of the housing bubble and led to exaggerated losses in the housing market.

While it is frequently overlooked in pinpointing the causes of the crisis, it is important to consider the noteworthy role that debt played in contriving the housing bubble and preceding the eventual collapse of the housing market. This is predominantly the case, as it is often true that debt exaggerates the gains and losses on assets by allowing for the spending of money that does not yet exist, or in other words, by allowing for the spending of money that the consumer does not have. Therefore, before delving into a direct examination of the crisis, first it is imperative to understand exactly how debt led to such exaggerated gains and losses in the housing market. This can best be illustrated through an example. For instance, suppose a consumer were to take out a loan of $80,000 to buy a home worth $100,000. Then, the consumer would have $20,000 in home equity that they used to make a down payment, while they would still owe $80,000. In this case, if the consumer were to suffer a 20% loss on the home, or if house prices were to decrease by 20%, then they would lose 20% of the $100,000, or $20,000
(100,000*0.20=20,000), the total amount of home equity that they have. This would leave their house value at $80,000 (100,000-20,000=80,000). Similarly, if house prices were to increase by 20% when the house was worth $100,000, then the consumer would gain $20,000 (100,000*0.20=20,000), making the value of their home $120,000 (100,000+20,000=120,000), and raising the consumer’s home equity from $20,000 to $40,000 (20,000+20,000=40,000). It is also important to note that prior to the crisis; many people indeed were able to withdraw the equity from their homes as the prices inflated, causing additional problems when the housing prices began to deflate. In contrast, if the consumer had not been given the ability to borrow, then they would not have been able to borrow the $80,000 and instead would have been forced to purchase a home worth $20,000. In this situation, if home prices were to decrease or increase by 20%, then they would only be able to lose or gain $4,000 (20,000*0.20=4,000), while having no debt payments to make. Therefore, the consumer would suffer exaggerated gains and losses on the home with debt since the percentage of the loss or gain would be determined by the additional amount of money they had ($20,000) and the amount of money they had borrowed ($80,000). This characteristic tendency of debt to entice exaggerated gains and losses is pertinent to understanding debt’s role in the economy and in potentially helping to expedite the crisis. Particularly, this idea is fundamental to understanding how debt aided in the creation of the housing bubble, as this is exactly what happened as housing prices rose and then eventually collapsed, making it difficult for homeowners to make the payments on their mortgages.

To start from the beginning, similar to many other “bubbles,” the housing bubble, which preceded the financial crisis, was initially fueled by the increase in the availability of credit. In simplistic terms, bubbles are usually described as large increases in asset
value, which result in asset mispricing, as will be described in more detail later. Whereas an influx of capital from other countries and the creation of securitized loans were responsible for leaving banks and financial institutions with an abundance of excess cash, it was these institutions who decided to use these proceeds to give additional loans to borrowers of all risk. This inevitably, led to relaxed credit standards and made credit widely available. Following from this, it was then apparent that as more mortgages were given, more people were able to buy homes, than would normally be able to. This thereby facilitated higher demand for homes and for homes of higher prices. Then, by the rules of supply and demand, it is not surprising that as the demand for these houses increased, so did the housing prices. Significantly, the ability of such widening of the credit market to create bubbles, was the main point of discussion in Kindleberger’s book *Manias, Panics, and Crashes* (2001). Namely, Kindleberger concludes that “asset price bubbles depend on the growth of credit” (Kindleberger 2001). Thus this expansion of the credit market, particularly for mortgages, meant that there would inescapably be a housing bubble. Though, it is important to note that this increase in housing prices caused by the increasing demand for homes, alone, does not make this spike in prices a housing price bubble.

Nonetheless, the increased optimism about the continual rise in housing prices and the ability to act on that optimism, due to the presence of debt, causing homes to become overvalued, does classify this spike in housing prices as a bubble. This phenomena can be described, according to the theory of Atif Mian and Amir Sufi in *House of Debt* (2014), as a result of lenders lending to optimistic home buyers, who believed that these home prices would continue to increase, and who were therefore willing and able to overpay for these homes using the money they had been lent. In the
words of Mian and Sufi, “By enhancing the optimists’ buying power in the future, debt increases the probability that a greater fool will indeed be waiting tomorrow” (Mian and Sufi 2014, 111). With this, they assert that by lending to those who are optimistic about the rising prices, people will continue to overpay for these homes, while assuming that they will be worth more the next day, further fueling and creating a price bubble. The problem with this, as they describe, is that when such expectations lead to the mispricing of assets, eventually these prices fall back down to their real value, paving the way for a cycle of many other economic consequences to follow. It is then true that when the housing prices started to collapse in order to readjust to their actual prices, homeowners could no longer afford to make the payments on these loans nor could they rely on home equity to do so, as mortgage values began to exceed home values. This, in turn, led to an increase in defaults. Further, as these defaults began to occur, the housing market along with both the market for mortgage securities, and many banks and financial institutions, began to collapse, commencing what would be termed as the “Great Recession.”

Just as is the case with most recessions, it is not astounding that in the brink of the crisis as some suffered large losses and others began to panic, consumer spending decreased as individuals no longer had the money nor the desire to spend. To make matters worse, as characteristic of debt, such losses were greatly exaggerated, as explained previously, leading to yet an even larger decrease in consumption. Once again, Mian and Sufi support this tendency of large amounts of debt to lead to large decreases in consumption, and thus to create recessions as a result. In comparing the pattern of recessions, internationally, Mian and Sufi state “This pattern of large jumps in household debt and drops in spending preceding economic disasters isn’t unique to the United States. Evidence demonstrates that this relationship is robust internationally. And looking
internationally, we notice something else: the bigger the increase in debt, the harder the fall in spending” (Mian and Sufi 2014, 6). This tells us that research agrees that in the long term, large increases in debt lead to large decreases in consumption, and in the worst case recessions. Put a different way, debt can have unwarranted effects on the spending behavior of individuals and the economy as a whole, as seen in the case of the 2008 Financial Crisis and, in turn, is worthy of our time to consider. This makes debt even more imperative to understand, concerning its relevance to the economy, consumer behavior, and superfluous influences. Now that we have seen the substantial impact that debt can have, we will now turn to the examination of the historical trends of mortgages and student loans, to determine how responsive they are to other factors. This will further enlighten us as to whether these trends in debt pose a cause for concern.

As the Financial Crisis drew a lot of attention to the borrowing in the housing sector and its significance to the rest of the economy, it seems appropriate to start by considering how the total mortgage debt outstanding for the typical one-to-four family household, has changed over time. This can be shown in Figure 1.
Particularly, this graph shows how the total amount of mortgage debt outstanding for one-to-four family homes in the US has changed over time, using data from four different quarters, per year starting in 1949 up until 2015. For the purpose of understanding the data, one-to-four family residences will refer to any residential property that contains one-to-four living units, such as a home or townhouse. As can be seen in Figure 1, over the years, the amount of mortgage debt held by households has increased dramatically, only beginning to decrease slightly starting in 2008 at the onset of the Financial Crisis in the housing market. To better elucidate the implications of this graph, these trends can be explained according to several factors, including the loosening of the credit market leading to a larger volume of loans outstanding; an increase in housing prices, all else constant, leading to larger amounts being borrowed for these mortgages; and an increase in the cultural acceptance of debt over time, leading to an increase in the number of borrowers, and to an increase in the amounts being borrowed.
In forming an interpretation of this trend, the increase in the total mortgage debt outstanding preceding the slight dip after 2008, can be attributed to the increase in the volume of mortgages given as a result of the loosening of the credit markets and lending standards leading up to the crisis. Still, among other factors, new financial innovation also made such credit conditions possible, since such innovation, including the creation of mortgage-backed securities among others, allowed the banks and other institutions to securitize these loans and sell them off. This then, as a result, freed up cash for the banks, which, in turn, allowed them to lend more and therefore led to looser lending standards. From this it also follows that the dip in the total mortgage debt outstanding can be explained by the sudden tightening of the credit market from 2008 onwards, as new policies such as Sarbanes-Oxley were implemented to deter behavior that could once again endanger the financial system and possibly lead to another financial crisis. The fact that the credit conditions were indeed relaxing prior to the crisis and tightening afterwards, can be evidenced by research done by the Federal Reserve. As stated in the research findings, “Thus, from the unusually loose lending conditions in 2007 to the much tighter conditions in 2010: Q1, the average loan spread increased by about 1 percentage point,” (Kwan 2010, 16). Put a different way, research shows that the credit standards were indeed loosening and tightening at these points on the graph, as well as the cost of these loans grew slightly as conditions tightened. Even though the evidence supporting the causal relationship between the loosening and tightening of the credit conditions, and the spikes and dips in this graph, may seem elusive, our previous discussion of the Financial Crisis also provides additional evidence, implicitly. While the potential tightening of the credit market up until the onset of the crisis may partially
explain these trends, another factor significant to contemplate in explaining this dip and the trend in the graph as a whole, is the trend in housing prices.

Momentarily ignoring all other factors, as it is evident from our previous discussion, regarding the creation of the housing price bubble, that housing prices were certainly increasing leading up to the crisis, it is not surprising that the total amount of mortgage debt also followed suit. This fact does not particularly come as a shock since this implies that people would need to borrow larger amounts in order to afford the higher home prices. Of course, making this statement also assumes that household income remains independent of these housing price movements, since if an increase in household income were to accompany an increase in the housing prices, then this increase in the total amount of mortgage debt outstanding would not necessarily commensurate with this increase in housing prices. This will not be true, however, in the case that this increase in income causes households to purchase homes of even higher costs, than if their income had not increased, and therefore causing households to still take on additional debt. Nonetheless, the movement in housing prices over time also potentially explains the dip in the mortgage debt outstanding in 2008, when the housing market had become crippled and the housing prices had begun dropping rapidly. These rapid drops in housing prices would then lead to decreased home values, resulting in an abundance of mortgage defaults and delinquencies, which would reduce the amount of mortgages outstanding, and thus reduce the total dollar amount of outstanding mortgages.

On another note, these trends in the total mortgage debt outstanding, also resonate with the increased cultural acceptance of debt over time, since as consumers became more accepting of borrowing, they were both able and willing to borrow more. Louis Hyman discussed such transitioning views of debt over time in Borrow: The American
Way of Debt (2012), as he stated that borrowing was initially viewed as a moral act of lending, in which failure to repay could result in imprisonment. In the words of Hyman, “…the failure to repay a loan was a moral failure—indeed, such a moral failure that it could send you to jail…In the eighteenth century, debt, especially on account, was a moral act of charity that happened to enable trade” (Hyman 2012, 20). Elaborating on this, Hyman also expounded the increasing acceptance of borrowing from the beginning of the nineteenth century onwards. As he stated “In the early nineteenth century, that clear moral vision of debt began to become murkier…This new perspective did not supplant the moral view of debt, but it did temper it. For the economy to grow and for innovation to occur, risks have to be taken,” and later “In the mid-nineteenth century, farmers in the West lived and died by credit” (Hyman 2012, 20-21). This tells us that earlier in the nineteenth century, people’s views regarding debt began to loosen as they believed it could be a useful means of promoting economic growth, while as time went on, later in the century people became even more accepting and began to utilize debt more frequently in their businesses. Then it follows, as supported by the figure, that people did in fact borrow more as time went on. While this is not only true for mortgages, but for all household debt, this claim can also be used to explain the current trends in student loan debt as well. As we will see, these trends bear a striking resemblance.

In comparison to these trends in mortgage debt, as we will see current trends in student loans mimic the trends in mortgages leading up to the financial crisis. In exploring these trends in student loans, it is also important to consider the greater economic purpose served by student loan debt, since such borrowing is not only an influential aspect of consumer behavior, but since such borrowing also serves to improve the productivity of the workforce, making the economy more efficient as a result. In
tandem with its ability to provide long-run economic benefits, the rapid increase in the total amount of student loan debt outstanding, as shown in Figure 2 below, also makes this trend of interest.

Figure 2
Total Student Loan Debt Outstanding Over Time

![Graph showing total student loan debt outstanding over time from 1977 to 2015.](image)

Source: Federal Reserve Bank of St. Louis

Primarily, Figure 2 shows a consistent upward trend in the total amount of student loan debt outstanding over time, from 1977 to 2011. Also, note in viewing this graph that other data have shown that this upward trend has continued steadily past 2011. This trend can be attributed to an increase in the cost of college, leading to larger amounts being borrowed; an increase in college enrollment, leading to an increase in the volume of student loans; a decrease in consumers’ confidence and optimism about the job market, making higher education more valuable, and increasing the number of student loans outstanding as a result; decreases in real earnings after the crisis, and in general, leading
to an increase in the need for student loans, and thus an increase in the volume of student loans outstanding; an increase in the availability of student loans; an increase the number of years for which students stay at college or pursue graduate schools, leading to an increase in the amount being borrowed; and the low repayment rate on student loans, accompanied by the rising volume of loans being given, since this leads to a larger amount of student loan debt outstanding.

In more detail, the rising costs of college, assuming all other factors are held constant, not only make it more likely that students will need to take out student loans to pursue their degrees, but it also makes it more likely that they will need to borrow higher amounts. This therefore, will contribute to the increase in the volume in student loans, and the increase in the average amount borrowed by the individual. This is true of inflation-adjusted college costs as well. As indicated by research done by William Gale, Benjamin Harris, Bryant Renaud, and Katherine Rodihan (2014) from The Brookings Institute, “From 2002 to 2012, inflation-adjusted (2012 dollars) college costs-defined as the sum of room, board and “net tuition” (tuition costs after subtracting federal, state, and private [non-loan] aid, as well as any discounts offered by the institution)-rose by 41 percent within public four-year institutions, by 9 percent for private four-year institutions, and actually fell by 7 percent for 2-year public institutions. Accounting for the number of students at each type of institution, average college costs rose by about 16 percent” (Gale, et. al 2014, 2). Therefore this research only reinforces the idea that college costs have risen, even after accounting for inflation, making this explanation for the rise in student loan debt outstanding plausible. Though, on the other end, it has also been noted that an increase in college enrollment contributes to the rising volume of student loans outstanding, thus increasing the total dollar amount outstanding.
Additional data from the research done by The Brookings Institution also supports the fact that these factors have contributed to these trends. In the words of the publication, “On the demand side, the first is an increase in college enrollment, which rose by 27 percent from 2002 to 2011. The second is an increase in college costs…” (Gale, et. al 2014, 2). Thus the Institute also explains this trend in student loans according to the same factors. In speculation, this increase in enrollment may also be caused by poor economic conditions, particularly in the job market, as was the case following the Financial Crisis of 2008. This is due to the fact that such increased enrollment tends to make higher education more valuable in competitive job markets. Though demand alone may not be responsible for the increase in the volume of student loans outstanding, as increased availability of these loans may also greatly contribute to this growing volume.

In contrast to other types of loans, such as mortgages, as student loans require repayment even in the case that the borrower declares bankruptcy, this will mean that the lending standards on these loans will be much lower, which is often the case when these loans are made to younger college students who may not yet have a credit score. Following from this, research from the Federal Reserve shows that it is in fact true that the repayment rate on student loans is low, as will be discussed in more detail later. Nonetheless, this low repayment rate coupled with both the fact that all payments on the outstanding debt will eventually be obtained, and the growing volume of outstanding loans, also will contribute to this trend in the growing amount of student loan debt outstanding. This primarily the case, since as people default, their payments will not disappear but will continue to be paid off slowly, leading to a higher dollar amount of student loan debt outstanding. This characteristic of student loan debt to not allow for the disappearance of payments owed emphasizes the significance of taking the default rates
on student loans into account, since these rates may have economic effects different from those anticipated under typical loans, such as mortgages.

Given the unique characteristic of student loans to require repayment, except in legally exceptional circumstances; high delinquency rates may inflate the total student loan debt outstanding, as those who default or become delinquent will likely be slower to make payments and therefore may have debt outstanding for longer; in order to correctly interpret the trend in the total student loan debt outstanding over time, we need to explore the trend in student loan default rates. More precisely, a delinquency can be defined as failing to make at least one payment on outstanding debt, while a default can be defined as being delinquent on a payment for 270 days or more. Thus in forming an interpretation of this trend as shown in Figures 3 and 4, we will keep in mind that these students were unable to make one or more payments over more than 90 days, as defined by the data. As Figure 3 represents the trends in the delinquency rates over time of many different types of debt, we will ignore these other types of debt in order to focus on the impact of student loans. Similarly, Figure 4 represents the trend of the delinquency rates on student loans over a shorter period of time, further displaying an interesting trend in 2012.
Interestingly, ignoring all other types of debt with the exception of student loans, Figure 3 represents the trend in delinquency rates, or percentage of those holding student loans.
who are currently delinquent, on student loans from 1999 until 2011. On the other hand, Figure 4 represents the trend in delinquency rates from 2003 until 2012 quarterly. This trend, as represented in both figures, shows an increase in the delinquency rate up until 2002, when delinquency rates then began to decrease through 2003, when delinquency rates then began to rise steadily again. Subsequently, as seen in Figure 4, this pattern was followed by a sharp increase in 2012. These trends can be explained by harsher conditions in the job market, making it more difficult for students graduating college to generate an income to make the payments on their loans; the changing interest rates causing the payments to be higher or lower, making it easier or harder to make these payments, thus making delinquency more or less likely; and the rising costs of college, making such payments on these loans larger, and making delinquency more prevalent as a result.

Successively, in interpreting these trends it is important to note that the way in which the delinquency rate is defined allows for the inclusion of previous individuals who had become, and, or remain delinquent or in default, meaning that a rising delinquency rate could imply that the number of new delinquencies each year is constant, while those previous delinquencies remain delinquent or in default. This very issue, however, was addressed in research done by Meta Brown, Andrew Haughwout, Donghoon Lee, Joelle Scally, and Wilbert van der Klaauw (2014) at the Federal Reserve Bank of New York, in which they analyzed the percentage of borrowers who became delinquent quarterly. More specifically, they stated that their research “…depicts the proportion of borrowers in repayment who became newly delinquent on a quarterly basis. Here we see that in 2005 about 6% of non-delinquent borrowers in repayment transitioned into delinquency each quarter, on average. By 2012, that rate had increased
to 9%” (Brown, et. al 2014, 12). This tells us that from 2005 up until 2012, given the data they used, there was an increase in new delinquencies. Therefore, moving forward, we can assume that these upward trends from 2005 onwards are attributed to the increase in newly delinquent borrowers. Interestingly, the first notable spike in the graph of Figure 3 appears in 2002, following the collapse of the dot-com bubble in 2001, and the recession that trailed after. This spike in delinquency rates can be ascribed to an increase in unemployment during 2001, as a consequence of the recession. More precisely, this decrease in employment caused those with outstanding student loans, who were no longer employed or who were unable to find an income generating job, to be incapable of making the payments on their loans, causing them to become delinquent. Though, interestingly, this same pattern was not as readily present in either figure, following the Financial Crisis of 2008. In speculation, this may possibly be explained by the presence of lower interest rates in 2008 than in 2001, easing the ability of borrowers to make these payments. As indicated by these figures, a steady upward trend in delinquency rates began in 2003 and continued both during and after the Great Recession. A possible explanation for this steady growth could be a combination of both the consistently low interest rates since the early 2000s, once again somewhat easing the payments on these loans, and the steady growth in the cost of college, as indicated by the rising total student loan debt outstanding in Figure 4, making these payments larger and more difficult to make, even as interest rates are not exceedingly high. Finally, the recent spike in delinquency rates starting in 2012 as shown in Figure 4, may be attributed to increased competition in the job market and rising amount of student loan debt outstanding, leading many college students to be unable to generate an income worthy of making the
payments on their student loans. Though, in comparison to the delinquency rates on mortgages, student loans tend to exhibit more fluctuations.

In contrast to that of student loans, the delinquency rates on mortgages exhibit a much less volatile pattern over time. This can be seen in detail in Figure 5, as well as this same pattern can also be seen in Figure 3.

Figure 5
Mortgage Delinquency Rates over Time

Source: Federal Reserve Bank of St. Louis

Represented in the figure, the delinquency rates of mortgages have remained relatively low and stable over time, with the exception of the large spike in the delinquency rates on mortgages from 2008 up until 2013 during the onset of the Great Recession and the recovery soon after. With that being said, given the fact that these delinquencies, which by definition are inclusive of defaults, ultimately fueled the crisis, to understand this downward trend it is important to understand some of the causes of the financial crisis and the large role that debt played in facilitating it. This was discussed previously. Once
again, as these trends as a whole tell us that household debt is on the rise and capable of producing unpredictable outcomes in light of many other economic factors which can lead to delinquencies on this debt, we need to understand how powerful and dangerous debt is in this context.

While we previously analyzed the trends in mortgages and student loans according to their various causes, it was found that the current spike in student loan debt and delinquencies mirrors that of mortgages leading up to the financial crisis. Thus, as a result, this illuminates a potential impending threat to the economy and makes household debt worth our time to consider in anticipating future economic outcomes. Further, in analyzing the trends in mortgages, it was determined that such observations were ascribed to the loosening of the credit standards, the rising housing prices, and the increased acceptance of borrowing on home purchases in order to pursue a greater lifestyle. Relative to these trends, student loans, like mortgages, were also ascribed to the rising costs of college, as well as to the increased acceptance of borrowing in education in order to pursue a greater lifestyle. Yet another similarity between the situation leading up to the crisis and the current situation with student loans is the lack of lending standards. While this is always the case for student loans, however, this is not always the case for mortgages. Unlike the situation under mortgages though, students lack the ability to be forgiven on their loans even after declaring bankruptcy, except in extraordinary circumstances under the law. Nevertheless, just as we have taken note of these similarities in student loan debt and mortgages preceding the crisis, others have also formed similar speculations on the matter.

In fact, some have even gone as far as to say that we are in the midst of a student loan, or higher education, bubble. In line with our previous definition of a bubble,
this would mean that students are overestimating the value of education, and as a result are overpaying, causing the costs of education to inflate. This is precisely what Surowiecki (2011) describes, as he asserts “[Y]ou can’t flip a college degree the way you flip a stock or even a home. But what bubble believers are really saying is that young people today are radically overestimating the economic value of going to college, and that many of them would be better off doing something else with their time or money,” (Surowiecki 2011). Simply put, stating that we are in an education bubble proclaims that the underlying value of college, both implicit and explicit, is far less than the price at which students are paying for it. Momentarily assuming that this assumption is correct, it would then follow that, similar to the housing bubble, this student loan bubble would eventually implode as the market corrects itself and the costs of education are readjusted. Continuing on the same path, as the value of education falls, it would then be true that students would owe more on their student loans than the underlying worth of their education, causing delinquencies to rise. Not to mention that these students would later be competing for jobs in a market comprised of other college students willing to accept lower wages for jobs, due to their sufficiently lower costs of education. Due to the inability to seek relief on student loans, in most cases, the impact of this increase in delinquencies would potentially have different consequences than the increase in mortgage delinquencies did during the onset of the financial crisis, making the end result unpredictable. For instance, in one case it may be possible that these delinquencies will lead to much greater losses than under the housing bubble crash due to the fact that students are generally unable to seek relief on these loans. From another perspective, due to this lack of loan forgiveness, the cycle of rapidly declining costs, which generally results from an influx of bankruptcies, can be avoided. As a result, this may prevent
additional delinquencies from occurring as a result of this erosion of prices. For mortgages, Mian and Sufi referred to this cycle as the “fire sale of assets,” in which bankruptcies cause an asset to sell for a below par price level, further eroding price levels, and causing additional bankruptcies to occur as a result (Mian and Sufi 2014, 27). Additionally, as the education market is characteristically different from that of the housing market in many respects, it is unclear as to the exact impact that such a student loan bubble, if it existed, would have on the spending habits of individuals or the economy. This further raises the importance of being able to precisely predict the influence that debt will have on consumer spending, and even more importantly, the economy.

In hindsight, as we previously saw, the Great Recession is only one eminent example of the astounding influence that household debt can have on not only consumer spending behavior, but also on the economy. As evidence shows, at its worst, excessive levels of debt may even be responsible for the creation or worsening of recessions. Through the analysis of these historical trends in mortgages and student loans, we were able to look at the patterns in borrowing and delinquency rates, and their underlying causes. In doing so, an even more terrifying pattern was unveiled. Namely, that the current trends in the total amount of student loan debt outstanding mimics the pattern in the total mortgage debt outstanding leading up to the financial crisis. This disturbing pattern deduces itself to the potential to create another financial crisis, and therefore this trend should be analyzed and dealt with carefully, in hopes of preventing such a disaster. Even more so, in this context, while these trends are undoubtedly worrisome, we are still uncertain as to exactly what such trends mean for the economy. In response, we seek a means of being able to predict the true impact that impending trends in household debt
will have on consumer spending, and on the economy. As we turn to traditional economic models of consumption to do so, however, it is apparent that these models have failed to incorporate the influence of debt. Due to the fact that these models do not account for debt’s influence on spending habits, in addition to various other aspects, these models will be subject to various criticisms. This can be seen in the next chapter.
Chapter 3 Modelling Consumption

For centuries economists have strived to conceptualize consumer behavior through the use of theories and statistics. In light of evolving conditions and consumer behavior, however, we are forced to reconsider the relevance of such theories in anticipating consumer behavior. In considering their relevance it is first important to understand both the present influences on spending and saving behavior, as well as how various theories have conveyed them. This begins with the analysis of prominent theories; including those of John-Maynard Keynes, Irving Fisher, Franco Modigliani, and Milton Friedman; as well as those of less prominent economists such as Robert Hall and David Laibson, who explained consumption from a psychological viewpoint. Collectively literature pertaining to theories on consumer spending behavior has shed light on the fact that new theories often emerge in response to discrepancies between the models and actual consumption data. From another perspective, literature on savings and data on consumer savings also stipulate that some influential factors on the saving and spending behavior of individuals include an individual’s perceived wealth relative to income, optimism regarding the economy, and the availability of credit. Such influences may very well have a dramatic effect on consumer behavior and are therefore important to consider in evaluating consumer behavior using traditional models and in determining the credibility of such models.

At the origins, John-Maynard Keynes’ *Absolute Income Hypothesis* was one of the first, and perhaps remains the most famous theory of consumer spending behavior. Exclusively, Keynes’ theory perceived consumption and savings as dependent upon one’s current income, as well as the theory has been credited with devising the concept of the marginal propensity to consume (MPC), or the additional income spent for each
additional dollar earned. As described in *The General Theory of Employment, Interest, and Money (1936)*, Keynes’ theory asserts that changes in consumption depend upon changes in disposable income. Particularly, Keynes regards income and consumption as directional predictors of both one another and of savings. Put in his own words, it can be assumed that “the amount of aggregate consumption mainly depends on the amount of aggregate income (both measured in terms of wage units),” that “…when real income is increased, it will not increase its consumption by an equal absolute amount,” and that “…a greater portion of income… (is) saved as real income increases” (Keynes 1936, 96-97). Restated, this says that consumption mainly depends on a consumer’s income level, that savings will increase when income is increased, and that consumption will not consist of the entirety of any increase in income. Conceptually, these very ideas are also expressed in the simple equation:

*Equation 1: C = C₀ + MPC(Y − T)*

In plain words, this equation states that consumption consists of an autonomous component or the smallest possible level of economic consumption when income is zero, C₀, in addition to the proportion of disposable income (Y-T) spent, or the MPC. As apparent from the equation, an additional assumption that is implicit in this theory is that consumers only consider their current income in making consumption decisions. It is worth noting that this directly contradicts the claims of other theories, such as the *Permanent Income Hypothesis* and *Life-Cycle Hypothesis*, which suggest that consumption reflects anticipated changes in income. From this Keynes also proposes to ignore the effect of interest rates on spending and saving behavior as he stated that the effects of interest rates were only conducive to changes in savings when all other factors were held equal, as well as he noted that interest rate changes alone would not greatly
impact spending or savings unless they were unusually large. In fact, in ignoring interest rates, Keynes also inexplicably ignored the potential for savings to be affected by any other factor besides income. The theory particularly emphasizes the assumption that savings will increase in a proportion to consumption, as income increases. Subsequently, this very idea precedes one of Keynes’ largest contributions to economics and to the theory of consumption, which is that of the marginal propensity to consume. To elaborate, Keynes designated that as income increases by an additional dollar, a proportion will be spent which he termed the MPC, while the remaining proportion will be saved, which he then termed the marginal propensity to save (MPS). As Keynes was the first to formulate the concept of the MPC, its use implied, along with the overall theory, that consumption was consistently changing along with income. Following this, Keynes’ average propensity to consume (APC) differed from the marginal propensity to consume in that the APC gave the overall proportion or percentage of one’s income that is consumed while the MPC gave the proportion of each additional dollar earned that was spent. As also embedded in Keynes’ assumptions, it follows that when the MPC is greater than the APC, savings will rise.

These concepts are important in understanding the application of this theory and the Keynesian multiplier. In application, one of the most significant aspects which arose from this theory, was its ability to predict resulting changes in GDP that would result from fiscal policy changes such as changes in government spending or taxes. In name, the Keynesian multiplier, described in Equation 2, can be used to estimate exactly that as Equation 3 demonstrates.

Equation 2: The Keynesian Multiplier: \[
\frac{1}{1 - MPC} = \frac{1}{MPS}
\]
\[ \text{Equation 3: } \Delta Y = \frac{1}{1 - MPC} \times \Delta G = \frac{1}{MPS} \times \Delta G \]

Simply stated, Equation 3 says that a change of amount \( X \) in government spending (G), will result in a change of \( X \) times the multiplier, given a certain MPS (or \( 1 - MPC \)). Note that in Equation 3, \( G \) could also be replaced by the various other components of real GDP (Y) which include consumption, net imports, and investment. While the multiplier was rather the work of economist Richard Kahn, versus that of Keynes, it was in fact Keynes’ theory and existing work with the MPC, which prompted its creation. In another light, it is mathematically intuitive that as savings increase, the marginal propensity to save will increase and therefore decrease the marginal propensity to consume, and cause the Keynesian multiplier to decrease as a result. Significantly, this can be taken to mean that changes in fiscal policy will have a much larger impact on those consumers with lower incomes, who have less leftover to save and thus lower MPSs. From Equation 3, it can also be inferred that changes in fiscal policy, such as an increase in taxes, could change one’s disposable income. According to the Keynesian equation, this will decrease consumption as a result. More importantly for real income or GDP (Y), as consumption comprises more than two-thirds of GDP, this could have a significant impact on overall GDP. This conclusion could also have been reached through analysis with the Keynesian multiplier which would have estimated the actual magnitude of the amount by which this will decrease. For example, if overall income (Y) was $1,000, the MPC was 0.75, and taxes were to increase by $100 (from $100 to $200), disposable income would decrease from $900 ($1,000-$100) to $800 ($1,000-$200). Then using the formula in Equation 1 and assuming autonomous consumption \( (C_0) \) to be $50, consumption would decrease by $75 from $725 ($50+$900(0.75)) to $650 ($50+$800(0.75)). Finally, to estimate the overall effect of consumption on Y, using the Keynesian multiplier in Equation 3, we see
that for a $75 decrease in consumption (plugging in C for G in Equation 3) a $300 change in income or real GDP will result \(((1/(1-0.75))*75\). This contribution to economics, therefore, has significant applicability in predicting the economic impact of certain fiscal policies.

Though, in reality, as also evident by the creation of newer consumption theories, some of these assumptions are flawed. To begin, one important gap in Keynes’s theory is the failure to incorporate debt and imports, as traditionally it has been assumed in this theory that income is either saved or spent. This can be visualized through the concept of the Keynesian multiplier which is derived only from the marginal propensity to consume and to save. The failure to account for these other factors could cause the multiplier to misrepresent the impact of changes in fiscal policy on real income. Similarly, while Keynes was correct in noting that interest rate changes may be insignificant if all other factors are not held constant, ignoring the impact of interest rates on spending and savings behavior altogether could very well cause savings to potentially be unaccounted for in times of higher interest rates. More importantly, considering debt as a factor in this equation, ignoring interest rates could also underestimate consumption in times where the cost of borrowing is exceedingly low. On another note, another fundamental issue with the theory lies in the assumption that consumption will not consist of the entire change in income. At one point in time, this may have been true; however, given the current availability of debt, it is not only true that consumption can increase by an amount equal to any change in income, but due to the possibility of debt financing, it is also true that the change in consumption can exceed that of income. This statement of course implies that the sum of the MPC and the marginal propensity to save (MPS) can in fact produce a sum larger than one, which has been proven to be the case in some situations.
Collectively, these critiques also bring to light another severe gap in Keynes’ theory, which is the consideration of a consumer’s long-run expected income, as Keynes’ theory generally has only held in predicting consumer behavior in the short run. While, other theories, such as that of Fisher’s, Modigliani’s, and Friedman’s have taken this into account, Keynes’ failure to include this lends itself to inaccurate long-run projections, and thus makes his theory less credible. Finally, perhaps the most criticized aspect of Keynes’s theory is its assumption that a rise in savings would accompany a rise in income. Conversely, data by Kuznets and others from post WW2 have shown this to be incorrect by showing that over time as income continued to rise after WW2, savings remained constant (Kuznets 1952, 507). While this equation ran into many more issues with disparities in empirical data, some additional recent research has also disproven the fact that savings increases with income, as certain influential factors on consumer behavior may cause an increase in consumption rather than of savings. Indeed other economists, discussed in further detail below, have also responded to the poor real-world applicability of this theory through the formulation of their own theories.

Whereas Friedman’s Permanent Income Hypothesis and Modigliani’s Life-Cycle Hypothesis have long been credited with formulating theories in opposition to Keynes, which accurately portray the long-run behavior of individuals; in actuality it was Irving Fisher’s Theory of Intertemporal Choice that gave way to these more famous theories. Similar to other theories, this theory proposed to critique Keynes’s theory by advising that consumer spending behavior relies not only on present changes in income, but also on expected future changes in income. One major difference, which separates this theory from Keynes’s, however, is the incorporation of real interest rates in explaining consumer tendencies to save more during certain periods and in allowing consumers to borrow to
obtain a desired consumption level during other periods. While Keynes’ *Absolute Income Hypothesis* did consider interest rates, nonetheless, it was assumed that interest rate changes would not impact consumer behavior unless they were unusually large, as well as such changes could only be assumed if all other factors regarding real income were held constant. Fisher’s theory mainly postulates that an individual distributes their consumption over their lifetime according to their time preference, or their preference to consume more now versus later. According to Fisher, this can be determined by the size of income, how income is expected to change over time, and what the components of one’s income are (Fisher 1930, 72). This is further described by Fisher, as he states in *The Theory of Interest* (1930), “In general, it may be said that, other things being equal, the smaller the income, the higher the preference for present over future income, that is the greater the impatience…” (Fisher 1930, 72). In essence, Fisher predicts that those with smaller incomes will be more likely to spend now rather than to save for later. To further elaborate, Fisher’s *Theory of Intertemporal Choice* took a Microeconomic approach in describing consumer preferences graphically through the use of an income budget constraint, the possibility of a borrowing constraint, and an indifference curve that represents the consumer’s preferred consumption over two time periods. These time periods are split according to a present time period and a future elder time period. Aligned with traditional Microeconomic theory, consumer preferences can be maximized by finding the highest possible indifference curve that allows, within the consumer’s given income and borrowing limits, the attainment of the highest possible consumption. Put another way, graphically consumer preferences can be maximized at the point where their highest possible indifference curve is tangent to their income budget constraint. Also consistent with many other theories of consumption, the derivation and shape of
these curves is dependent upon the concept of consumption smoothing, where consumers prefer to spread out their consumption over time. Mathematically, these relationships have been depicted through Fisher’s following equations:

\[ \text{Equation 4: } S = Y_1 - C_1 \]

\[ \text{Equation 5: } C_2 = (1 + r)S + Y_2 \]

Conceptually, as Fisher’s theory conceives consumer behavior in terms of two periods, in which the first period denotes an individual’s youth and the second denotes an individual’s elder years, Equation 5 defines second period consumption \((C_2)\) as the sum of an individual’s second period income \((Y_2)\) and accumulated savings from period one \(((1+r)S)\) where \(S\) is savings and \((1+r)\) is the amortized real interest on these savings. Another significant observation is Fisher’s use of a real interest rate, rather than the utilization of nominal interest rates in describing human behavior; implying consumers have no money illusion and rely on real interest rates. From this equation it is also implied, however, that one only saves in the first period of their life, as they do not expect to live for a third period. This assumption is also pronounced in Equation 4, which displays an individual’s savings \((S)\) in terms of the entirety of period one income \((Y_1)\) less any consumption in period one \((C_1)\). Once again, the idea of consumption smoothing is embedded in these equations, as this would mean that consumers save during their youth in order to maintain consistent consumption in post-retirement years, according to their time preferences. In terms of its graphical implications, it is also apparent from this equation that changes in the real interest rate could cause shifts in the budget constraint and thus a different tangency. This is particularly the case as increases in real interest
rates lead to increased savings in the present and a decrease in borrowing, moreover leading to a higher expected future income and consumption ability.

While overall the theory does pose a sufficient challenge to Keynes’ original theory, it leaves several gaps, inviting additional criticism. In considering some significant gaps left by the theory, it is important to recognize the theory’s integration of debt financing in the derivation of the shape of an individuals’ budget constraint and corresponding indifference curves, as it does in fact account for the possibility of a borrowing constraint in restricting an individual’s ability to borrow and consume in excess of their first period income. As the theory does attempt to consider a consumer’s expected income in the long-run and ability to borrow, one noticeable gap in this theory’s explanation of consumer behavior is its failure to address the decreased future consumption that will accompany such a run up in debt to obtain a higher present consumption level. Although debt financing was less prevalent and much less available during the formation of this theory, in modern society the enumerating quantities of debt made available to individuals are likely to dramatically decrease an individuals’ second period consumption, in the event that they actually intend to pay off their debts before the end of their life cycle. Another overzealous assumption made by this theory is its assumption of analogous consumer preferences over time, as it postulates that the shape of a consumer’s optimal indifference curve given their budget constraint will be the same in the future as it is today. On the other hand, it is important to note that the theory does account for the ability of an individual’s budget constraint to shift over time, allowing for the establishment of a new optimal indifference curve, but rather assumes that their shape does not change over time. This supposition, while necessary for simplicity purposes, will mean that changes in consumer’s desired consumption given their current budget
constraint may not be represented fairly, and therefore may not actually explain a consumer’s actual spending behavior if their actual spending preferences differ from what is predicted. Furthermore, Fisher also assumes in the model that the rate at which consumers are willing to exchange units of current consumption for future units of consumption, or the marginal rate of substitution, is consistent across consumers. This assumption, once again, can cause consumer preferences to be inaccurately portrayed and thus may serve as a poor indicator of a consumer’s behavior. In contrast, however, it has been documented in data that the theory’s predictions that savings will increase in response to an increase in the prospects of expected future income are in fact true, making this theory’s ability to predict consumer behavior more credible (Council of Economic Advisers 2010, 116). In light of such criticisms of this theory along with Keynes’ theory of consumption, the formulation of additional theories to explain both the long-run and short-run behavior of consumers were fueled.

Building on the groundwork already established by Fisher, Modigliani’s Life Cycle Hypothesis also predicts that consumer spending behavior is driven by their desires to maintain consistent consumption across time. As evidenced in Albert Ando and Franco Modigliani’s The “Life Cycle” Hypothesis of Saving: Aggregate Implications and Tests (1963), the Life Cycle Hypothesis proclaims that an individual’s consumption function is determined by a utility function as a constant proportion of one’s current and future income. As Modigliani and Ando explain, “The individual is then assumed to maximize his utility subject to the resources available to him, his resources being the sum of current and discounted future earnings over his lifetime and his current net worth. As a result of this maximization the current consumption of the individual can be expressed as a function of his resources and the rate of return on capital with parameters depending on
Thus, this theory assumes that an individual prefers to consume a constant proportion of their income regardless of fluctuations in that income, that an individual will neither be left nor leave any resources at the end of their life-cycle, that income is constant and expected to be consumed entirely over a consumer’s life-cycle, and that all households have the same earnings and life expectations. These very ideas are instilled in a simplified version of Modigliani’s consumption function, in which consumption is a constant proportion $k$; as determined by one’s preferences and expressed in the utility function; of the present value of one’s expected future earnings (FI), current earnings (CI) and net worth (NW), given by $P(FI, CI, NW)$. Namely,

$$E_{quation\ 6}: \ C_t^T = kP(CI, FI, NW)$$

The equation describes the consumption function of an individual in a given year $t$ for a person of age $T$, as determined by the individual’s utility function or preferred constant consumption over time, interest rates which are assumed to be constant over time in the equation, and the age of the person. Alternatively, from another simpler perspective, this equation can also be represented as:

$$E_{quation\ 7}: \ C = \beta W + \alpha I$$

Where $W$, represents wealth according to the value of one’s current assets, $I$ represents income, $\beta$ represents a marginal propensity to consume from one’s wealth, and $\alpha$ represents the marginal propensity to consume from one’s income, similar to Keynes. This simply says that consumption for each time period consists of a proportion of one’s expected wealth and a proportion of their expected income, where the total proportion of wealth is equally allocated across a consumer’s entire life-span and the total proportion of income is allocated between current spending and retirement savings. When it comes to the application of these earlier theories to modern theories however, once again, some
potential adjustments appear necessary. Precisely, these assumptions would run into problems today, as it is often the case that consumers not only consume more than their income over their lifetimes, but may even have unpaid debts at the end of their life-cycles. This equation, furthermore, does not account for the fact that with debt financing, people are able to spend more than their actual income over their lives and may not as a result have restricted future earnings or may include leverage in the constant proportion $k$. Yet again, this equation also fails to address the fact that people live, let alone continue to work, well beyond the age of 50. This means under the assumptions of this theory, this equation could drastically underestimate the present value of earnings and general income, and could therefore as a result, underestimate the proportion of income consumed in any given time period. Likewise, it is flawed by nature to assume that the rate of return is constant over time, given the equation, but for simplicity purposes it can be assumed that the changes in the rate of return balance out over time, making these changes insignificant. These flaws while minimal, can apply to yet another similar theory.

Similarly, Friedman’s *Permanent Income Hypothesis* also attempted to accommodate the role of consumer income expectations in addition to current income, in influencing consumer spending decisions and preferences. As described in Milton Friedman’s *A Theory of the Consumption Function (1957)*, Friedman’s *Permanent Income Hypothesis* states that consumption is a proportion of permanent income or expected future income. Much like Fisher’s, this theory also incorporates the idea of consumption smoothing, which assumes that consumers prefer to consume a constant amount of income over time as determined by the consumer’s beliefs about their permanent income, in the formation of consumer spending preferences. More
specifically, Friedman’s theory is based on the assumptions that consumers have infinite life-spans (for calculation purposes), that consumption for an individual is constant over time, and that consumers can borrow to achieve constant consumption over time. In the words of Friedman, “The permanent component is to be interpreted as reflecting the effect of those factors that the unit regards as determining its capital value of wealth: the nonhuman wealth it owns; the personal attributes of the earners in the unit such as their training, ability, personality; the attributes of economic activity of the earners, such as the occupation followed, the location of the economic activity, and so on…The transitory component is to be interpreted as reflecting all “other” factors…” (Friedman 1957, 21).

Likewise, this theory and the relationship between variables; which Friedman has termed income (Y), permanent income (Yp), transitory income or the unexpected component of income (YT), consumption (C), permanent consumption or a consumer’s expected consumption (CP), which depends on the nominal interest rates (i), an individual’s wealth (w), an individual’s consumption preferences (u), and transitory or unexpected consumption (CT); can be conceptualized through the use of three simple equations.

Equation 8: Y = Yp + YT

Equation 9: C = CP + CT

Equation 10: CP = k(w, i, u)Yp

In other words, Friedman refers to consumption as the proportion of a consumer’s income that they expect to consume; given their current wealth (w), cost of borrowing (i), and preferences (u); in addition to any extra unexpected consumption due to illness or other unpredictable means (CT). These equations collectively provide the basis of the theory and its assumptions. In the realm of assumptions in which these equations and the theory rely on, many of these do not hold under current conditions. To elaborate, while
the theory does assume that a consumer can use debt in order to ensure constant consumption over their life-span due to the interest rate component, it fails to account for the fact that the existence of debt may change the long-run assumptions of a consumer about their long-run expected income. Additionally, when it comes to the theory’s assumption that consumers prefer to keep consumption constant over time, the theory does not take into consideration that one’s ability to do so may rely on not only the use of debt, in the case of student loans or other means, but also on the eventual payment of such large debt quantities over time, which may skew a larger portion of one’s consumption towards the beginning of their lives. Hence, while these assumptions are theoretically significant, given the current evolving economic factors, not all of its assumptions hold when analyzing real world behavior. This critique remains true for other prevailing theories of the time, as well.

Much like Friedman’s theory, Robert Hall’s Random Walk Hypothesis also deviates from the traditional Keynesian theory. This theory primarily combines two previously established economic ideas, which include the ideas established by Friedman’s Permanent Income Hypothesis, as well as the idea established by John F. Muth in “Rational Expectations and the Theory of Price Movements” (1961) that consumers have rational expectations, or use all information available to them in their decision-making. Stated more explicitly, the theory follows that since people base their consumption on their long-run expected income and use all information available to them in making decisions, over time consumption will be unpredictable, or a “random walk” (Hall 1978, 974). In Robert Hall’s “Stochastic Implications of the Life Cycle-Permanent Income Hypothesis: Theory and Evidence” (1978), Hall explains “Earnings, $w_t$, are stochastic and are the only source of uncertainty. In each period, $t$, the consumer chooses
consumption, $C_t$, to maximize expected lifetime utility in light of all information available then” (Hall 1978, 974). Generally speaking this says that consumers decide to consume based on their desired life-time consumption, as well as based on all information that has been provided about their futures. Since earnings are unpredictable, however, consumption will rely on unexpected changes in earnings. This can also be taken to mean that consumption behavior can only be altered by surprise events, given that consumers base consumption on expectations of their future income and have all information regarding this. Conceptually, these ideas are also embedded in a severely simplified version of Hall’s original equation. As Hall attempted to utilize the Euler equation to compare expected consumption of individuals to changes in stock market prices, in simplification, into two periods, this equation can be conceptually represented as:

Equation 11: $C_2 = C_1 + b$

Where $C_2$ is second period consumption, $C_1$ first period consumption, and $b$ is the extra variable accounting for unexpected changes (random variable). This equation can be interpreted directly to mean that consumption in the long-run, or in the second period, is unpredictable since it only depends on what was consumed in the prior period and a random variable. Furthermore, this would imply that policymakers should implement unpredictable policies in order to induce the desired reactions in consumption. Contrary to this statement, studies suggest that this, along with other aspects of this theory, is not true. To be more specific, it has been shown that “Data on consumption and income, however, appear not to satisfy this implication of the random-walk theory. When income is expected to fall by $1, consumption will on average fall at the same time about $0.50” (Mankiw 2007, 480). Therefore, predicted changes in income do in fact, also influence
changes in consumption; discrediting this part of the theory. It has been noted, in
addition, that this could possibly be due to the fact that people do not actually have or use
all information available to them, as assumed by this theory given its rational
expectations of consumers (Mankiw 2007, 480). This once again, suggests that the
ultimate assumptions that the theory is derived from are unrealistic, and thus this theory
loses credibility. Hence, a major critique and drawback to this theory is in its
inapplicability to actual data. Nonetheless, Hall’s theory was not unique in its deviation
from other more-well known theories.

In contrast to many economic theories of consumption, David Laibson’s *Pull and
Instant Gratification* theory of consumption takes a psychological approach to explaining
consumer behavior. Specifically, this theory says that while consumers often intend to
save a certain amount of their income, they often fail to save as much as previously
planned due to “the pull of instant gratification.” This “pull of instant gratification” can
be described as the preference to indulge in immediate desires when confronted with such
decisions in the short-run, while believing that one can wait to obtain such gratification in
the long-run. As David Laibson and Christopher Harris explained in “Instant
Gratification” (2000) this “…implies that current preferences are inconsistent with those
held in the future….early selves are faced with two competing strategies with very
different implications for current consumption. In the first strategy, the early self
consumes a lot, thereby depriving later selves of resources that those later selves would
wastefully splurge. Alternatively, the early self consumes relatively little, thereby
providing later selves with resources so that those later selves will be able to both
consume *and* save for the future. As wealth rises, the early self switches from the first
strategy to the second…” (Laibson and Harris 2000, 2). Put another way, people prefer to
consume more now, and the more they consume now the less they will be able to consume later, and therefore the magnitude of their preferences for immediate versus later consumption changes over time. For example, when confronted with the decision of obtaining a candy bar today or two tomorrow, one will often choose the latter, while when confronted with the decision of obtaining a candy bar in 100 days verses two in 101 days, they will tend to decide today to wait an extra day in the future (Mankiw 2007, 481). This decision to wait in the long-run, however, according to Laibson, will change once one comes to the 100th day and one’s preferences incline to favor immediate gratification (Mankiw 2007, 481). He therefore uses this to describe the tendency of consumers in the present to promise to save more in the future, but to fail to do so, when actually confronted with the choice between saving and spending the money. This theory, moreover, has important implications for attempting to change the saving behavior of individuals. A study showed that when people agreed to a plan in which they promised to allocate a portion of their future income earnings to a retirement plan, but none of their current income, 78% of people joined the plan, as well as the savings of those people had increased from 3.5% to 13.6% (Mankiw, 2007, p. 481). This says that by taking advantage of such biases in consumer behavior towards instant gratification, policies that strive to commit individuals to a plan in present day for the future will likely be successful in altering consumer spending or saving habits. While this theory successfully has managed to divert its assumptions away from those of typical theories, it still fails to account for the significant impact of various economic factors. One of these salient economic factors is that of inflation. Specifically, the theory suggests that if people do not spend the money now that they will have that money available to them to spend in the future. In stating this, however, the theory does not consider the potential change in
purchasing power that could result from waiting to spend this money in the future. Just as
it fails to consider the impact of inflation on consumer spending power, much like other
theories, it also does not consider the influence of debt on one’s decision to save. In this
way the presence of debt is likely to lessen the chances that a consumer will save in the
present given their ability to borrow to obtain necessary funds in the future. These
problematic assumptions, while not pertinent to this theory alone, as seen above, are
notably embedded among all of the theories discussed.

While the ability of economists to predict consumer spending and saving
behavior, using traditional models, has long depended upon the ancient prospects of
theories formulated by Keynes, Friedman, and many others; in the face of modern
contributions and financial innovation, the relevance of such theories can be called into
question. These various theories can be traced back to Keynes’ *Absolute Income
Hypothesis*, which introduced the idea of the MPC and established a perceptual
relationship between changes in income with changes in consumption and savings. Other
theories were quick to follow, as criticism of Keynes’ theory spawned Fisher’s *Theory of
Intertemporal Choice*, which thereby projected Keynes’ current income assumption onto
the expected future income. Furthermore, in the same way, Fisher’s theory then gave way
to Friedman’s *Permanent Income Hypothesis* and Modigliani’s *Life-Cycle Hypothesis*. In
contrast to these economically based theories, various other theories had roots in
psychology. This was true of Robert Hall’s *Random Walk Hypothesis*, which regarded
long term consumer behavior as unpredictable, as well as this was true of David
Laibson’s *Pull and Instant Gratification theory* of consumption, which deemed
consumption as a bias in consumer preference towards the immediate indulgence in their
current desires rather than waiting to receive more at a later time. Overall, these theories
represent different perspectives of viewing and predicting behavior, as well as their relevance can be evaluated from the perspective of modern data.

Particularly, as modern day adjustments and conditions such as the greater availability of credit in times of low interest rates and seemingly minimal restrictions have substantially impacted consumer behavior, the ability of traditional theories to predict current consumer behavior is faulty and thus subject to critique. In sum, some of the major gaps in these theories are in their exclusion of debt and the various kinds of debt, their disregard of the impact of interest rates, and in their unrealistic assumptions about consumers such as the assumption that consumers have consistent preferences over time, or prefer to consume a consistent proportion of their income over time. Nonetheless, these gaps in previous theories bring us to an alternative theory, based on these traditional ones, in order to depict modern consumer behavior with more accuracy, as well as to account for these various factors.
Chapter 4 A New Theory of Consumption

Just as many prominent economic theorists have attempted to respond to the criticism of the traditional Keynesian theory through the formation of newer models, in doing so they have still failed to encompass a significant piece of consumption behavior. That piece, as it still remains missing today, is that of debt and the interest rates.

Consequently, the exclusion of debt from these traditional theories has created inaccurate predictions about consumer spending behavior by ignoring both the ability of consumers to borrow in order to spend more now, and the accompanying hindrance in spending which follows. Not only has this overlooked the impact of debt on the consumer’s ability to spend, but this has also significantly disregarded the ability of consumers to distribute this debt differently over their lives depending upon need, cost, and availability of debt.

Thus, in an effort to create a model in which the most accurate predictions can be formed, this thesis proposes a new model, based on traditional ones, which will incorporate debt, the impact of debt on spending behavior, the change in the distribution of debt over one’s lifetime, and the influence of changes in both the availability of and cost of credit.

Through this model it can be argued that borrowing, in general, will lead to a negative net change in real GDP, as will be demonstrated through an example.

Following in the footsteps of the traditional Keynesian theory of consumption, this theory, hereby referred to as The Lifestyles Hypothesis, states that spending and savings behavior will be inversely related in the absence of debt. In the presence of debt, however, in contrast to Keynes’s theory, the theory predicts that the spending and savings behavior of an individual becomes time dependent. That is, when a consumer holds debt, there are only two possible time periods: an earlier period in one’s life, in which money is borrowed, and a later period, in which debt is paid off. More specifically, during the
earlier period, in which the money is borrowed, the amount of available cash in the pocket of the individual will increase and, henceforth, will increase spending behavior, while having no effect on the saving behavior of the individual, holding all else constant. For our purposes, as we are referring to long-term privately held debt, we will assume that this earlier period is long, but not necessarily longer than the later period. Therefore, paving the way for the introduction of the model itself, this increased income resulting from the borrowed money will be referred to as available income. Namely, where available income in the earlier period can be defined as the highest attainable income given an individual uses all of their available borrowing power, denoted by D, in addition to all of their disposable income, or income after taxes (Y−T). Conceptually, these ideas of the earlier period available income are included in Equation 12 below.

\[ E_{earlier} = Y - T + D \]

This equation shows that the total amount of money in the pocket of an individual can be determined by the amount available for them to borrow (D), in addition to their disposable income (Y−T). It is important to mention here, however, that D refers to the absolute borrowing limit, similar to the credit limit on a credit card, to the individual. Building off of this, this theory will further assume that an individual knows the amount that they will be borrowing in advance, as is often the case when it comes to long-term borrowing, as seen in the case of home loans and student loans. Much like the purpose of the MPC in Keynes’ traditional consumption function, the proportion of debt that will be borrowed, will also be determined by the MPC. Once again, in order to make these assertions plausible, we will assume that an individual will consume the same proportion of their disposable income as they will borrow from their absolute maximum borrowing pool. As a result, directly deriving the equation from the Keynesian model, plugging in
our new available income for disposable income and asserting the assumptions discussed, we will get our new earlier period consumption function. These thoughts are stated mathematically in Equation 13.

*Equation 13:* \( C_{\text{earlier}} = C_0 + MPC(Y - T + D) \)

As shown in Equation 13, consumption in the earlier period is dependent upon autonomous consumption; an individual’s propensity to consume, which will determine how much they will spend of their income and how much they will borrow using credit; in addition to the availability of credit to the individual; and disposable income. It is also important to note here that in direct contrast to what Keynes’s theory proposed, now with the use of debt, one can not only consume the entirety of their income, but, by using debt, they can consume more than their current income during the earlier period. In contradiction to what Keynes predicted, this will mean as income increases, consumption can increase by more than the entirety of the change in income, while simultaneously the MPC will not be greater than 1, since the borrowed amount has been added into income.

In further analyzing Equation 13, it can also be seen that the availability of credit, \( D \), will almost always increase the spending behavior of the individual during the earlier period, holding all other variables constant, and while the other determinants of available income \((Y,T, C_0)\) may influence the savings behavior of an individual, this theory suggests that while holding all else constant, the availability of credit will not have an effect on the saving behavior of individuals during the earlier period. This may not remain true in the long-run, and as we will see, it does not. Of course, it is important to keep in mind that other factors may, in fact, impact the savings behavior of the individual in this case, as would be true in the case of low interest rates where an individual’s saving is likely to be deterred by the lack of incentive, since these conditions are more conducive to
borrowing. This would, as a result, make a decrease in savings and an increase in debt more likely. Other factors which may also influence the savings and spending behavior of the individual in the presence of debt include the availability of credit, which depends upon interest rates, the credit rating of the individual, and even the income of the individual. It is also possible, moreover, that expectations about future borrowing or credit availability could also cause a decrease in savings. While it is true that credit alone does not influence one’s saving and spending behavior according to our theory in the earlier period, in order to make the theory plausible it is necessary to account for the impact of borrowing in the long-run, which brings us to the later period available income.

Similarly, in the second time period in which the consumer holds debt, termed as the later period, the amount of cash available in the consumer’s pocket will decrease as the consumer pays back the debt in addition to paying interest on the debt. Therefore, using what we have established for this theory already, the theory would predict that consumption and savings will decrease as the total cash available to that individual decreases as a result of now having to commit cash to pay debt and interest. Hence, our later period available income will follow.

Equation 14: \( Y_{\text{Later}} = Y - T - (1 + i)D \)

From Equation 14 it can be inferred that available income in the later period is nothing more than the total amount of income that will be available after debt and interest on the debt \((1+i)D\) are paid off, along with taxes \((T)\). That is, where the interest rate \((i)\) represents the annual interest rate in percentage terms, as our equation only pertains to a one year period of consumption. This will be elaborated on later. While correspondingly, \(\text{MPC*}D\) represents the amount of debt actually borrowed, given the individual’s borrowing restriction, \(D\). In other words, the later period available income is represented
by disposable income less the largest possible amount borrowed and interest on the borrowed proceeds. This is particularly intuitive, as one can expect the total income available to them to be significantly less when a proportion of their income must be dedicated to paying off their debt and interest on the debt. Likewise, it follows that such a large decrease in income will deter consumption as a result. This can be seen by looking at the later period consumption equation. Just as for the earlier period, this later period consumption function can be found by plugging in our new available income for disposable income into the Keynesian equation, as has been done in Equation 15 below.

Equation 15: \( C_{\text{Later}} = C_0 + MPC(Y - T - (1 + i)D) \)

Equation 15 shows that consumption in the later period will thereby be determined by autonomous consumption, the propensity to consume, disposable income, and the total amount borrowed, in addition to the interest due \((MPC(D(1+i)))\). Therefore the more borrowed, the lower consumption will be in the later period as a result. This can also be taken to mean, once again, that the larger income is, holding the amount borrowed and all else constant, the larger consumption will be.

Once again, all of the assumptions asserted for the earlier period apply to the later period. Specifically, the theory assumes that this later period is long and determined by the consumer, but not necessarily longer than the earlier period that \( D \) represents the maximum amount of private long-term debt that an individual can borrow that an individual knows how much they are going to borrow ahead of time, that an individual cannot borrow additional long-term debt while they are paying back debt and that an individual intends to pay off their debt. As a result of these assumptions and equations, these new consumption equations will have important implications for determining whether the net change in GDP of the two time periods is positive or negative, which
even more importantly will have significant implications for the economy as a whole.
This impact of debt in each individual period, as well as overall for both periods, can be
determined through the derivation and analysis of the resulting real GDP.

To build on the groundwork that has been established for the theory, through
derivation of real GDP (Y), we can determine what the inclusion of debt in this theory
implies for real GDP and the economy. This will be done both algebraically and then
using an example in order to analyze the effects of our new earlier and later consumption
equations, as well as to enable us to properly interpret the results of the example. We start
by plugging in our new consumption equation for both the earlier and later period, into
Keynes’s real GDP equation.

*Equation 16:* $Y_{earlier} = C + I + G + (X - IM)$

Where C=consumption
I=investment
G=government spending
X-IM=exports-imports=NX=net exports

Inserting the earlier consumption equation:

$Y = C_0 + MPC(Y - T + D) + I_0 + G_0 + NX_0$

$Y = C_0 + I_0 + G_0 + NX_0 + MPC(Y) - MPC(T) + MPC(D)$

$Y - MPC(Y) = C_0 + I_0 + G_0 + NX_0 - MPC(T) + MPC(D)$

$Y(1 - MPC) = C_0 + I_0 + G_0 + NX_0 + MPC(D - T)$

$Y = \frac{C_0 + I_0 + G_0 + NX_0 + MPC(D - T)}{(1 - MPC)}$

$Y_{earlier} = \frac{C_0 + I_0 + G_0 + NX_0 + MPC(D - T)}{MPS}$
From this it can be inferred that MPC is directly related to real GDP; i.e., the larger the MPC is, holding all else constant, the larger Y or real GDP will be and vice versa. This tells us that the less people spend (or the more they save) of each unit of additional income, the smaller real GDP will be as a result. Though, notably with the inclusion of debt, unlike Keynes’s original version, since the new numerator includes the addition of MPC(D), holding all else constant, while a lower MPC will lead to a smaller real GDP, it will not lead to as much of a decrease in real GDP as Keynes’s model previously predicted. This can be explained by the fact that even though people are saving more of each dollar of income they receive, they are also able to spend more because of their ability to borrow additional money to consume. Therefore their consumption and thus real GDP, for each additional dollar will not be as dramatically decreased by their increase in savings. Hence it is also true that a higher MPC (lower MPS) will lead to a higher real GDP, even higher than previously predicted. Once again this can be explained by the ability to borrow, which will allow people to spend more of each dollar and as a result will lead to an even larger real GDP, initially, than if consumers did not have this ability. Then, it is also true that in the short-run or the earlier period, the more available debt is, represented by D in the numerator, the larger real GDP will be as long as the MPC is not zero, which by definition (0<MPC<1) will not be the case. It is also important to note that this equation overall will always remain positive or equal to zero, since debt is being added while nothing is being subtracted, and the other components in the numerator are not likely to be negative unless imports were to be exceedingly high. In addition, for all of this to hold we must assume that D>T, or that total borrowing power is larger than the amount of taxes the individual pays. Overall, holding all other variables constant, this equation tells us that the inclusion of debt will therefore increase real GDP.
in the short-run (first year of borrowing) or during the earlier period. While this is in fact true in the short-run, this differs dramatically in the long-run when the debt is paid back in the later period.

Just as we did for the earlier equation, in order to determine the impact of debt in the later period or in the longer term, we will analyze real GDP or Y the exact same way using the later period available income.

*Equation 17:* \( Y_{\text{Later}} = C + I + G + (X - IM) \)

Where C=consumption

I=investment

G=government spending

X-IM=exports-imports=NX=net exports

Inserting the later consumption equation:

\[
Y = C_0 + MPC(Y - T - (1 + i)D) + I_0 + G_0 + NX_0
\]

\[
Y = C_0 + I_0 + G_0 + NX_0 + MPC(Y) - MPC(T) - MPC(1 + i)(D)
\]

\[
Y - MPC(Y) = C_0 + I_0 + G_0 + NX_0 - MPC(T) - MPC(1 + i)(D)
\]

\[
Y(1 - MPC) = C_0 + I_0 + G_0 + NX_0 - MPC(T + (1 + i)D)
\]

\[
y = \frac{C_0 + I_0 + G_0 + NX_0 - MPC(T + (1 + i)D)}{(1 - MPC)}
\]

\[
y_{\text{Later}} = \frac{C_0 + I_0 + G_0 + NX_0 - MPC(T + (1 + i)D)}{MPS}
\]

In tandem with the earlier period, while not initially intuitive from the equation above, if all other variables including D are held constant, as the MPC is increased (and the MPS is decreased as a result), real GDP as a whole will increase. Conversely, the reverse will also be true, meaning that as the MPC decreases, real GDP will also decrease as a result.
This is particularly true since the MPS in the denominator will by definition be a positive number less than 1 (proper fraction), and therefore will increase Y as a result of the MPC increasing since it will become a multiple greater than one (the smaller the denominator, the larger the multiplier). This of course, is assuming that $C_0 + I_0 + G_0 + NX_0$ is greater than or equal to $(MPC(T + (1 + i)D))$. This implies, in the case that all variables except D were to be considered constant, that taking on a large enough amount of debt (MPC(D)) will lead to a smaller real GDP in the later period and thus a negative net real GDP, or negative change in real GDP. Likewise, this also implies that while the proportion of additional income consumed increases, real GDP will increase so long as the proportion of debt consumed is not too large, since otherwise the numerator could potentially be negative, which we know economically is impossible. The collective impact of both periods together, therefore, cannot be determined from these individual equations alone, however. Consequently, in order to determine their collective impact, we will examine the net change between the two periods.

Using what we have established in Equation 16 and 17, in order to analyze the net impact of both of these individual periods, the net change will be derived algebraically, by plugging in the end result of these equations.

**Equation 18: Net $\Delta Y = Y_{\text{Later}} - Y_{\text{Earlier}}$**

\[
Net \Delta Y = \frac{C_0 + I_0 + G_0 + NX_0 - MPC(T + (1 + i)D)}{MPS} - \frac{C_0 + I_0 + G_0 + NX_0 + MPC(D - T)}{MPS}
\]

\[
Net \Delta Y = \frac{C_0 + I_0 + G_0 + NX_0 - C_0 - I_0 - G_0 - NX_0 - MPC(D - T) - MPC(T + (1 + i)D)}{MPS}
\]
\[ Net \Delta Y = \frac{0 - \text{MPC}(D - T) - \text{MPC}(T + (1 + i)D)}{\text{MPS}} \]

\[ Net \Delta Y = \frac{\text{MPC}(-D + T - T - (1 + i)D)}{\text{MPS}} \]

\[ Net \Delta Y = \frac{\text{MPC}(-D - (1 + i)D)}{\text{MPS}} \]

\[ Net \Delta Y = \frac{\text{MPC}(-D - D - Di)}{\text{MPS}} \]

\[ Net \Delta Y = \frac{\text{MPC}(-D)(1 + 1 + i)}{\text{MPS}} \]

\[ Net \Delta Y = - \frac{\text{MPC}(D)(2 + i)}{\text{MPS}} < 0 \]

This says that the net change in real GDP, or the cumulative effect of an individual borrowing in the earlier period and paying back the debt in the later period, is completely dependent upon the availability of credit, D, the interest rate, i, and the individual’s propensity to consume (or save). Looking at the end result, this equation tells us that the end result of borrowing (when the earlier and later periods are the same length, or one year each in this case), will be harmful in the long-run no matter what. On the other hand, it is worth noting that the only way that this net change can be made non-negative is if either the MPC (or MPS), D, or i are made negative. Nonetheless, this proposition is nearly impossible since by definition the MPC and MPS are between zero and one, since interest rates cannot be negative as this would mean being paid to borrow, and since one cannot have a negative borrowing limit as this would imply that no one is able to borrow but can only lend. Therefore, this suggests that it is unrealistic to assume that any borrowing results in a positive net change in real GDP. It is possible, however, that the net change is zero, in the instance that all individuals have a borrowing limit of zero and assuming that all other factors of the earlier period consumption are unchanged.
in the later period consumption, making this net change zero as a result. Particularly, in considering a case in which the earlier and later periods were to be longer than one year each, in contrast to the current equations, it is also notable that when the earlier period is longer than the later period, the larger the amount of the accumulated debt \((D(MPC))\) and the larger the payment of this debt will be \((D(1+i)(MPC))\), meaning the larger the amount that will be subtracted in total, as seen at the very top of the derivation of the equation, making for an even larger net negative. It is also evident that the longer the earlier period is, the larger the amount of debt that will be accumulated in the earlier period, resulting in an even larger amount of debt and interest that will need to be paid back in the later period. The same will effectively be true when the amount borrowed in the earlier period is exceptionally large unless the later period is exceedingly long, leaving ample time to pay off the debt in increments. Then, it is not surprising that the net change in real GDP is according to the theory, always negative.

Consequently, this means that the overall effect of borrowing in the long term, at least in terms of long-term debt, will be to hurt the economy by decreasing real GDP in the long term, while only temporarily increasing real GDP in the short-run. Even more significantly, this has important implications for predicting the long-term effects of accumulating student loan debt on the economy, as well as in predicting the retirement behavior of individuals. This is true as student loans are an exact example of borrowing a lot earlier on in life, and moreover will have a dramatic negative effect on the economy overall in the long term. More importantly for retirement, as large amounts of accumulated debt will restrict more of an individual’s future income, this will mean delayed retirement for many individuals who have taken on large amounts of debt. This
negative impact on GDP and the economy can be further displayed through a numerical example.

\textit{Equation 19: }$Y_{Earlier}$:

Where $C=$ consumption$=1,000+0.75(Y-T+D)$

$I=$ investment$=2,000$

$G=$ government spending$=4,000$

$T=$ taxes$=2,000$

$D=$ maximum can borrow$=500$

$I=$ interest rate$=5\%$

$X-IM=$ exports-imports$=NX=$ net exports$= -2,000$

$Y = C + I + G + (X - IM)$

So,

$MPC=0.75$

$C_0=1,000$

Inserting the earlier consumption equation along with numerical values:

$Y = 1,000 + 0.75(Y - 2,000 + D) + 2,000 + 4,000 - 2,000$

$Y = 5,000 + 0.75(Y) - 0.75(2,000) + 0.75(D)$

$Y - 0.75(Y) = 5,000 - 1,500 + 0.75(D)$

$Y(1 - 0.75) = 3,500 + 0.75(D)$

$Y = \frac{3,500 + 0.75(D)}{0.25}$

Now, using $D=500$ above:
\[ Y_{\text{earlier}} = \frac{3,500 + 0.75(500)}{0.25} = \frac{3,500 + 375}{0.25} = \frac{3,875}{0.25} = 15,500 \]

Doing the same for the later period:

*Equation 20: \( Y_{\text{later}} \):*

Where \( C=\text{consumption}=1,000+0.75(Y-T-D(1+i)) \)

\( I=\text{investment}=2,000 \)

\( G=\text{government spending}=4,000 \)

\( T=\text{taxes}=2,000 \)

\( D=\text{maximum can borrow}=500 \)

\( i=\text{interest rate}=5\% \)

\( X-\text{IM}=\text{exports-imports}=NX=\text{net exports}= -2,000 \)

\[ Y = C + I + G + (X - IM) \]

So,

\( \text{MPC}=0.75 \)

\( C_0=1,000 \)

Inserting the later consumption equation and numerical values:

\[ Y = 1,000 + 0.75(Y - 2,000 - (1 + 0.05)D) + 2,000 + 4,000 - 2,000 \]

\[ Y = 5,000 + 0.75(Y) - 0.75(2,000) - 0.75(1.05)(D) \]

\[ Y - 0.75(Y) = 5,000 - 1,500 - 0.75(1.05)(D) \]

\[ Y(1 - 0.75) = 3,500 - 0.75(1.05)(D) \]

\[ Y = \frac{3,500 - 0.75(1.05)(D)}{(1 - 0.75)} \]

\[ Y = \frac{3,500 - 0.75(1.05)(D)}{0.25} \]

Plugging in \( D=500 \)
\[ Y = \frac{3,500 - 0.75(1.05)(500)}{0.25} \]

\[ Y = \frac{3,500 - 393.75}{0.25} \]

\[ Y_{Later} = \frac{3,106.25}{0.25} = 12,425 \]

Intuitively, real GDP will be smaller in the later period than in the earlier period, as seen since \(12,425 < 15,500\). The effect on the net real GDP can be seen by plugging in both of these numbers into the end result of Equation 18.

*Equation 21: Net \( \Delta Y \):*

Where \( D = 500 \)

\( i = 5\% \)

\( MPC = 0.75 \)

\( MPS = 1 - MPC = 0.25 \)

\[ Net \Delta Y = Y_{Later} - Y_{Earlier} \]

\[ Net \Delta Y = - \frac{MPC(D)(2 + i)}{MPS} \]

\[ Net \Delta Y = - \frac{0.75(500)(2 + 0.05)}{0.25} \]

\[ Net \Delta Y = - \frac{768.75}{0.25} = -3,075 \]

Just as predicted, the net change comes out to a negative 3,075. It is also apparent, since we established in Equation 16 and 17 that the earlier period consumption will always be larger than the later period consumption when the later period is equal in length or longer than the earlier period, that when borrowing, the net change in real GDP
will always be negative. Using deduction, it is also easy to see that the larger \( D \) is, holding all else constant, the larger this negative number will be. This is also seen to be true for the interest rates when all else is constant. This has significant implications for the health of the economy as this suggests that assuming people’s borrowing behaviors are not deterred by a higher cost of borrowing, higher interest rates and a higher availability of credit, in general, will hurt the economy. Most importantly, by analyzing both the net change and the real GDP of each period separately, we have established that the addition of debt will hurt the economy in the long-run by actually decreasing real GDP, and therefore these new consumption equations will be important in analyzing the impact that debt will have on the formation of policy.

While collectively previous attempts to create realistic economic models of consumer behavior have sufficed insofar as we have assumed that our income could solely be divided between spending and savings, as we now recognize, debt has become a salient contributor to our spending. Likewise, the exclusion of debt from these prominent traditional theories was particularly problematic as it meant that these theories ignored the possible increase and decreases in available income that could occur as a result of consumers taking on and paying off debt, as well as this further ignored the time element and distribution of debt over their life cycles. These significant missing components, therefore, meant that a salient portion of income would not be accounted for by the models. This is exactly what this thesis accomplishes by creating a model which attempts to correct these very flaws. Using this model, it can be argued that borrowing, in general, will lead to a negative net change in real GDP, as the previous example illustrated. This will, as a result, have detrimental consequences on retirement, future economic growth, and potentially on the effectiveness of fiscal policy, as will be discussed in a later
chapter. For now, as we have assumed up to this point that the earlier and later period are each only a year in length, as well as we have assumed that interest rates are always simple, in order to account for these aspects, we now turn to an even more complex version of this model.
Chapter 5 The Lifestyles Hypothesis

To further elaborate on the prospects of the theory that we have established thus far, we will now expand both the earlier and later periods of consumption to account for consumption over one’s entire life, rather than only two years of it. Namely, in order to do so, we will begin by assuming that collectively the earlier and later periods are representative of an individual’s entire life, in addition to a retirement period, where the length of time that an individual spends in each time period will depend upon the preferences and nature of the consumer. As far as these different types of consumers are concerned, we will further classify them into three categories, before analyzing the impact of each. First, however, it is necessary to lay the groundwork for determining the economic impact of each of these types of consumers, by introducing a generic version of the new earlier and later period consumption functions, as well as by introducing the lifetime consumption function. Collectively, these will then be used to give an even more accurate depiction of the influence of debt on the economy, as it is most often not the case that people only spend two years of their lives borrowing and paying back debt, as our simplified version assumed.

While our earlier and later period consumption equations previously assumed that one borrows and pays off their debt in a two year period; in order to entertain the possibility that one borrows and pays back their debt over a longer time period, as is often the case, we will now sum our previous annual consumption equations over the time period for which one plans to borrow. For the earlier period, this will begin at time period $s$, where $s$ represents the age of the consumer in which they begin to borrow, $t$ represents a random variable which will keep track of the current age of the consumer, and $j$ represents the age at which the consumer stops borrowing. From this it will also
follow that the later period consumption will begin at time period \( j+1 \), increasing as the individual ages according to the random variable \( t \), and will end at the end of one’s life, represented by \( n \). Though, for retirement purposes, as we will discuss later, one’s life does not necessarily have to end at \( n \), as this will depend on the nature of the consumer. In that case, \( n \) could also represent the end of one’s payback period or the age at which they finish paying off their debt. Mathematically this can is represented by Equations 22 and 23.

**Equation 22: \( C_{Early} \)**

\[
C_{Early} = \sum_{t=s}^{j} \left[ C_0 + MPC(Y - T + D) \right]_t = (j - s + 1) \left[ C_0 + MPC(Y - T + D) \right]
\]

**Equation 23:**

\[
C_{Later} = \sum_{t=j+1}^{n} \left[ C_0 + MPC(Y - T - D(1 + i)) \right]
\]

\[
= \sum_{t=j+1}^{n} \left[ C_0 + MPC(Y - T) - MPC(D(1 + i)) \right]
\]

\[
= (n - (j + 1) + 1) \left[ C_0 + MPC(Y - T) - MPC(D(1 + i)) \right]
\]

\[
= (n - j) \left[ C_0 + MPC(Y - T) - MPC(D(1 + i)) \right]
\]

\[
= (n - j) \left[ C_0 + MPC(Y - T) \right] - (n - j) \left[ MPC(D(1 + i)) \right]
\]

Explicitly, this shows that earlier period consumption is the sum of each individual year’s consumption over the length of the earlier period, as well as later period consumption is
the sum of each individual year’s consumption over the length of the later period (or the remaining length of one’s life). As seen on the right side of Equation 22, in simplified form due to the rules of summation, the earlier period can be reinstated as \((j-s+1)\), rather than simply \((j-s)\), multiplied by the yearly consumption equation. The same reasoning will follow in simplifying Equation 23 as well. Of course as the equations are written in simplified forms, this assumes that consumption is consistent from year to year. Alternatively, however, the summed equations can be used in the latter case in which consumption differs from year to year, making the calculations more complex, but still feasible, so long as future year consumption can be estimated. In deriving these equations, however, it is also important to note that we will refrain from calculating the future value of these sums in predicting the future consumption of the individual, since we have currently defined all of our variables in real terms and calculating a future value of these sums using the inflation rate would give a nominal future value of lifetime consumption. This would make it difficult to decipher the influence that these real variables would have on this nominal value. Thus for simplicity, all variables will be left in real terms. Alternatively, using the interest rate rather than the inflation rate to calculate the future value of each year’s consumption would be implausible since growing each year’s consumption by the interest rate, for an individual, would assume that one saves a portion of what they consume each year. Therefore, this would be nonsensical.

On a related note, as we previously calculated consumption for only one year, it was unnecessary to consider the possibility of simple versus compound interest rates in calculating our later period consumption. In considering our new later period consumption equation over multiple years, however, as shown above, in order to give the
most accurate predictions, we will now need to consider the possibility of simple versus compound interest rates in calculating our later period consumption. In thinking about simple versus compound interest rates, it is important to consider that in application many loans such as student loans can have either simple or compound interest payments, though it is generally more common for shorter loans to assume simple interest and longer loans to assume compound interest. Though in some cases, such as in the case of student loans, while compound interest is more common, depending on the circumstances of the loan either simple or compound interest payments may be assumed. Therefore it is important to consider the case of both simple and compound interest. Thus, we will first begin by recalling that simple interest is simply defined as the annual interest rate \(i\) multiplied by the number of years or the length of the time period, \((j+1-s)\), while compound interest is defined as the accumulated interest, or interest on interest, over a given time period. Also in introducing this into the existing equations, it is important to note that the principal payment is the total amount borrowed during the earlier period or \((j+1-s)*MPC(D)\). Though, in further simplifying Equation 23, it is also noticeable that the assumed principal payment in the later period \((n-j)*MPC(D)\) is different from that of the amount borrowed in the earlier period \((j+1-s)*MPC(D)\), where \((j+1-s)\) represents the length of the earlier period. To adjust for this, we will have to replace this assumed principal amount \((n-j)*MPC(D)\) with the amount actually borrowed during the earlier period \((j+1-s)*MPC(D)\), before taking into account the multi-period interest rates. This can, henceforth, be referred to as the principal payment on the debt, since this represents the total amount borrowed over \((j+1-s)\) years. Now in taking the interest rates into account, to determine the simple and compound interest rates, as we previously defined, we will only need to consider the amount of time taken to pay back the debt, as
determined by the length of the later period \((n-(j+1)+1=n-j-1+1=n-j)\). This is due to the fact that the longer one takes to pay back their debt; the more costly the borrowing will be as a result. So, simply stated, the length of the later period will determine the cost of debt. Thus, taking all of these factors into account, the total interest payment made using simple interest can be defined by the principal payment \(((j+1-s)MPC(D))\) plus the simple interest on that principal payment \(((j+1-s)MPC(D)i(n-j))\), as well as the interest payment made using compound interest can be defined as the compound interest over a given time period of the principal amount \(((j+1-s)MPC(D))\). This can further be exemplified by Equations 24 and 25.

**Equation 24:** Total payment using simple interest

\[
= (j + 1 - s)MPC(D)(1 + (i * (n - j)))
\]

**Equation 25:** Total payment using compound interest

\[
= (j + 1 - s)MPC(D)(1 + i)^{n-j}
\]

Here these equations show the total payments to be made on the debt, including the interest and principal payments, for both simple and compound interest. In interpreting these equations, however, it is important to consider that this model proposes to look at the accumulated effects of debt. This will mean that we will treat these debt payments in the later period as the cumulative debt payments over one’s lifetime, while this will also mean treating the earlier period debt as the accumulation of one’s borrowed proceeds, over their lifetime. Therefore, in another way, \((j+1-s)\)MPC(D) will represent the total amount borrowed over one’s entire lifetime. In rewriting the later period consumption equation, we can now take into consideration simple verses compound interest rates in our later period consumption equation, as well as we will now take into account the
actual principal amount borrowed in the earlier period. To do so, we can now simply use
Equations 24 and 25 to replace the total amount of interest payment on the debt \(((n-j)(MPC(D(i))))\) in Equation 23. Therefore, our final new later period consumption
equation can be represented by Equations 26 and 27.

*Equation 26: Simple interest:*

\[
C_{\text{Later}} = (n - j)[C_0 + MPC(Y - T)] - (j + 1 - s)MPC(D)(1 + (n - j) * i)
\]

*Equation 27: Compound interest:*

\[
C_{\text{Later}} = (n - j)[C_0 + MPC(Y - T)] - (j + 1 - s)MPC(D)(1 + i)^{n-j}
\]

Thus Equations 26 and 27 represent the new cumulative later period consumption
equation, depending on the type of debt one holds, as determined by the type of interest
paid on the debt. Stemming from this, we can see that since the earlier and later periods
are representative of one’s entire life, by simply adding together the earlier period
consumption equation and our new later period consumption equation, we can obtain the
equation for one’s lifetime consumption. In addition, in order to account for the fact that
some consumers may pay off debt more quickly than others, but may not have shorter life
spans than those who pay off their debt more slowly, a new retirement consumption
variable has been added. Simply stated, the retirement income consumption will merely
represent consumption during retirement, but for simplicity purposes we will treat it as a
constant in our equation. From this we will also assume that general retirement
consumption, not taking the time aspect into account, will be much smaller than
consumption during the later or earlier periods. More specifically, this assumption does
not only make sense intuitively due to the fact that income decreases following
retirement, but this assumption is also aligned with the results of some studies done on
retirement spending which state that 53% of those entering retirement decrease their spending, while only 12% increase their spending (Hurd and Rohwedder 2003).

Furthermore, the addition of retirement consumption will help us to determine the total impact of debt, and debt payments on consumption, over one’s lifetime. This new lifetime consumption equation is represented below in Equation 28 and 29, where 28 assumes simple interest and 29 assumes compound interest.

**Equation 28:** $C_{Lifetime \ with \ simple \ interest} = C_{Earlier} + C_{Later} + C_{Retirement}$

\[
= (j - s + 1)[C_0 + MPC(Y - T + D)] + (n - j)[C_0 + MPC(Y - T)] - (j + 1 - s)MPC(D)(1 + (n - j) \cdot i) + C_{Retirement}
\]

\[
= (n + 1 - s)[C_0 + MPC(Y - T)] + (j + 1 - s)MPC(D) - (j + 1 - s)MPC(D)(1 + (n - j) \cdot i) + C_{Retirement}
\]

**Equation 29:** $C_{Lifetime \ with \ compound \ interest} = C_{Earlier} + C_{Later} + C_{Retirement}$

\[
= (j - s + 1)[C_0 + MPC(Y - T + D)] + (n - j)[C_0 + MPC(Y - T)] - (j + 1 - s)MPC(D)(1 + i)^{n-j} + C_{Retirement}
\]

\[
= (n + 1 - s)[C_0 + MPC(Y - T)] + (j + 1 - s)MPC(D) - (j + 1 - s)MPC(D)(1 + i)^{n-j} + C_{Retirement}
\]

These equations can be taken to represent one’s total lifetime consumption, where in its simplified form, $n+1-s (j+n+1-s-j=n+1-s)$, can be taken to represent the total amount of time or years, in which an individual spends borrowing and paying off debt. Thus, in more detail, each shows the total amount consumed over one’s entire lifetime plus the
total amount borrowed, less the total amount borrowed and the total amount of interest paid, in addition to any consumption during retirement. With the addition of retirement consumption, we can assume that a consumer who is able to pay off all of their debts earlier in life will be able to enter retirement earlier than if they are borrowing and paying off debt for a larger portion of their life. In order to interpret the impact of the length of each period properly, this equation will be analyzed according to four cases: the case in which debt is not paid back or not fully paid back, and the case in which debt is paid back and the later period is longer, shorter, or equal in length to the earlier period. This will help to gain an overall understanding of this abstract equation before applying it to some real world examples, in the introduction of the three different types of consumers.

First, in considering the difference between the impact of the compound verses simple interest rates, it is noticeable that the total payment of debt using compound interest will always be greater than or equal to that of the total payment made with simple interest over the same time period. This means that the impact of the later period will always be larger when compound interest rates are used, in comparison to simple interest rates. As a result, lifetime consumption using compound interest rates will always be smaller than lifetime consumption with simple interest rates, no matter how long one spends in each period. Therefore, we will assume this to be true regardless of the other circumstances, in our case-by-case analysis. To begin the analysis on a case-by-case basis, in the case that an individual does not pay off any or some of their debt, an individual will likely have no retirement period consumption since they will die before they retire due to their inability to pay off their debt, as well as they will likely have little to no later period consumption, since they have not in fact begun paying off their debt and therefore will remain in the earlier period of consumption for the entirety of their
lives. In other words, this individual’s lifetime consumption is comprised entirely of
earlier period consumption. Since we are assuming that retirement period consumption is
smaller than general consumption in the later and earlier periods, the end result of this
will be that an individual who never pays off their debt or does not finish paying off debt
over their lifetime, will have a much larger lifetime consumption than one who had paid
off their debts, or than one who had merely not borrowed, assuming all else remains
constant. It is important to note, however, that this result, while true in the case of the
United States where those who claim bankruptcy or die in debt are not forced to pay back
their debts, in other countries where the laws vary, this might not always be the case.
Though, in making this statement it is important to note that we are merely only
considering the individual’s consumption function, since if an individual were to not pay
back their debts, while this would increase that individual’s lifetime consumption, the
burden of the debt will likely fall back on others such as the family of the deceased. Put
another way, while dying in debt will not cause harm to that particular individual, it may
impact the consumption of surrounding others.

Similarly, in the case that an individual does pay off their debt, the impact on their
lifetime consumption will differ based on how long they spend in the earlier period
compared to that of the later period. In the case that an individual pays off debt and
spends more time in the earlier period, in which they borrow, that will mean that an
individual will borrow a lot over their lifetime but will pay it off quickly, making the later
period consumption smaller. Thus, as a result, this will make one’s lifetime consumption
much larger than if the individual had spent longer paying off their debt, while it will still
be less than it would be if they had not borrowed at all since by paying back the debt one
decreases their consumption function by a proportion of the interest payments. Though, it
is important to realize here that in the case that the consumer actually pays off their debt, consumption will be less than if they had not borrowed at all, due to the extra costs of borrowing or the interest. The amount by which one’s consumption, having borrowed, will be less than one’s consumption had they not chosen to borrow, however, varies to some degrees based upon how long each period is.

In the opposing case that an individual spends longer in the later period of consumption than in the earlier period of consumption, it follows that an individual will borrow only a little and will pay it off very slowly over their lifetime. This will further mean that lifetime consumption will be much smaller than if an individual had paid this off quicker or had not borrowed at all, due to the impact of the extra interest payments that will result from paying off the debt much more slowly.

Finally, in the case that an individual spends an equal amount of time in the earlier and later periods, the result will be that one’s lifetime consumption will be smaller than one’s consumption if they had not borrowed at all, by the amount of interest paid on the debt. Now that we have established the lifetime consumption function and instilled a basic understanding of how it varies based upon how long a consumer spends in each period, we can more specifically show the impact on lifetime consumption in the case of more specific types of consumers.

As we have now established new consumption equations representative of one’s lifetime, in essence making the theory more applicable to the real world, in order to help us to use the predictions of this model to our best ability, we will now apply this theory in the case of three different types of consumers, which we will refer to as the conservative consumer, the responsible consumer, and the irresponsible consumer. To be more
specific, the conservative consumer can be characterized as a consumer who borrows very little and pays off their debt very quickly. In application, this will mean that this type of consumer will have a short earlier period and an even shorter later period, while their retirement period will begin much earlier in their life. This will mean that as they finish paying off their debts sooner, they will be able to retire sooner. Likewise, as in this case, in which the consumer prefers to pay off the debt very quickly, this would generally mean that this consumer will only be subject to the use of simple interest rates, due to the fact that they are able to pay off debt quickly enough to avoid any compounding on their interest within a year. In practice, however, in assuming that this kind of consumer, while paying off debt quickly, borrows for more than a year, in constructing the equation, we will use compound interest, due to the fact that compound interest is much more common, especially in the case of heavy loans such as student loans or mortgages. The lifetime consumption of this kind of consumer can be shown through an example of a consumer, in which the consumer borrows from the time they are 20 until they are 40 and is done paying off their debt by the time they are 50. As discussed above, this will mean that the individual will have larger lifetime consumption than if they had spent longer paying off their debt, but will have a smaller lifetime consumption than if they had not borrowed. Then, immediately following, the consumer will go into their retirement period early. It is also important to note here that we will assume that prior to the age of 20, the consumer’s consumption was dependent upon their parents’ income, for the most part, and therefore was accounted for in the consumption equations of their parents, and thereby not necessary to include as part of their lifetime consumption. Now, recalling that n represents one’s age at the end of the later period or the age at which they have finished paying off their debt, j represents one’s age at the end of the earlier period or the age at
which they have finished borrowing, and $s$ represents the age at which one enters the
earlier period or the age at which they begin to borrow; we note that in this case $n$ will be
50, $j$ will be 40, and $s$ will be 20. Therefore, plugging these numbers into Equation 29
above, the lifetime consumption equation of a conservative individual, with these
parameters will look as follows:

\[
\begin{align*}
\text{Equation 30: } \ & C_{\text{Lifetime}} \\
= & (31)[C_0 + MPC(Y - T)] + (21)\textit{MPC}(D) - (21)\textit{MPC}(D)(1 + i)^{10} + C_{\text{Retirement}}
\end{align*}
\]

Therefore, this shows, just as predicted, that lifetime consumption of the conservative
consumer will be much larger than if one had spent longer paying back the debt, since
this this could potentially subject them to more interest payments as a result of a longer
payback period. It is also important to take note of the fact that simple interest in this
scenario would also contribute to making consumption larger than if compound interest
had been used.

Similarly, the responsible consumer can be characterized by those who borrow
and pay off debt slowly over their lifetimes. In contrast to the conservative consumer, this
consumer will spend a moderate amount of time borrowing, or in the earlier period, and a
longer amount of time in the later period, paying off their debt. Though, on the other
hand, this will also mean waiting longer until they are able to enter retirement. Once
again, as mentioned above, this will mean that their lifetime consumption is likely to be
fairly small, since they will spend longer paying off their debt than actually spending the
money used from the debt. This will also subject the consumer to compound interest rates
the majority of the time, since they spend awhile paying off the debt, meaning the amount
of interest paid is likely to be higher overall. Of course, the type of interest may vary, depending upon the form of debt that is taken on. Conceptually, this can also be demonstrated through an example, in which we will assume that the responsible consumer will be in the earlier period from the age of 20 until the age of 40, will remain in the later period from the time they are 41 until they are 70, and therefore will not enter retirement until the age of 70. Once again, notice, using the previous definitions, n will be 70, j will be 40, and s will be 20. By plugging in these numbers into Equation 29, this can be shown in Equation 31 below.

\[ E_{equation \text{ 31}}: \]

\[ C_{lifetime} = (51)[C_0 + MPC(Y - T)] + (21)MPC(D) - (21)MPC(D)(1 + i)^{30} \]

\[ + C_{retirement} \]

Similarly, this also agrees with the predictions, and shows that due to the longer later period or payback period, payments will be larger and as a result, consumption will be much smaller than it otherwise would have been.

In contrast to the other two types of consumers, the irresponsible consumer is one who borrows a lot of money and pays back some or none of their debt over their lifetimes. In other words, the irresponsible consumer dies in debt. Therefore as discussed previously, this will mean, in the case that they never pay back their debt, that they never enter the later period or the retirement period, meaning that since the retirement period consumption will be less than that of the earlier and later periods, consumption will be very large. Extensively, this level of consumption can certainly surpass the level of consumption had they not borrowed in the first place. Nonetheless, this is much more likely in the case that the consumer dies without paying back any debt, or with paying
back very little debt. This also means, on the other hand, that the individual may never retire and thus may have no retirement period consumption, since they will remain their entire lives in debt and never retire as a result. To illustrate through an example, assuming a person lives for 80 years and begins borrowing money at the age of 20, where \( j \) will be 80 and \( s \) will be 20, using our previous definitions. Since in this situation they will never enter the later period or begin paying back their debt, there will be no \( n \) and we see by plugging these numbers into the earlier period consumption equation, denoted by Equation 22, their lifetime consumption would look as follows.

\[
Equation 32: C_{\text{Lifetime}} = (61)[C_0 + MPC(Y - T + D)]
\]

This shows, once again as predicted, that consumption will be very large and in fact will be much larger than if they had paid off their debts, or than if they had not even borrowed in the first place. We will further look at the impact of each of these types of consumers on the entire economy based on the proportion of the population that fits into these categories. In doing so, it is also important to note that while these three classes of consumers may represent many consumers, they are not exhaustive of all possible types of consumers. Though for the sake of simplicity, we will assume this to be true, in interpreting statistics based on this.

Overall, as these equations illustrate the effects of borrowing on consumption, it can be concluded that in the case that the consumer actually pays back their debt, borrowing will lead to a decrease in consumption than if no money had been borrowed, and as a result will have negative implications for the economy as a whole. On the other hand, in the case that debt is not paid back, this may actually lead to higher consumption levels than if no money was borrowed, assuming that consumption in future generations
is not affected through lower bequests from parents. Though, it is important to keep in mind that while this may initially have a positive impact on real GDP, this could be harmful to the economy in other ways. Nonetheless, in order to analyze the overall impact that borrowing will have on the economy, we will first determine the classification of the majority of the population, and then apply the results that we have established for that classification of consumer. As statistics from 2013 suggest that the majority of consumers are of the responsible type, this will mean that the impact on the economy will be a large decrease in consumption, as a result of borrowing. More specifically, with respect to student loans, statistics have shown that in 2009 only 12% of the people who took out a student loan had paid off their student loan a year after graduating (Woo 2013, 9). While on the other hand, 60% of those people had begun paying off their student loan a year after graduating and 28% still had not even started to pay off their debt (Woo 2013, 9). As it can be noted that these statistics were taken following the crisis, however, in looking at data from 2001 and 1994 the patterns were roughly the same, making these results more convincing as a result. This can be seen as 2001 shows 66% of people who begun repaying their loans repayment a year after graduating, 9% who had paid off their loan, and 25% who had not yet begun to repay their loan (Woo 2013, 9). These statistics therefore suggest that the majority of consumers are classified as responsible consumers, while about a third of people are irresponsible, and finally that only a small portion of people are conservative. The impact of this on the overall consumption, for the economy as a whole, will therefore mean that consumption will be much smaller as a result of the majority of people slowly paying off their debt and incurring larger costs of borrowing, than they otherwise would have. Thus this smaller consumption should have a negative impact on real GDP. This will further be
analyzed through the use of the AD-AS and IS-LM models, in order to determine more conclusively, the overall impact that debt will and is having on the economy.
Chapter 6 Debt and the Macro Economy

As we have now laid down the groundwork for applying our theory, by concluding that debt will lead to a decrease in consumption in the typical case of the responsible type of consumer, we can now use this information to determine the broader impact that this decrease will have on the real interest rates, real GDP, prices, and thus the economy as a whole. Likewise, we will attempt to do so by examining the impact of this decreased consumption, according to both the Keynesian Model of Aggregate Demand and Aggregate Supply (AD-AS) in the short-run and the adjustments made in the long-run, and the IS-LM Model. These models can subsequently be used to determine the effect that the consumption habits of each individual type of consumer, as we previously discussed, will have on the economy. Additionally, these models will also prove useful in predicting the behavior of the economy in the case that the typical type of consumer were to evolve. This can be done in each case, by considering the lifetime consumption equation, as previously described, in comparison to the lifetime consumption equation of an individual which does not include debt. Correspondingly, in using both models we will assume that the economy is either currently in a state of full-employment or in a recession, while only briefly considering the possibility of an inflationary or expansionary economy due to the rarity of this event more recently. First, we will begin by evoking the facets of the AD-AS and IS-LM models.

Recall that the Keynesian AD-AS Model plots a downward sloping Aggregate Demand curve (AD), an upward sloping short-run Aggregate Supply curve (ASSR), and a vertical long-run Aggregate Supply curve (ASLR) in the case of the of the long-run version of this model. This is followed with prices (P), represented by the vertical axis, and real GDP, or income (Y) represented by the horizontal axis. For illustrative purposes,
we will assume for the time being that the economy is beginning at full-employment (YFE) and in doing so we will also keep in mind that the long-run version of this model assumes that Y cannot surpass full-employment. Later, however, in applying these models to scenarios, we will also consider the possibility of a recessionary economy, and only briefly consider the possibility of an expansionary economy. While for the short-run model Y will be left unconstrained by the condition of the economy, this will not be true in the case of the long-run AD-AS model, in which the condition of the economy will determine the starting equilibrium of the graph. In graphing the long-run version of this model, however, for the sake of demonstration, the shift in the graph will represent an intermediate moment in the short-run prior to these curves shifting back to their long-run equilibrium. These long-run consequences as a result of these shifts, however, will be discussed in interpreting the long-run impact of these shifts. This will, in turn, mean that the only difference between the long-run and short-run version of this model, graphically, will be the inclusion of an ASLR located at full-employment used to represent different starting conditions of the economy. Hence, in sum, this model primarily represents the relationship between prices and real GDP (Y), in the economy. To illustrate, this is represented graphically for the short-run (SR) in Figure 6 and for the long-run (LR) at full employment in Figure 7.
To elaborate on these graphs themselves, we can recall that the AD curve can be shifted by changes in any of the components of GDP (Y), where an increase in any of the components (except imports) will represent a shift right and a decrease will represent a shift to the left. These components include consumption (C), investment (I) in projects such as construction rather than in financial assets, government spending (G), and net exports or exports less imports (NX=X-IM). From this, it also follows that the AS curves can be shifted according to changes in the labor or capital market. Such changes may include new supply-side policies or economic growth, which would shift the curve to the right, as well as such changes, may include increased workers’ expectations or supply shocks, which would shift the curve left. In this respect, AS can be described as a function of labor, capital, and technology, where increases in these variables would cause a rightwards shift in the curve and vice versa. With this, it is also important to note that long-run changes can emerge from permanent changes, such as a change in technology. In cases like these, however, both the short-run and long-run AS curves would shift.

In contrast to Keynes’s AD-AS model, Keynes’s IS-LM model is a representation of both the goods and service market, and the money and bond market, in which the downward sloping IS curve captures changes in fiscal policy, while the upward sloping LM curve captures changes in monetary policy. In more detail, the LM curve represents the equilibrium in the money and bond market, while the IS curve represents the equilibrium in the goods and services market. From this it follows that the goods and services market will be at equilibrium at the place where production equals planned expenditures. Graphically, this model represents the relationship between real interest rates (r) on the vertical axis and real GDP (Y) on the horizontal axis. Visually this can be
seen in Figure 8, where both the long-run and short-run changes are represented by the same graph here for simplicity purposes.

To be more precise, as shown in Figure 8, as mentioned before, the LM curve is shifted according to changes in monetary policy, which can include changes in the money supply or prices. In this case, increases in the money supply will shift the LM curve right and decreases will shift it left. By the same token, increases in prices (inflation) will cause a leftward shift in the LM curve and decreases will cause it to shift to the right. On the other hand, much like the AD curve, the downward sloping IS curve can be shifted by changes in the components of GDP, which include changes in C, I, G, and NX. Also in tandem with the AD curve, it also follows that increases in these components, except for imports which will have the opposite effect, will shift the IS curve right and decreases will shift it left. As we will see, the prospects of both the AD-AS and IS-LM models will
particularly prove useful in determining the impact of consumer borrowing behavior on the economy according to our different cases of consumers.

Now that we have given a brief overview of Keynes’ AD-AS model and the IS-LM model, we can use these models to demonstrate the effect that household debt will have on the economy for each type of consumer, and eventually for the economy as a whole. For the AD-AS model, this will be shown for the short-run and long-run, according to the graphical impact of changes in lifetime consumption. In attempting to comprise results that can be generalized to the economy as a whole, we will do so using our knowledge that the responsible type of consumer is the dominant type among the population, as supported by a previous chapter. This will begin with the analysis of the impact of the irresponsible type of consumer.

As it was previously demarcated, the irresponsible type of consumer can be characterized as one who borrows a lot and pays some or none of their debt back over their lifetime. We noted that this will presumably lead to an increase in that individual’s consumption over a consumer’s lifetime due to their failure to pay back their debt, ignoring the impact of such cases on the consumption of others for simplicity purposes in our analysis. In other words the impact that the debt of the irresponsible consumer will have on the economy will be measured by that consumer’s earlier period impact, since in the case that they never pay back any debt before death, the consumer will indeed never enter the later period. Henceforth, from this it also follows that the long-run impact will mimic that of the short-run in a magnified form due to the difference in the length of the borrowing period. As a result, in describing the impact according to our economic models, while this impact will be examined in both the long-run and short-run, we will keep in mind that these graphs will look remarkably similar and the short-run effect will
simply mimic that of the long-run in a reduced form. We will begin by analyzing the short-run impact of the irresponsible consumer. Looking back at the lifetime consumption equation for the irresponsible consumer, as we mentioned, their consumption will increase over their lifetime as a result of endless borrowing and, in the extreme case, never paying any of it back. Therefore, as a result, holding all else constant, the short run will exhibit an increase in consumption, smaller than that of the long-run, and in turn will increase AD, shifting the AD curve right while the AS curve will not shift at all. This can be demonstrated graphically in Figure 9.

![Figure 9: SR AD-AS Irresponsible Type](image)

As seen in the above figure, the short-run economic impact of a population of irresponsible consumers borrowing will be an increase in prices and real GDP. Given the short nature of the short-run, however, these effects while important to consider only represent an increment of the economic impact, making the long-run impact of even more
importance in examining the overall impact on the economy. Therefore, this brings us to long-run impact, in which two separate cases will be considered; one in which the economy begins at full employment and another in which the economy begins in a recession. The case in which the economy begins in an expansion will only be briefly investigated.

Now to begin analyzing the economic impact of the irresponsible consumer from the long-run perspective, using the AD-AS model, we note that holding all else constant, this increase in consumption, much like in the short-run, will lead to an increase in AD and shift the AD curve right in a greater magnitude than that of the short-run as lifetime consumption will be greater, while not shifting either of the ASSR or ASLR curves. This can be shown for the case that the economy is beginning at full-employment, as well as in the case that the economy begins in a recession. Once again, both of these cases can be displayed graphically, where Figure 10 represents the impact on an economy that is initially at full-employment, and Figure 11 represents the impact on an economy that is initially in a recession.
Particularly, in the case that the economy begins at full-employment, according to Figure 10, the intermediate result of the borrowing behavior of the irresponsible consumer will be to increase prices, while having no effect on real GDP (Y) since in an economy at full-employment, GDP cannot surpass full employment as a result of shifts in these curves. From this it is also important to note, that the consequence of this, assuming all other factors of AD and AS are unchanged, will be an inflationary economy. As a result of this inflation, workers will demand higher nominal wages which will shift the ASSR curve left on the graph, back to the equilibrium at full employment at an even higher price level (P2), as indicated in Figure 10. Therefore, the long-run impact will be even higher inflation than was seen under the short-run in Figure 9; while there will be no change in real GDP from full-employment. Conversely, in the case that the economy starts out in a recession, the impact of this shift right in the AD curve will be to increase GDP to full-employment, depending upon the magnitude of this shift, in addition to increasing prices. Therefore the result of the irresponsible consumer taking on debt could actually prove to be beneficial to the economy, that is, if we ignore all other variables involved, including the impact that the irresponsible consumer’s failure to pay back their debts may have on the consumption of others. Though, as stated in the previous chapter, since the irresponsible type of consumer only comprises a small part of the population, in today’s economy this result does not mean much, since it will be overpowered by the impact of the dominating responsible consumer, which makes up the majority of the population.

Relative to this, from the perspective of an expansionary economy, the equilibrium or intersection between the AD and ASSR curves would begin slightly to the right of full employment, rather than to the left. Then it also follows that the resulting shift in the AD curve and the accompanying reasoning that were established in the case
of a recessionary economy, will also apply in this case, with the only difference being the results. This can be shown in Figure 12.

Figure 12: Inflationary AD-AS Irresponsible Type

As shown in the figure, the results of an economy comprised of a majority of irresponsible consumers, will be severe inflation (P1 to P2), while real GDP will remain constant at full-employment due to the assumptions that follow under the AD-AS model that real GDP cannot surpass the point of full-employment in the economy. These changes are indicated by the new equilibrium in the figure. Once again, as this represents a brief moment in time preceding the long-run, over time the short run aggregate supply curve will shift left to intersect at the new equilibrium point on the long-run aggregate supply curve as the economy adjusts. Therefore the long-run result will also be exceedingly high inflation, of an even larger magnitude than was the case under an economy beginning at full employment, and no change in GDP from full-employment.
While this viewpoint of the expansionary economy will not be explored in detail due to the rarity of this event, we note that in order to make the model applicable to all types of economies, it will be discussed briefly relative to each classification of consumer.

The outcome of the irresponsible consumer borrowing can be further analyzed in a similar manner, using the IS-LM model. Once again, we will keep in mind here that the short-run results will mimic that of the longer-run in lesser intensity, and thus we will refrain from graphing the shorter run impact, but will keep in mind that the magnitude of the shift may differ. In taking a longer-run perspective, as we previously reiterated that the end result of the irresponsible consumer taking on debt will be an increase in consumption, this increase in consumption, holding all else constant, would cause the IS curve to shift right, while the LM curve will not shift in the short-run. It will, however, shift in the long-run as prices increase and real money balances fall. This can again be visualized graphically in Figure 13.
It is notable that the end result here, similar to that of the AD-AS curve, will be an increase in real GDP (Y) and an increase in real interest rates. This means that a large population of irresponsible consumers could result in an increase in GDP, at least on the forefront, as well as this would raise the cost of borrowing. Though this increase in GDP, if not eventually counteracted by the negative impact that dying in debt would have on the consumption of the family members of the deceased, could also eventually lead to an increase in real GDP in the long term since a growing population of irresponsible consumers would in turn mean growing consumption and thus an increase in GDP. Of course these results once again assume that all components of the IS and LM curves remain unchanged. Even more important to consider is the high costs associated with these higher interest rates, since a higher cost of borrowing could also lead to the “crowding out” of private business by making it harder for private businesses to borrow.
in order to grow or enter an industry. This could lead to a lack of competition in the sphere of private businesses, thus potentially only further exaggerating the resulting inflation. Though another potential concern in analyzing these results is the fact that even if this crowding out were to occur, then the boost in consumption that results from the irresponsible type of consumer borrowing, will override any decrease in investment spending that may result from these higher interest rates. As a result, this could mean that GDP may not change as a result. Nevertheless, as mentioned before since there is currently a low population of this type of consumer, for now these results can be overlooked, in analyzing the bigger picture of the economy.

In contrast to the irresponsible consumer, to reiterate the previous definition, the conservative type of consumer can be characterized as one whom borrows very little and pays it off very quickly. From a short-run perspective, once again in looking at the lifetime consumption of the consumer, since the consumption of the conservative consumer will decrease over their lifetime as a result of borrowing, given the smaller time frame of the short-run, the short-run impact will mimic that of the long-run impact in a lesser magnitude. More specifically, it can be noted that while holding all else constant, this will result in a decrease in AD and a leftwards shift in the AD in the short-run. This can be seen in Figure 14 below.
Noticeably the result of the conservative consumer borrowing in the short-run will be to decrease prices and GDP, but in a smaller quantity than will result in the long-run since the short-run here is only representing an increment of time while the long-run is representative of the sum of these short-runs. Thus, the impact of the conservative consumer borrowing in the short-run will likely be to create deflation and to dampen GDP. Nonetheless, this temporary deflation and dampened GDP is much more likely to be of a lesser magnitude than that of other types of consumers since characteristically, the conservative consumer does not borrow in large quantities. Significantly, in determining the longer lasting effects of a population of conservative consumers borrowing, we must look at the long-run impact, once again considering the impact on both an economy at full-employment and an economy in a recession.
From this, we can analyze this impact from a long-run perspective. As was previously determined through the examination of the lifetime consumption of the conservative consumer, the behavior will inevitably lead to a decrease in one’s consumption over their lifetime, but a smaller decrease than if they had borrowed for longer. Applying this to our AD-AS model, and holding all other factors constant, this decrease in consumption will cause the AD curve to shift left on the graph, while causing no shift in Aggregate Supply. This can be demonstrated below for an economy at full-employment in Figure 15 and for a recessionary economy in Figure 16.

**Figure 15: AD-AS at FE Conservative Type**
In both cases, these figures show that as a result, the impact of the conservative consumer’s borrowing would be to slightly decrease prices and GDP, pulling it away from full employment. More importantly, it is noticeable that the new graph after the shift represents a recessionary economy, meaning if this decrease in consumption is not counteracted by an increase in another component of Aggregate Demand or some change in Aggregate Supply, a recession could result. From this, in Figure 15, we note that in the long-run this resulting decrease in prices would cause workers to accept lower nominal wages since the real wages would be the same, which would then cause the ASSR curve to shift right, moving the equilibrium back to full employment and decreasing prices even further. Though, as evidenced in Figure 16, this decline in GDP and prices is even more severe, and potentially detrimental, to a recessionary economy, as it only further
exacerbates the low levels of GDP. This impact can be further analyzed using the IS-LM model.

Mimicking this situation for an expansionary economy, it also follows that the shift in the AD curve and its reasoning will be the same as was the case for the recessionary economy. In contrast, however, as the economy is beginning in an expansion, when the AD curve shifts left it will shift left back to full-employment, depending on the magnitude of this shift, as can be seen in Figure 17.

As this figure shows, as a result prices will decrease and real GDP will remain the same in the long-run.

Just as this decrease in consumption over the conservative consumer’s life caused the AD curve to slightly shift left in the short-run and then further left in the long-run, in
analyzing this effect of a population of conservative consumers borrowing according to
the IS-LM model, this will also cause the IS curve to shift in the same way due to the
decreased consumption, while there will be no shift in the LM curve, holding all else
constant and assuming that the economy is starting from a point prior to which any
economic changes have resulted from the previous graphs, as we are assuming that these
effects are occurring simultaneously will the effects from the previous graphs. More so,
since the shifts in the curves will be the same for both the short-run and the long term,
while noting that the economy readjusts itself back to full-employment in the long-run,
and will only differ in the magnitude of their shifts, with the short-run having a smaller
shift, we will refrain from displaying separate curves, while keeping in mind the slight
difference in the magnitude of the impact of each. This can be shown in Figure 18.
As shown in the Figure 18, the result of this borrowing would be a slight decrease in real GDP and real interest rates, assuming all other variables are constant. Paradoxically, while the real GDP prediction is consistent with that of the predictions made by the AD-AS model, as should be the case, this result also entails a lower cost of borrowing which will inevitably only further exacerbate reckless consumer borrowing behavior. These results as shown by the IS-LM and AD-AS models, for the conservative consumer are very similar to that of the responsible consumer. Once again since this type of consumer does not make up the majority of the population, while the impact of the conservative consumer’s borrowing behavior is important to consider, the real basis for our predictions of the economic impact of borrowing will be better determined through analysis of the impact of the responsible type of consumer.

To further give insight as to the ultimate direction of the economy as a consequence of consumer debt, we will begin by remembering that the responsible type of consumer borrows and pays off debt slowly over their lifetime. To begin with analyzing this from a short-run overview, it is notable that in tandem with the conservative consumer, the responsible type of consumer will exhibit a decrease in consumption over their lifetime and thus only a small decrease in consumption in the short-run, leading to a shift leftwards in the AD curve in the short-run and a shift leftwards in the IS curve in both the short-run and the long term, representing the short-run impact. Just as has been done above, the IS curve will be used to generalize the effects over both the long term and short-run, keeping in mind that the leftwards shift of the IS curve in the short-run will be smaller than the leftwards shift in the long term, as well as keeping in mind that in the long-run the economy will readjust itself back to full
employment. This can be further conceptualized graphically for the short-run AD-AS model in Figure 19 and for the IS-LM model in Figure 20.

Figure 19: SR AD-AS Responsible Type
This shows that the results, as we predicted before will be to decrease prices, real GDP and interest rates. Therefore, the immediate and prolonged impact, in looking at Figure 19, of the responsible consumer borrowing will be deflation in the short-run, as well as potentially loosening some of the borrowing constraints as shown in Figure 20, further encouraging people to borrow. While it is undoubtedly important to consider the immediate or short-run impact of the borrowing behavior of the responsible consumer, to make the analysis complete we must also consider, more significantly, the longer lasting long term impact and the long run impact.

Now to conceptualize the impact of the responsible consumer in the long-run, looking at the lifetime consumption, we see that the effects are similar to that of the conservative consumer. Using our lifetime consumption equation, it was previously shown that the impact of the responsible consumer’s borrowing behavior would lead to a
decrease in consumption over one’s lifetime, in which the magnitude of this decrease would be larger than that of the conservative consumer in the intermediate term. Therefore, as shown in Figures 21 and 22, the result of this larger decrease in consumption will be an even larger shift left in the AD curve in both the case of an economy at full-employment and in the case of a recessionary economy, assuming that once again all other variables of the AD-AS are held constant.

**Figure 21: AD-AS at FE Responsible Type**

![AD-AS Diagram](Image)
Consequently, holding all else constant, these figures show that the ultimate result in the intermediate term of not only the responsible consumer’s borrowing behavior, but also likely the impact of consumer borrowing on the economy as a whole, will be a decrease, larger in magnitude than that of the conservative consumer, in prices, in real GDP (Y), and in real interest rates as shown in Figure 20 previously. Once again to caution in the interpretation of this outcome, this disturbing result implies that in the case that the other components of GDP do not counteract this decrease and that all other variables that impact AS remain constant, this accumulating debt can cause a recession in the case that the economy begins at full-employment or further intensify a recession in the case that the economy begins in a recession. In the long-run, however, we take note of the fact that the short run aggregate supply curve will shift right as workers respond to the lower prices by accepting lower nominal wages since the real wages will be the same, and thus
bring the economy back to full employment as a result, also causing deflation. Unlike with the conservative consumer, however, in the long term since the decrease in real GDP is larger, the increase in real GDP stemming from the other three components of GDP would have to be even larger to counteract the decrease. Furthermore, the fact that consumption comprises about two-thirds of GDP may make this harder to counteract. This is especially true, since as we previously determined that the responsible consumers make up the majority of the population, this result is by far the most compelling when it comes to forming future predictions. Nevertheless, in the case of an expansionary economy, such a decrease in Aggregate Demand shifting the curve to the left, will also have similar effects, as this will possibly result in a recessionary economy or bring the economy back to full employment, depending on the magnitude of this shift, as seen previously in Figure 17. This tells us that depending on the magnitude of the shift and the stage of expansion an economy is in, borrowing may actually have positive impact on the economy if it were to decrease inflation, while keeping the economy at full employment. In contrast, however, as mentioned this may not always be the case as too much borrowing even in the case that the economy begins in an expansion, can still cause a recession. In scrutinizing these results, it is also important to consider that the impact of the irresponsible consumer may also slightly soften this result, while the impact of the conservative consumer may slightly enhance it. Nonetheless, from this we can now conclusively determine, holding all other factors of these models constant, that the addition of debt to the economy not only can decrease real output but can cause deflation, lower interest rates further conducing additional borrowing, and most disturbingly cause recessions.
Chapter 7 How Debt Has Changed Spending and the Economy

From the debt fueled housing bubble to the inevitable crash, which left many individuals without homes or jobs, the Great Recession is only one example of the detrimental consequences that the excessive use of debt can have for both consumers and the economy. This destructive nature of such excessive levels, or uses, of debt makes the current rising trends in the total amounts of outstanding student loans, an even greater cause for concern. The fact that these current trends in student loan debt mimic that of mortgages leading up to the Financial Crisis of 2008, coupled with the fact that we currently have no means of understanding or predicting the impact that this debt will have on the spending habits of individuals or the economy, is a recipe for disaster. When it comes to such ambiguity created by the uncertain influence of debt, however, not only is being able to predict debt’s impact on future spending behavior imperative to anticipating its effects on the future economy, but it is also essential in being able to form effective fiscal policy to combat such effects. This, furthermore, makes the use of accurate economic models of consumption, of the upmost importance, which motivates the central purpose of this thesis. In other words, this thesis strived to create a simplistic model, based on traditional models, which would enable us to predict the impact of debt on the economy, where we can then use this model to predict the impact of debt, and thereby show how its presence affects the economy and the effectiveness of fiscal policy. This is indeed, exactly what this thesis did.

Currently, traditional economic models of consumption, which have been used to predict consumer behavior and aid in the formation of fiscal policy, do not account for the effects that debt can have on the spending behaviors of individuals. At the forefront of these traditional models, Keynes’ Absolute Income Hypothesis states that consumption is
comprised of autonomous consumption, or the minimum amount of consumption needed for survival, added to a proportion of disposable income, or income after taxes. This proportion of disposable income, also known as the marginal propensity to consume, depends on the consumer’s preferences and tells us the additional dollar amount that an individual will spend for every one dollar increase in disposable income. The rest of this dollar, which is not spent by the consumer, is assumed under this theory to be saved. From this, it follows that the theory is built on the assumptions that one can either save or spend income, that consumption depends on savings and disposable income level, and that for each additional increase in disposable income the amount that one increases spending (or inversely savings) by will not consist of the entirety of the dollar. In other words, under the assumptions of this theory, the MPC cannot exceed one. Nevertheless, these assumptions invite obvious criticism, including the fact that they assume that disposable income can only be distributed among spending or saving, when these funds can also be used to pay back debt; that they ignore the ability of debt, and the availability of debt, to influence consumer spending; that they disregard the ability of interest rates to influence savings behavior; and that they incorrectly assume that the MPC cannot exceed one, when this has been shown to not always be the case in situations where consumers spend more than their disposable income. This may potentially be due to the consumer’s ability to borrow to spend. As seen in Chapter 3, other theories of consumption; including Fisher’s Theory of Intertemporal Choice, Friedman’s Permanent Income Hypothesis, Modigliani’s Life-Cycle Hypothesis, Robert Hall’s Random Walk Hypothesis, and David Laibson’s Pull and Instant Gratification theory; were also subject to similar criticisms. This lack of a sufficient means of predicting consumer behavior, according to traditional
models, under the modern influences of debt, serves as the primary motivation for the development of our model, which we have called *The Lifestyles Hypothesis*.

In this new model, in order to address the failure of the Keynesian model to account for the extra income available, or not available, to the consumer as a result of being able to borrow and having to pay back the debt, the concept of available income was introduced. Therefore, it follows that we defined available income as the total amount of funds available to the consumer to be consumed, in which a new variable D was used to denote the maximum amount that the consumer can borrow. To account for the ability of debt to either increase or decrease the total amount of income available to the consumer for spending, depending on whether they are currently borrowing or paying back their debt, available income was defined for two separate periods. The first being the earlier period in which the consumer is borrowing, and the second being the later period in which the consumer is paying back their debt and interest. With that being said, the earlier period available income was then created by adding D to disposable income, while the later period available income was created by subtracting D and the interest on D from disposable income. These earlier and later period available income equations were then used to create the new earlier and later period consumption equations by simply plugging in available income for disposable income in the traditional Keynesian equation. After creating our new earlier and later period consumption equations, in order to show the impact of debt on GDP, we were then able to use our new model, to plug the earlier and later period consumption equations into the multiplier equations for GDP, and obtain the predicted real GDP levels for both the earlier and later periods as a result of borrowing. By subtracting the resulting earlier period GDP equation from the later period GDP equation, we saw that borrowing results in a negative net change in real GDP in the
long term and therefore is harmful to the economy. Under the simple model, we recall that some of the key assumptions included assuming that the consumer chooses to borrow, that they know how much they want to borrow ahead of time, and that the magnitude of the consumer’s lifetime consumption will depend on how long the consumer chooses to borrow for and how long they spend paying back their debt. In order to expand on this, we then introduced a more complex version of this model, which then assumed that the lifetime of the consumer, namely the sum of these earlier and later periods, expands beyond two years (which were previously assumed to be one year for the earlier period and one year for the later period), and includes a retirement period at the end.

To do this, new equations were created in which these earlier period and later periods were summed over multiple years, in addition to adding a constant retirement period consumption variable onto the end of this. Subsequently, in this more complex version, the later period consumption equations were also divided into two different equations, in which one assumed that the interest on the debt was simple and the other assumed that the interest on the debt was compound. Following from the expansion of the simpler version of the model and its assumptions, we were able to obtain a lifetime consumption equation by simply adding the equation for each of the three periods together. Collectively, the lifetime consumption equation demonstrated that the presence of debt decreased consumer spending. The lifetime consumption equation was then able to be applied under the assumptions of the three different types of consumers, which were introduced under our complex model, to show the impact that borrowing has on the lifetime consumption of each type. More specifically, these three types include the conservative type, or one that borrows very little and pays it back quickly; the responsible
type, who borrows a relative amount and pays it back slowly; and the irresponsible type, who borrows a lot and pays back a little to none of it. The results showed us that there would be a decrease in consumption for both the conservative or responsible types of consumer, in which the magnitude of this decrease would be much larger than that of the conservative type of consumer. While in contrast, the results showed that, ignoring the impact on the consumption of the families of the indebted deceased, the irresponsible type of consumer would actually experience an increase in their lifetime consumption. Nonetheless, as we determined that the majority of the economies, according to student loan survey results, are of the responsible type, our economic analysis using the IS-LM and AD-AS models focused on the results for this type of consumer in applying the results to our current economy.

Furthermore, to expand on this concept and show under the traditional Keynesian model of AD-AS and IS-LM the economic impact of the influence of debt on consumer spending, we then used our new definitions of consumption in the Keynesian model of AD-AS and IS-LM under different economic conditions to show the impact of each type on the economy, as represented graphically. Primarily, to do so we used the assumptions under the lifetime consumption equations for each type of consumer, as previously derived, in order to determine the magnitude of which these shifts would take place. As a result, we saw that the result of borrowing would lead to a decrease in consumption over one’s lifetime, for both the conservative and responsible types of consumers, this led to shifts leftwards in the AD curve in the AD-AS model, and a shift leftwards in the IS curve using the IS-LM model, resulting in a decrease in GDP. The irresponsible type in contrast had a slight increase in consumption, leading to a shift right in the AD curve for the AD-AS model and a shift right in the IS curve in the IS-LM model. This result we
found generalizes to both recessionary economies and economies that begin at full employment. Expansionary economies, in contrast, we found will not experience a decrease in GDP in most cases, but generally experience deflation since the equilibrium begins in an inflation prior to the shift. Additionally, the IS-LM model results are consistent when it comes to GDP, as well as they tell us that in the case of the conservative and responsible type of consumers, interest rates will also decrease. Though, in the case of the irresponsible type of consumer, once again, the IS-LM shows that interest rates will end up increasing as a result of this type of consumer borrowing. Analyzing this result from the perspective of the responsible type of consumer, as this is the most common type of consumer, we see that the general result is that borrowing decreases lifetime consumption, thereby decreasing GDP (in addition to decreasing prices and interest rates) as a result, and in the worst case, can cause or exacerbate recessions.

Collectively interpreting these results, it can be stated that, according to our model, the use of debt leads to an overall decrease in consumption over one’s lifetime, due to the larger impact of having to pay back the debt than being able to borrow the money in the first place. This thereby leads to a decrease in GDP, and has the potential to create a recession or harm the economy, as a result. Of even more importance, now that we have a model which we can use in the future to predict economic outcomes, we can also use this model to help us form appropriate fiscal policy to counteract such outcomes. As we now know that debt leads to a decrease in consumption, from this it can be determined that for any given decrease in consumption, this decrease will be much larger under our new model in comparison to the traditional Keynesian model. This is due to the fact that any decrease in consumption in our new model, will now account for the decrease in consumption from the repayment of the debt and interest, in addition to the
decrease in consumption due to any alternative external factor. This can best be illustrated through an example. For instance, supposing that there were to be an increase in taxes, under the traditional model, this would lead to a decrease in disposable income (Y-T), which would thereby lead to a decrease in consumption, using Keynes’ original consumption equation. Further, assuming that the economy were to start in a recession, using the AD-AS model, this decrease in consumption would lead to a decrease in Aggregate Demand, further shifting this curve to the left. This would look as follows, in Figure 23.

As can be seen here, the result, as we would expect, is a decrease in GDP. In comparison, under the new model, as we showed in the previous chapter that the use of debt over one’s lifetime leads to a decrease in consumption, our model beginning in a recession will already begin at an equilibrium with a much lower level of real GDP, or in other
words with the AD curve further to the left than in Figure 23 above. Then, accounting for the increase in taxes, it follows just as it did above, that this will decrease $Y-T$, thereby decreasing the total lifetime consumption equations in our new model, decreasing consumption, and thereby leading to a decrease in Aggregate Demand, which will shift the AD curve leftwards in the graph. This is displayed in Figure 24.

**Figure 24: Decrease in C under New Model**

In this figure, the dotted line can be used to denote the shift in AD that would result from the traditional Keynesian model, for comparison as shown above, while the solid line labeled AD2 represents the new AD curve under our new model. Therefore, as seen in the graph, as expected the result is a much larger shift and therefore a much larger decrease in GDP. As a result of this much larger decrease in GDP, in order to combat this decrease in consumption through the use of fiscal policies, much stronger policies would
be needed in order to bring the economy back to full employment. Once again, this can be shown through another example.

To show the magnitude of the difference in fiscal policy with an example, using the ending equilibrium graph shown in Figure 24, we will suppose that the government decides to increase government spending in order to increase Aggregate Demand and shift this curve to the right. Under these conditions of the new model, the government would need to increase government spending by a large enough proportion to move the curve AD1 (previously labeled AD2 in Figure 24) back to full employment, as indicated by the large arrows in Figure 25.

![Figure 25: Fiscal Policy under New Model](image)

As the dotted line is used, once again, to denote the placement of the AD curve under the traditional Keynesian model, it is easy to see how if the government had employed a strategy of increasing government spending by the smaller amount required to shift the
AD curve to full employment under the traditional model, why this would not only not be enough to bring the economy to full-employment, but, in hindsight, would make this policy ineffective. Therefore, a stronger fiscal policy would need to be employed here in order to be effective. This further provides evidence as to just how pertinent debt’s influence on the economy is. Though, on the other hand, when it comes to crafting appropriate policies to combat the influence that debt has on our economy, we are not merely restricted to the use of fiscal policy. Namely, there are other means, such as monetary policy, which can also be used to not only counteract these effects, but to also potentially help to avoid them altogether. Through these alternative means, consumers can be encouraged to save, and discouraged from exerting excessive borrowing behaviors, as would be the case through the imposition of higher interest rates under monetary policy.

Following as a direct consequence of the ease with which consumers have been able to borrow in recent years, it is not surprising that borrowing behaviors have increased. As a result, it is intuitive that imposing higher costs of borrowing will, at least in part, help to reduce the total amount of debt outstanding. Particularly, this can simply be done through the manipulation of the interest rates under typical monetary policy. In brief, monetary policy is policy that the Federal Reserve of the United States uses to influence the economy by changing the money supply in the economy. This is generally done by changing the interest rates, changing the amount of capital that banks are required to keep in their vaults, or by the Federal Reserve buying or selling government bonds. Just as changes in interest rates under monetary policy are typically used to influence the money supply in the economy by encouraging banks to lend or not to lend, it follows that the current environment of low interest rates has indeed been responsible
for encouraging banks to lend, and allowing consumers to borrow at a low cost. Additionally, not only are these low interest rates conducive to encouraging consumers to borrow at this low cost, but they also serve as a deterrence of savings behavior, since these low interest rates earned on savings provide a low incentive for saving consumers, encouraging them to spend rather than save their money. Therefore, in response, raising the interest rates in our current environment would not only serve to deter excessive borrowing by raising the cost of borrowing, but it would also discourage spending and encourage saving by providing higher incentives, or greater rewards, to savers. Though while the current low interest rates certainly play a pertinent role in encouraging borrowing and discouraging savings, it is also true that the seemingly endless borrowing limits also bare some burden of the responsibility for this behavior, as these also allow consumers to borrow excessively and spend beyond their means. Using the model that we have established, this brings us to another suggested way in which excessive borrowing behaviors can be circumvented, further helping to avoid the negative economic impact that follows from excessive borrowing altogether.

More strictly stated, as D under our new model was used to denote the maximum amount that one could borrow, this can be taken a step further in forming policy which restricts the amount that one can borrow. In other words, the government could use this D as a policy tool under which D would represent a sort of borrowing limit, or cap, on the total amount that one could borrow, which the government could manipulate to influence consumer behavior. Then, it follows that by raising and lowering this component, D, the government would enable and disable people to borrow more and less, thereby not only directly restricting or enabling the borrowing behavior of consumers, but also directly being able to predict the impact of such changes through the use of the model. As a
result, in our current situation, the government could lower this D, restricting the ability of consumers to borrow. Though in recognizing that this model is simplistic in its assumptions and inputs, in nature, additional assumptions would need to go into the use of this model in the creation of policy, in order to account for the additional influence that this change in D would have on exterior variables, such as on the spending behavior of individuals of different income levels. Similarly, this idea that the borrowing behavior of individuals can be capped through the imposition of a debt cap, can also be a useful means of influencing the overall culture of borrowing, in helping to establish a new norm for future generations against borrowing, thereby preventing such excessive behaviors in the future.

In more detail, as it is notable that the current American culture promotes excessive spending and borrowing, changing the attitudes that current consumers have about borrowing, in attempts to promote a more conservative use of debt, would most definitely have a powerful effect on the total amount that consumers borrow. The problem remains, however, that changing such attitudes of individuals will prove to be difficult, especially when consumers have grown up watching their families and the government spend excessively thanks to the unrestricted use of debt. Therefore, in order to culturally engrave such a norm against the excessive use of debt, and towards savings, the idea that there will be immediate consequences for such excessive borrowing would need to be bestowed through the use of both legislation and role modeling on the part of the government. Particularly, as such a culture is not likely to be successfully established while consumers watch the government take on enumerating amounts of debt, this type of cultural change would have to begin with a change in behavior on the government’s part. To do this, the government would need to establish a precedent through the
imposition of a debt ceiling, for which they are unable to borrow beyond or are unable to obtain additional funding once they have exceeded this, forcing them to be more responsible and cautious with what they choose to spend and what they choose to save. From this it would then follow that consumers could also be subject to a debt ceiling, which would be calculated as a percentage of their income. Furthermore, this percentage could be determined based on the consumer’s current income level, as those of lower income may be subject to a higher percentage based on need, as well as this percentage would be diminished as a result of failing to pay back this debt. This percentage would also be determined according to the age of the individual, as younger individuals would likely be allocated a larger percentage, while those in retirement would be subject to a percentage close to zero. Similarly, those considered to be higher risk borrowers, based on their history, would also be allocated a smaller percentage at the outset. In addition, except in the case that the consumer fails to pay back their debt, this restricted amount would remain constant. This means that as the consumer pays back their debt, the amount that they have borrowed under the ceiling will be eliminated, enabling them to borrow more. Not only would this restrict the borrowing behavior of individuals, accommodating the absolute need to borrow in certain circumstances, and forcing consumers to save and spend wisely, but it would also directly encourage responsible behavior, while imposing immediate consequences on those who are irresponsible. As a result of this immediate policy, as consumers grow up watching the government and other households manage their money responsibly, it would then follow that over time such responsible behavior would come to be regarded as a norm, while such irresponsible behavior would come to be viewed as shameful. Such a shift in the cultural norms away from the excessive use of debt and spending will thereby help to prevent debt from negatively influencing the
economy in the long term. Though, aside from using legislation to bestow cultural changes, which will likely take years to embed into the American culture, similar legislation on mortgages following the crisis have also entertained the idea that borrowing behavior can be restricted through the use of legislation. In contrast, however, these restrictions have been imposed on the lending side, with banks, rather than on the consumer side.

As we would also expect that the current slow decline in the amount of mortgage debt held by individuals are in part due to the increase in defaults, which followed the crisis as discussed in Chapter 2, this can also be attributed to additional legislative restrictions levied on banks, such as Sarbanes Oxley and the Dodd Frank Act. As legislation, such as these, have successfully managed to change bank behavior and restrict excessive lending by forcing banks to hold more capital and by raising the lending standards, this is evidence as to just how effective restricting the amounts that can be borrowed, can be. This also tells us that raising the percentage of a home price that one would need to make the down payment for a house, would also be useful in discouraging excessive borrowing. In other words, imposing restrictions on the lending side are also important to consider in crafting policies to help diminish excessive borrowing and spending, and therefore escape the detrimental consequences that can result from the excessive use of debt. Though, from a different viewpoint, another viable alternative to using policy to influence behavior or culture would be the ability of consumers to avoid borrowing in certain situations altogether, possibly through the use of grants.

This is particularly prevalent in the case of student loans, in which certain colleges who receive large enough endowments are able to give students grants, rather than having them borrow the full amount of tuition, helping to ease the amounts of debt
that they are taking on. This alternative to having to borrow an amount large enough to cover the entire cost of tuition will help to ease the debt burden for students, and as a result will make it easier for them to save more as they graduate, rather than forcing them to contribute the entirety of their incomes to paying back student loans. Additionally, this would also make it more likely that these students would be able and willing to contribute to the endowment of the school later on, when they are not bothered with enumerating amounts of student loan debt, thereby making it possible for other students to do the same in the future. Similarly, as college has value beyond its simple dollar value, companies paying to educate their employees would also serve as a viable alternative in helping students to avoid taking on debt, while still being able to provide their companies with the value added from the education. Therefore providing alternatives to borrowing is also a significant way in which the excessive amounts of debt accumulating in the economy can be reduced, preventing the negative economic impact that follows.

Collectively, as we now see that the presence of debt will magnify changes in consumption; this makes debt of the upmost importance, as debt does indeed influence spending behavior, which thereby impacts GDP and the economy. Likewise, this also shows us that in using a model which accounts for these changes in spending behavior as a result of the ability to borrow, we may be able to prevent some of the disastrous outcomes that can result from debt. Such disastrous outcomes, as we have seen from the financial crisis, include people losing their homes, their jobs, and much more. Generally speaking, understanding the impact that debt has on the economy can help us to create effective policies to prevent and counteract some of the effects of recessions, and other kinds of economic distress.
While this model gives us some insight as to the potential interworking of debt on our spending behavior and the economy, however, it is important to note that this model does not in fact account for all types of debt. Namely, the form of the debt used in our model, mimics that of student loan debt, as well as it contains some characteristics of mortgages. Additionally, we note that this model is specifically tailored under its assumptions, and may be ineffective in the case that any of these assumptions break down, such as if the majority of consumers in the economy chose not to borrow at all. While this seems relatively unrealistic, among other assumptions, it is still important to ponder this possibility. When it comes to the future applicability of this model and others, however, it would be interesting to pursue in more detail the impact that other types of household debt such as credit card debt, and even types of government debt, may have on the economy. By understanding how debt works, we can help to create better models and policies, as well as even prevent major economic disasters from occurring in the future. Until then, we can only hope that in light of these increasing trends in student loan debt that we do not find ourselves in the wake of another financial crisis in the next couple of years. If we just so happen to do so, then maybe we can finally understand why debt and research on its impact is so important to not only the well-being of the economy, but to the well-being of individuals.
Bibliography


http://www.federalreserve.gov/econresdata/releases/mortoutstand/frb_mdo_historical.csv

www.federalreserve.gov/publications/default.htm


http://www2.ed.gov/about/overview/budget/budget13/justifications/r-loansoverview.pdf

http://www2.ed.gov/about/overview/budget/budget11/justifications/t-loansoverview.pdf


http://www.secureloanconsolidation.com/compare-loans-to-debt-trends/

https://research.stlouisfed.org/fred2/series/DRSFRMACBS

https://research.stlouisfed.org/fred2/series/TDSP

http://www.theburningplatform.com/2013/02/06/all-is-well-3/


