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THE COST OF DEFAULTING ON STUDENT LOANS

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ABSTRACT

This paper explores how the cost of defaulting on student loans affects which students choose to go to college. Through a two-period model, I will explain how these costs affect individuals when making the decision to go to college by discussing the returns to education, uncertainty in the job market after graduating college, the chance of defaulting on student loans, and the measurable costs of defaulting on student loans. This work will expand on the work done by many other economists in the realm of human capital accumulation – most notably, it will expand on the work of Lance Lochner and Alexander Monge-Naranjo. This work, however, considers developments from the Great Recession whereas many models similar to the one in this paper were developed before 2007 or use data from before the Great Recession.

Additionally, this model addresses how the costs of default affect the economy as a whole, as it shows how accrued debt and wage garnishments change the indifference wage between repayment and default in the aggregate distribution of wages.

With the results of my model, I recommend policies that should be adopted for repaying student loans or alleviating the burden of defaulting on loans in certain situations including income based repayment suggestions and school level policies. This will ultimately add to the growing literature of human capital accumulation and student loan markets.

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Chapter 1

Introduction

Student loans cannot be discharged in bankruptcy unless repayment is ruled as an "undue burden" on the borrower. What exactly constitutes an "undue burden"? In recent years, student debt has skyrocketed and default rates have risen to the historic high levels. This is a concern for the nation, especially after the Great Recession of 2007. Being saddled with a large amount of debt can reduce a college graduate's participation in the economy, forcing them to allocate more money towards repaying loans rather than towards savings or consumption. While student loans are a vital tool in financing higher education, they can also prove to be detrimental in the wrong economic conditions. If a borrower defaults on their student loans, this could prove disastrous for their future income and consumption. If many borrowers default on their student loans, this could prove disastrous for the economy as a whole.

As a senior in college, this topic is of particular importance to me. While there are many resources for educating borrowers on repayment, the increasing default rates in the last ten years show that there is more than just a lack of information that drives default. Furthermore, the pressure to find a high paying job after college in order to repay student loans is extremely high. Through my research, I wanted to develop new ways to make repaying student loans easier and determine how the costs of default affect an individual's decision to go to college.

This thesis will look to prove that increasing wage garnishments and other costs of default will adversely affect economically disadvantaged students by discouraging them from receiving a higher education. I will present some current facts and statistics about the student

loan program currently in the United States to determine which factors affect an individual's choice to attend a four-year college and an individual's choice to repay or default on their student loans. Next, I will explore literature relevant to human capital accumulation, financing higher education, and the decision to default. These models will help me develop my own two period model of human capital accumulation with default penalties, which I will describe in chapter four. I will then choose parameters for my model and test it using simulated data. Finally, with my results I will draw conclusions about the penalties of default and make policy recommendations for both the federal government and individual institutions in order to help prevent the possibility of default.

Chapter 2

Information on Student Loans

As many Americans know, the amount of student debt held by borrowers in the United States is over one trillion dollars, above credit card and auto loan debt. According to the Institute for College Access and Success (Cochrane & Reed 2015), about sixty-nine percent of students leave college with student loan debt. Those that took out loans for higher education graduate with an average of $28,950 in student loan debt (Cochrane & Reed, 2015). Cochrane and Reed (2015) also found that in Pennsylvania, the state with the third highest level of student debt, the average borrower leaves college with over $33,000 in student loans. The Pennsylvania State University is classified as a "high-debt" public university (Cochrane & Reed 2015). The majority of these loans come from the federal government in the form of subsidized and unsubsidized Stafford loans, Parent and Grad PLUS loans, and Perkins loans. Only around seven percent of loans disbursed are non-federal loans (U.S. Congress, 2013).

According to the Federal Reserve Bank of New York, as of 2014, eleven percent of borrowers were in default on their loans and six percent of borrowers were delinquent on their loans (Haughwout et al., 2015). Haughwout et al. (2015) also studied the income level of the individuals who took out student loans through "ZIP code income" or the average income of the area the student lived in when they first took out their student loans. Not surprisingly, Haughwout at al. (2015) found that borrowers from the lowest ZIP code income had the highest rates of default and delinquency. Default and delinquency rates have also been increasing across all ZIP code incomes, which could be attributed to the increase in the number of borrowers in the

last ten years (Haughwout et al., 2015). These statistics will be helpful when determining how the cost of default affects different income levels when they are choosing whether or not to attend college. The default rates for different income levels are shown in figure one.

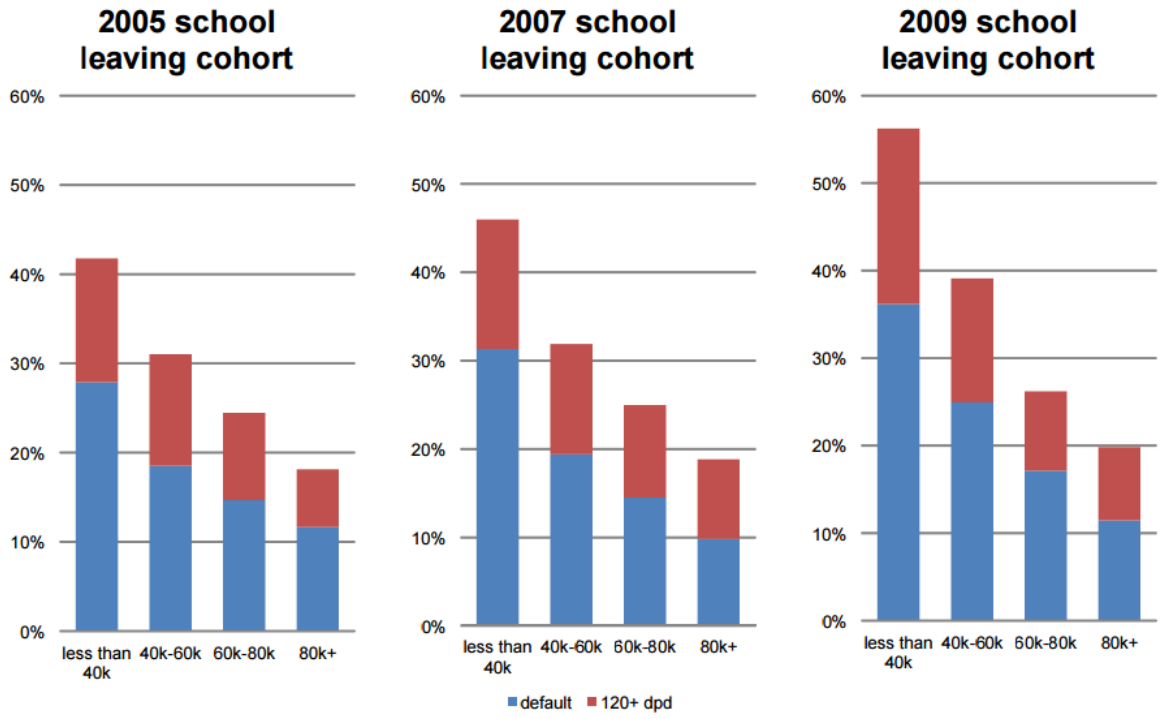

Figure 1 Default and Delinquency Rates by ZIP Income (Haughwout et al., 2015)

In regards to the characteristics of those borrowing for student loans, Adam Looney and Constantine Yannelis (2015) report that there has been an increase in "non-traditional" borrowers who look to attend for-profit or two year institutions. For this paper, however, we will be focusing on four-year institutions. Looney and Yannelis (2015) define borrowers who attend four-year institutions as "traditional" borrowers and report that these borrowers, while they have higher levels of debt, experience better labor market outcomes and lower rates of default. It is interesting to note, however, that the family background of these "traditional" borrowers has remained relatively constant over the last ten years, meaning the same types of people are attending college in all periods (Looney & Yannelis, 2015).

The model I will develop in this paper may help to explain this phenomenon, as I will look at borrowers that are most likely to default, often from low-income families, and determine if and how the cost of default affects the critical level of ability a person must have in order to choose to go to college. If there is a drastic change in the level of ability because of the cost of default, this model may help to develop new policy initiatives to encourage more students to attend college.

Chapter 3

Literature Review

Two prominent researchers in the market for student loans are Lance Lochner and Alexander Monge-Naranjo, whose work I will expand upon later in my thesis. They have co-authored several theory papers on credit constraints in the accumulation of human capital and designed an optimal credit model for student loan markets, many of which I will summarize here in order to create a basis for my own theoretical work. I will also summarize the work of other economists who have written about student loans and the business cycle, characteristics of borrowers who default, other models that incorporate borrowing constraints in student loan markets, and international comparisons of student debt. All of these works are instrumental in creating my own model of the student loan market as it is today in that they offer different variables to consider and varying perspectives on the issue of student debt.

In 2002, Lochner and Monge-Naranjo developed a model of human capital accumulation with endogenous credit constraints, as opposed to exogenous credit constraints. They explain that endogenous credit constraint models can help better design optimal credit programs for student borrowers and allows different borrowing constraints for different individuals (Lochner & Monge-Naranjo, 2002).

Lochner and Monge-Naranjo's (2002) four-period model in this paper uses different components to determine credit constraints, such as age, ability, and future earnings, rather than assigning the same credit constraints to everyone. Their model was parameterized using data for men from the National Longitudinal Youth Survey and tested empirically (Lochner & Monge-

Naranjo, 2002). Lochner and Monge-Naranjo (2002) found that their model explains how government policies and credit constraints in the choice of accumulation of human capital interact when different parameters are changed.

One problem with this model is that it does not answer the question of whether or not the credit constraints have an effect on human capital accumulation. There is no clear cut answer to this question in any literature, so my thesis will help contribute another view to the debate. Another problem is the use of data from only men, as it excludes a large part of society which is also involved in the student loan market. Finally, the model is from 2002 before the Great Recession, so updating the model to embody the current state of the economy would be interesting in order to determine whether the model holds over time.

Later, in 2011, Lochner and Monge-Naranjo developed a human capital accumulation model that takes into account the relationship between family income and college attendance as well as ability and college attendance. The authors find that there is a positive correlation between both family income and college attendance as well as ability with the accumulation of human capital (Lochner & Monge-Naranjo, 2011).

In their model, students can fund their human capital accumulation through government student loan programs in which repayment is fully enforced and through private borrowing under limited commitment (Lochner & Monge-Naranjo, 2011). According to Lochner and Monge-Naranjo's (2011) model, people below a certain wealth level are constrained by the limits on borrowing from government student loan programs and must turn to private funding. There are no obstacles to receiving private funding in their model, unlike there are for low-income borrowers (Lochner & Monge-Naranjo, 2011). The amount borrowed must then be repaid when the individual is in the labor force (Lochner & Monge-Naranjo, 2011). While an individual in

this model cannot default on government student loans, in the event of default on private loans, the model imposes penalties (i.e. wage garnishments) for a certain amount of time (Lochner & Monge-Naranjo, 2011). This model is based on three main assumptions:

> (i) individuals can default on private loans only at the time of labor market entry; (ii) individuals who choose to repay their private student loans have access to perfect financial markets upon entry into the labor market; and (iii) individuals who default on private loans can access frictionless and fully enforceable credit markets after the punishment period. (Lochner, Monge-Naranjo 2011)

The problems with assumptions (ii) and (iii) are that they are not indicative of the student loan market in the real world. Financial markets are not perfect and individuals who default often face difficulties even after they are no longer in default, as poor credit scores can affect important transactions. These imperfect capital markets, however, are often difficult to model.

Lochner and Monge-Naranjo (2011) then empirically test their model using data on males from the 1979 cohort of the National Longitudinal Survey of Youth. The results held with the general trends they observed in human capital accumulation increasing in family income and ability (Lochner & Monge-Naranjo, 2011). However, using only data on males in the test eliminates any effects borrowing constraints may have across gender, which would create a clearer picture from the model of society as a whole.

My model will utilize a function from this model that measures the returns to education by giving a dollar amount that measures total expenditures and foregone wages.

Recently, in January of 2015, Lochner and Monge-Naranjo published a paper on designing the optimal credit program for student loans. The paper lays out current student loan

markets in the United States and discusses whether or not students are able to borrow enough to finance their higher education (Lochner & Monge-Naranjo, 2015).

The two-period model developed in this paper includes both private and federal loans while suggesting optimal penalties for default so that no borrower has an incentive to default on their loans (Lochner & Monge-Naranjo, 2015). Lochner and Monge-Naranjo (2015) also include various levels of commitment and enforcement from the borrower and lender, respectively. Their model is different than others that have tried to design optimal credit programs because it takes into account several different incentive problems, rather than just one. Lochner and Monge-Naranjo's (2015) model better explains the student loan market as it is in the real world.

While this paper is helpful in explaining the problems with current models and problems within the student loan system, it does not model a real world choice of an individual's human capital accumulation. The authors note that this model is primarily concerned with economic efficiency, so there are many other areas to consider when designing the optimal credit system (Lochner & Monge-Naranjo, 2015). This model is a good way to work backwards from modeling an optimal credit system to modeling the current credit system in which default is still a large problem.

In 2013, Matthew Johnson also developed a model that simulates the effect of borrowing constraints on college enrollment and educational attainment. He also explores the option of delayed college enrollment if a borrower does not have access to enough credit to fund their schooling (Johnson, 2013). Another aspect of Johnson's (2013) paper explores the relationship between parental income and educational attainment, based on Lochner and Monge-Naranjo's work in 2011, which I summarized earlier.

In his multi-period model, Johnson (2013) allows for heterogeneity across individuals in regards to ability and school choice (i.e. two-year or four-year institutions). Other variables the author considers include the probability of completing a Bachelor's Degree, labor market uncertainty, and future wages (Johnson, 2013). Johnson (2013) bases his model on data on males from the 1997 cohort of the National Longitudinal Survey of Youth. The major findings of this model are that borrowing constraints do not have a large impact on educational attainment (Johnson, 2013). Johnson (2013) also suggests that tuition subsidies, rather than loans, are more effective in increasing college attendance and Bachelor's Degree completion.

One problem in Johnson's model is that it is based on a federal student loan structure and does not acknowledge private student loans, but rather treats them as forms of parental income. Additionally, he bases his model on the Federal Family Education Loan Program, which has since been replaced by a new federal loan system. Furthermore, Johnson (2013) only uses data on males in the parameterizing of his model, just as some of the other models I described earlier did. Again, this creates a narrow view of the entire student loan market and educational attainment as the inclusion of women in the model would serve as a better benchmark for society as a whole. In the model I have developed, I will also address repayment as it affects individuals, which was not present in Johnson's model.

Another piece of literature that is relevant to my thesis regards the relationship between student loans, defaulting on student loans, and the business cycle, which was studied by Sam Ramsey Hakim and M. Rashidan in 1995. This paper presents a model that indicates the likelihood of default by certain characteristics such as institutional characteristics, gender, income, family wealth, and race (Hakim & Rashidan, 1995).

Hakim and Rashidan (1995) find that the primary reason for default in the United States is national unemployment. This means, somewhat obviously, that during periods of high unemployment, the rate of default is also high. One interesting finding of their model is that women default more than men, which may be caused by the prevalence of single mothers who are repaying loans and the wage gap between men and women (Hakim & Rashidan, 1995). Hakim and Rashidan (1995) also discuss that race plays a role in default, as African Americans are more likely to default than non-African Americans. These findings prove their suggestion that institutional characteristics are not the driving factor in default on educational loans (Hakim & Rashidan, 1995).

Hakim and Rashidan (1995) conclude their paper by making policy recommendations for student loan repayment. My model differs from Hakim and Rashidan's in that it does not model the default decision, but rather how the possibility of default affects an individual's choice to go to college. My model will also add to the study of economically disadvantaged students' choice of education level with regards to student loan availability.

A final paper that helped me develop my thesis and shows the importance of this topic is that of Shen and Ziderman from 2009. They discuss many different government student loan programs across the world and their implications (Shen & Ziderman, 2009). One of their findings is that repayment is a problem among all countries studied, which gives more weight to my research, as it can be applied and adapted to fit many different countries (Shen & Ziderman, 2009). Shen and Ziderman (2009) also suggest different plans to create better, more efficient student loan programs such as decreasing subsidized loans, decreasing administration costs for these loans, and implementing income-based repayment plans for all borrowers.

There are many holes in the current literature on human capital accumulation. Many variables that factor into educational decisions are often immeasurable or cannot be separated effectively. I hope that my model will be able to answer some questions about the cost of defaulting on student loans and how that factors into an individual's decision to attend college.

Chapter 4

Environment

There are two periods in this model, $t = 1, 2$. In period 1, the individual chooses his or her level of education, e. For simplicity, the choice is discrete over $e \in \{0, \bar{e}\}$ where 0 means the individual does not choose to go to college and $\bar{e}$ denotes a college education from a four-year public institution. This model can be easily adapted to two-year institutions by changing the level of $\bar{e}$ to one that represents an education from the two-year institution. An individual will choose to go to college if her lifetime income is greater with a college education than without a college education. This means we must find some level of ability, Θ, in the distribution of ability where the lifetime income with no college education is equal to the lifetime income with a college education. Everyone below this critical level of Θ, which we will call Θ^*, will choose not to go to college and everyone above Θ^* will choose to go to college.

In previous models, this level of Θ depends on wages in periods 1 and 2, the returns to education, which for the purposes of this paper will be some function h(e), and the price of education. The model I develop in this paper will also include the costs of default through penalties like wage garnishments to explore whether the cost of defaulting on student loans has any effect on the critical level of ability needed to choose a college education.

Period 1

In period 1, the individual is working in an unskilled job while getting an education, receiving a wage of w_1^u. The individual works during the time when she is not in school, or 1 – e. If the individual chooses e = 0, she will spend all of her time working and will stay in the

unskilled labor market for all periods. If the individual chooses $e = \bar{e}$, she will work $1 - \bar{e}$ and incur the additional cost of going to college, or p. We can assume that some individuals receive an endowment, B, from their parents to offset the costs of education. If this endowment does not cover the full cost of education, the individual will have the opportunity to take out student loans in the amount d. For the purposes of this model, we will focus on loans made by the federal government.

To measure the utility the individual gains during period 1, we then have the equation:

$$U[w_1^u(1 - e) - p + B + d]$$

The individual consumes her wages, B, and d minus the price of her education in period 1. If the individual chooses not to receive an education in the first period, she incurs no student debt and will remain in the unskilled market for all subsequent periods.

Period 2

In period 2, the individual has finished her college education and is entering the work force. As in the real world, having a college education in this model does not necessarily mean the individual will end up in the skilled labor market. I model this phenomenon by denoting the probability of receiving a job in the skilled market as π. In turn, the probability of ending up in the unskilled market is $1 - \pi$. When an individual enters the skilled market, she must use the knowledge she gained in college and her inherent ability in her career, which will affect the numerical wage she receives. The numerical wage, which can be treated as a "base", in the skilled market in period 2, w_2^s, will be multiplied by the individual's Θ and the returns to

education function h(e). The function h(e) is such that h'(e) > 0 and h''(e) < 0. The measured wage in the skilled market then reads:

$$\Theta h(e)\, w_2^s$$

If the individual ends up in the unskilled labor market, the returns to education and her ability do not affect her wages, so she only receives w_2^u.

During period 2, the individual must also decide whether she will repay or default on her loans. If she repays, she must pay the amount of debt, d, plus interest, r. If she defaults, she will suffer penalties as decided by the federal government. In this model, we will denote these penalties with the variable φ, which will represent wage garnishments. Wage garnishments are a portion of an individual's income that is withheld by the federal government which will go towards repayment of the individual's loans. The variable φ will be the portion of income the borrower is allowed to keep if she defaults. By law, the government is only allowed to garnish up to ten percent of an individual's wages (Singleton, 2014) so $0.9 < \varphi < 1$.

In addition to repayment, the individual must decide how much money she wants to save, or s. Savings in period 2 will be used for retirement funds or possibly given to the individual's children as a parental contribution. If the individual repays in period 2 while in the skilled market, her consumption will be

$$\Theta h(e)\, w_2^s - s - d(1 + r)$$

If the individual defaults while in the skilled market, her consumption will be

$$\Theta h(e)\, w_2^s \varphi - s$$

In the unskilled market, if the individual repays, her consumption will be $w_2^u - s - d(1 + r)$ and if she defaults her consumption will be $w_2^u \varphi - s$.

To determine whether or not the individual will default on her loans in period 2, we must find the point where she is indifferent between default and repayment in both markets. In both labor markets, this point is where the consumption of the individual in the case of default equals the consumption of the individual in the case of repayment. Solving that equation for w_2^s in the skilled market, we find that the individual is indifferent between repayment and default when

$$w_2^s = [d(1 + r)/1 – \varphi]/\Theta h(e)$$

Solving the equation for w_2^u yields

$$w_2^u = [d(1 + r)/1 – \varphi]$$

Ultimately, the decision to default or repay depends on where the individual ends up on the probability distribution function of wages, which I will define as G, in each labor market and the cost of defaulting. If they get a job that pays a wage lower than the indifference point, they will default. If they get a job that pays a wage higher than the indifference point, they will repay. Moreover, as I will prove in chapter 5, if there are no costs of defaulting on student loans, everyone will choose to default.

Putting all of the markets and uncertainty together gives the expected value for period 2 as:

$$\pi\left[\int_0^{\frac{\frac{dr}{1-\varphi}}{\theta h(e)}} U(\theta h(e) w_2^s \varphi - s) dG + \int_{\frac{\frac{dr}{1-\varphi}}{\theta h(e)}}^{w_2^s} U(\theta h(e) w_2^s - dr - s) dG\right] +$$

$$(1 - \pi)\left[\int_0^{\frac{dr}{1-\varphi}} U(w_2^u \varphi - s) dG + \int_{\frac{dr}{1-\varphi}}^{w_2^u} U(w_2^u - dr - s) dG\right]$$

Lifetime Utility

When periods 1 and 2 are combined, we have the individual's lifetime utility. In this equation, β represents the discount factor of consumption in period 2. Both periods yield

$$U[w_1^u(1-e)-p+B+d]+$$

$$\beta\{\pi\left[\int_0^{\frac{\frac{dr}{1-\varphi}}{\theta h(e)}} U(\theta h(e)w_2^s\varphi-s)dG+\int_{\frac{\frac{dr}{1-\varphi}}{\theta h(e)}}^{w_2^s} U(\theta h(e)w_2^s-dr-s)dG\right]+$$

$$(1-\pi)\left[\int_0^{\frac{dr}{1-\varphi}} U(w_2^u\varphi-s)dG+\int_{\frac{dr}{1-\varphi}}^{w_2^u} U(w_2^u-dr-s)dG\right]\}$$

When looking at this lifetime utility, we see that, as expected, as debt increases, the chance of default increases, or the wage threshold in each distribution moves to the right. This shows why rising student debt levels are a concern for society, as more people will default on their loans if the cost of higher education continues to rise. Moreover, we can see that the cost of defaulting will also have an effect on an individual's lifetime utility and their ability to participate in the economy.

Costs of Default

There are many ways that defaulting on student loans can affect an individual's life. Defaulting on loans can decrease a borrower's credit score, thus making it harder to borrow in future periods and making it harder for the borrower to make large purchases, like a house or car.

In addition to lowering the defaulting individual's credit score, the individual will likely have lower savings than an individual who does not default, as the government can also seize savings as repayment for student loans. Unfortunately, it is difficult to incorporate all of the costs of default in this model, so we will focus on the wage garnishments and the amount of savings in period 2. Additionally, these costs only refer to the cost of defaulting on federal loans, as the penalties for private loans are harsher and there are less protections for the borrower.

Cost of Default and the Wage Distribution

To determine how the cost of default affects society as a whole, we need to look at the limits on the integrals of the wage distributions in period 2. As is shown in the second period, the cost function is in the denominator of the limits. This shows that as the cost of defaulting increases, or φ decreases, the default threshold moves to the left, thus lowering the amount of people who are likely to default in society. As is expected, this is because increasing the costs of default will incentivize more people to repay their loans. Figure 2 shows the effect of raising φ^L to φ^H in the skilled wage market. These results will also be shown with simulated data in chapter five.

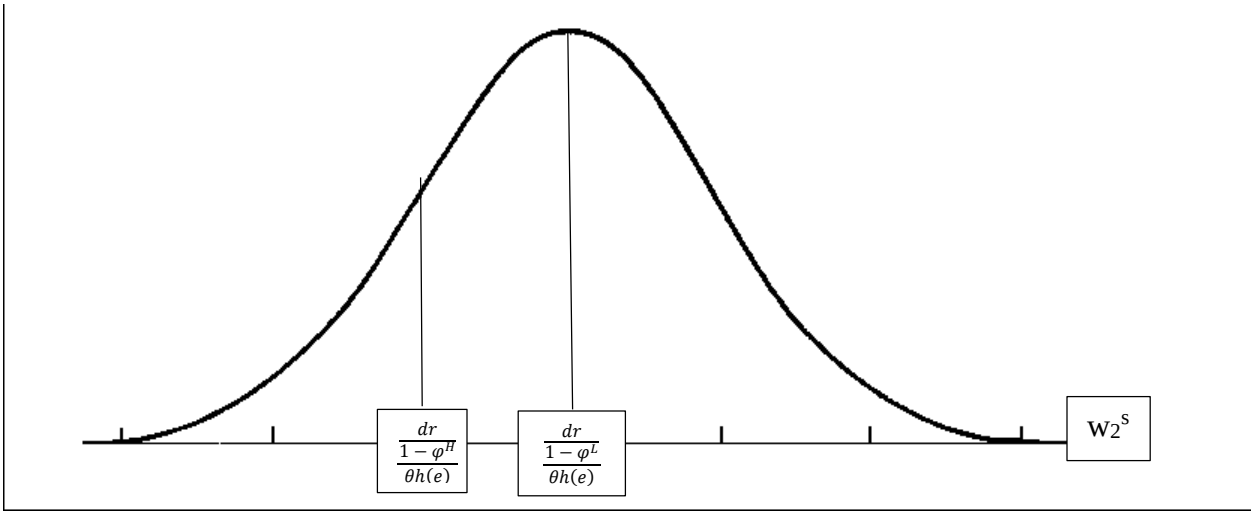

Figure 2 Effects of changing penalties on the skilled wage market

While a smaller portion of borrowers defaulting may be good for society, it is important to look at how these costs affect different groups of people individually.

Cost of Default and Critical Θ

As stated earlier in section I, the decision to go to college depends on the expected lifetime utility of the individual and her ability level. Now, we must introduce the cost of defaulting on student loans into this choice of education and the critical level of Θ to determine how these costs affect who chooses to attend college. When we assume this individual is likely to default in period 2, we must look at her lifetime utility when she defaults versus her lifetime utility when she does not go to college at all.

Her expected lifetime income if she does not go to college will be $w_1^u + (w_2^u - s)/R$. Obviously, if an individual does not go to college, she does not accumulate any student loan debt. If she does choose to go to college and defaults in period 2, her expected utility will be

$$w_1^u(1 - e) - p + B + d + \{\pi[(\Theta h(e)\, w_2^s)\, \varphi - s] + (1 - \pi)(\varphi w_2^u - s)\}/R$$

Because those who do not default on their loans do not incur the costs of default, there is no need to compare the expected lifetime utility in the case of repayment, unless the aim is to determine when an individual will default. In this paper, I focus only on the costs of default when an individual is likely to default.

To find the critical level of Θ, or Θ*, needed for an individual who is likely to default, we must set the expected lifetime utility of the individual when she does not go to college equal to the expected lifetime utility of the individual when she goes to college and defaults on her loans. This yields the equation

$$\theta_d^* = \frac{\left[\left(\frac{w_2^u - s}{R} + w_1^u e + p - d - B\right)R - (1 - \pi)(w_2^u \varphi - s)\right]}{w_2^s h(e)\varphi\pi} + s$$

Given this equation, we can see that as the cost of default increases, or φ decreases, Θ* will likely increase. As a comparison, the critical Θ level of someone who is likely to repay their student loans is

$$\theta_r^* = \frac{\left[\left(\frac{w_2^u - s}{R} + w_1^u e + p - d - B\right)R - (1 - \pi)(w_2^u - d(1+r) - s)\right]}{\pi w_2^s h(e)} + \frac{d(1+r) + s}{w_2^s h(e)}$$

As I will show in the next chapter, the critical Θ for someone who is likely to repay is lower than the critical Θ for someone who is likely to default, even with equal wages, education levels, debt levels, and probabilities of getting a job in the skilled market. Before we show this however, we must define what characteristics make a borrower likely to default.

Characteristics of Defaulting Borrowers

There are many factors that determine who is likely to default on their loans. According to the Federal Reserve Bank of New York, a large portion of the borrowers who defaulted in 2014 came from middle and low income areas, or areas with an average household income below $40,000 (Haughwout et al., 2015). In my model, this will translate as a low value of B. This is because students from low income families are unlikely to receive any extra aid from their parents in period 1. Furthermore, with a low value of B, students from low income families will be forced to take out more loans to finance their education. This means that their value of φ will be closer to 0.9 because they have more loans to repay.

Some things that I am not able to fully account for in my model are characteristics such as race and gender. Hakim and Rashidan (1995) found that African American borrowers and women were more likely to default than other borrowers, as they were found to have come from a lower income bracket and most of the people living in poverty were single mothers. Race and gender are somewhat modeled in the variable B to demonstrate an individual's low income background or lack of wealth. What type of institution a person attends often also has a bearing on the probability of default. While my model focuses on four-year public institutions, further research could be done to adapt this model to represent two-year or for profit institutions by altering the human capital accumulation function, amount of education, price of education, and debt levels.

Chapter 5

Testing and Results

In this chapter, I will develop parameters for the model and use simulated data to determine how the cost of defaulting on student loans affects who defaults in society and how default affects the ability of students that choose to go to college. I will compare these results across borrowers who are likely to default and borrowers who are likely to repay.

Parameters

The variables in this model will be determined using information about today's economy such as the unemployment rate for recent college graduates, average debt levels of students graduating from four year institutions, and average wages of high school graduates and college graduates.

In 2014, the unemployment rate for recent college graduates was about six percent and the underemployment rate for recent college graduates was around 44 percent (Abel et al., 2014). This information helps define the variable π, the probability of getting a job in the skilled market, as 0.5. As of 2012, federal unsubsidized Stafford, or Direct, loans made up around 40 percent of educational loans, so the interest rate in this model will be the current interest rate on unsubsidized Direct loans (Klobuchar, 2013). As reported by the U.S. Department of Education, the current rate is 4.29 percent. This model can easily be adapted to accommodate other federal loans by using the various interest rates assigned to each type of loan.

In order to model the cost of education, I will Cochrane and Reed's weighted averages of annual college tuition and fees – $8,552 for in-state students' tuition and fees and $31,743 for all other students (2015). In the model, I will multiply these numbers by four, as they only represent the yearly average. Any grants or scholarships can be subtracted from the price of education, however for this model we will assume there are no grants or scholarships. As of 2014, the average student graduated college with $28,950 in student loans, which will replace the variable d in my model (Cochrane & Reed, 2015). To model the amount of education a student receives, I use a value of .75 to represent the approximately 9 months of the year a student spends in school. The rest of the time the student will spend working.

To determine the wages of the skilled and unskilled markets, I will look at the average wages of high school graduates and college graduates with a Bachelor's degree. The unskilled wage in period one will be the average annual earnings of a high school graduate multiplied by four to represent the four years a student spends in college. Using data from the U.S. Department of education, this parameter will be $128,000, or $32,000 annually for four years (Carnevale et al., 2011). According to the same study, an individual with a Bachelor's degree can expect to earn about $2.3 billion during their lifetime, or as a skilled, full-time worker between ages 25 and 64 (Carnevale et al., 2011). For a high school graduate, the lifetime earnings expectation is about $1.3 billion (Carnevale et al., 2011). These values are the medians for each education level.

Recall that savings in period two will be treated as retirement funds or funds to give to the individual's children when they attend school. One assumption I make in this model is that all individuals will save ten percent of their disposable income for savings. I will then use ten percent of the individual's expected disposable income, or expected total income minus the debt

incurred, as the amount of savings in this model as a base. In further tests, I will lower this amount to model the effects of defaulting on student loans.

In order to illustrate the returns to education, h(e), I will use the model from Locher and Monge-Naranjo (2011) which gives dollar values for returns to education based on expenditures and foregone earnings. The forgone earnings are broken down across ability level, so I have averaged these values together and added them to the total expenditures for a value of $111,255.75.

The last variable to account for is R, which I will set equal to the current inflation rate plus one, as these calculations take place in terms of period 2, giving a value of 1.01.

Wage Distribution

First, I will look at the values of w_2^u and w_2^s that will cause individuals to default in period 2. As a base, I will assume that there are no costs of default, or $\varphi = 1$. Because the indifference wage between default and repayment is conditional on Θ, I will choose an arbitrary value of $\Theta = 3$. For ease of calculation, all of the dollar values in my model are in terms of millions of dollars.

Recall that the indifference wage between default and repay for the skilled and unskilled markets are $w_2^s = [d(1 + r)/1 - \varphi]/\Theta h(e)$ and $w_2^u = [d(1 + r)/1 - \varphi]$ respectively. When there are no costs of default, the indifference wage in each market is infinite. This is intuitive, because if there are no costs of default, repayment is costlier than default and thus everyone will choose to default.

Table 1 Indifference Wage

Wage	$\varphi = 1$	$\varphi = 0.95$	$\varphi = 0.9$
w_2^s	∞	1.809	0.905
w_2^u	∞	0.604	0.302

Table 1 shows the results of my tests when I change φ in the distribution of wages. If I increase the cost of default, in this case decrease φ by 0.05, the indifference wage drastically decreases. If I decrease φ further to 0.9, the indifference wage drops by about 50 percent. On the aggregate level, this seems good for society, as there will be less people defaulting on their loans. This, however, does not give the entire picture. There are many more factors on the individual level that need to be accounted for, which will be discussed in the next subsection.

Critical Theta

As I already stated, there are many factors that characterize a borrower as likely to default. In order to effectively test these variables, I compared them to the critical level of Θ for those borrowers that were unlikely to default with both in and out of state tuition levels. Each price level had separate tests and all of tests are shown in Appendix B. I normalized the level of Θ for those likely to repay to one for both prices.

I found that just the probability of default itself increased the critical Θ needed for borrowers likely to default by about 36 times, even without changing the costs of default. In further tests, I increased the costs of default through changing φ, B, s, and d. After changing the variables one at a time, I also tested how a change in two variables would affect the critical level of Θ needed for an individual to choose to go to college if they believe they are likely to default.

I have summarized the most significant of my findings in Table 2. All values of Θ have been divided by their respective control values of Θ (Θ_c) from the repayment tests in order to better compare them.

Table 2 Significant Results

	d	p	s	φ	Θ_r/Θ_{rC}	Θ_d/Θ_{rC}	Θ_d/Θ_{dC}
Control 1 In-state	0.02895	0.034208	179.997	1	1	36.23884	1
Control 2 Out of state	0.02895	0.126972	179.997	1	1	36.23377	1
Test 1 In-state	0.02895	0.034208	179.997	0.9	1	36.44553	1.0057
Test 2 Out of state	0.02895	0.126972	179.997	0.9	1	36.44044	1.0057
Test 7 In-state	0.02895	0.034208	89.998	1	1.99851	18.61940	0.5138
Test 8 Out of state	0.02895	0.126972	89.998	1	1.99836	18.61686	0.5138

In Test 1, I decreased the value of φ to 0.9 and it had no effect on the critical Θ for borrowers that are likely to repay, as φ is not in the equation for those borrowers. It did, on the other hand, have an effect on the borrowers who were likely to default. As can be seen from the last column, as φ increases, the Θ* for borrowers likely to default also increases. This shows the opposite result from the aggregate level, suggesting that while increasing penalties may seem good for everyone, increasing penalties also hurts more disadvantaged students by discouraging them from getting an education.

Another way to model default costs and those who are likely to default is lowering savings. The base savings amount was ten percent of the individual's expected disposable income. In tests 7 and 8, I changed the savings amount to five percent of the expected disposable

income which gave some interesting results. In the case of borrowers who are likely to repay, a lower amount of savings increased the critical level of Θ. For those who are likely to default, the critical level of Θ decreases. This may be because as savings decrease, there is more disposable income to be garnished, meaning it will be easier to get the entire amount of the loan back from the defaulting borrower. That, in turn, would decrease the concern of the borrower and make the choice easier to go to college. Combining both decreased savings and increased costs did not yield significant results, as the effect of changing savings dominated the equation.

Before starting these tests, I believed that parental contributions would have a significant effect on the critical level of Θ needed to go to college in this environment. In the cases of both repayment and default, B had a very slight effect on the critical Θ. This is similar to findings in other models, however this result may also be a product of the value I chose for B. It is difficult to determine what this true value is, as parental contributions cannot be accurately measured.

Another variable I believed would have an effect on the critical Θ of each group was the amount of debt incurred. For the borrowers likely to repay, increasing debt also increased the critical level of Θ. This is intuitive, as it can be compared to going to a prestigious school with higher tuition. An individual must have a higher ability in order to take on a larger amount of debt in order to be able to repay the entire amount of debt. Interestingly, the higher amount of debt had a negligible effect on the critical Θ for borrowers likely to default. This could be because the cost of default in this model is not directly related to the amount of debt incurred.

Nevertheless, the debt incurred does have an effect on the aggregate default decision. As debt increases, the indifferent wage shifts to the right, increasing the chances of default.

Problems

One of the largest problems with this model is that it is a simple model that does not account for many factors in the decision to go to college or the decision to default. For example, family income and parental ability often influences which individuals attend college. Additionally, there is no way to truly determine how these values of Θ translate to the real world. Ability can be measured in many ways like standardized test scores, resumes, interviews, and letters of recommendation. Only having two periods in the environment also contributes to the simplicity of the model, as in the real world, people can fluctuate between repayment and default.

Another problem is the relationship between many of these variables. In order to accurately isolate the effect of the costs of default, I kept many of the variables constant for all borrowers. This poses a problem because factors such as debt are dependent on factors such as family income and price of education. Furthermore, the cost of default may be affected by the amount of debt incurred, as student loans must be repaid in full.

The last problem I will address is that of the capital market. In this case, everyone can borrow as much as they need in order to go to college. The government also has full enforcement of repayment in this model and there is no effect on future borrowing if the individual defaults.

Chapter 6

Further Discussion

Policy Recommendations

One of the best suggestions in policy regarding student loan repayment is making income based repayment plans automatic. The United States has several options for income based repayment, but borrowers must meet certain qualifications and enroll every year. One study shows that borrowers have difficulties with these options because they are not notified that they must reenroll, they are not aware that they are eligible, they are caught up in extensive paperwork to enroll, or they have other difficulties enrolling (Frotman, 2015). Making income based repayment automatic will be beneficial because the programs are already in place, so streamlining them will save money and help more borrowers after college. In addition, this plan will still allow borrowers to repay their loans entirely.

Another recommendation could be increasing grants from the government and private organizations rather than loans. Because grants do not have to be repaid, borrowers will incur less debt and will be less likely to default or become delinquent on their loans. Of course, this is easier said than done. One way around this, however, is making the search for scholarships easier. I can attest from personal experience that searching for scholarships is extremely difficult. There are many scholarships available, especially for students who are traditionally disadvantaged, but the search costs are extremely high. There are many sites that have scholarship listings, but some are not trustworthy or do not regularly update their lists. If high

schools were able to compile a large list of scholarships for their students, this may encourage more students to apply for scholarships to offset the cost of higher education.

One last solution to decreasing the costs and probability of default is addressing rising tuition costs. Tuition has been rapidly increasing in the last decade, so universities should look into different ways to curb these costs. Again, this is much easier said than done and this discussion is best suited for another paper.

Further Research

This model can easily be adapted to explain trends I observed in my literature review, such as the prevalence of default among students from two-year or private institutions. These changes could be modeled through the changing of the returns to education function, price of education, time spent in college, and debt. Another way this model could be adapted is by changing the probability of getting a job in the skilled market when the economy is in a recession. This could model changes in the job market from the Great Recession.

This model can also be adapted to incorporate private loans. Private loans, while they do not make up a large portion of the total student loans currently disbursed, are more likely to affect those students who have borrowed the maximum amount allowed by the federal government.

While this model answers some questions, there are still some questions to be addressed. For example, my model could be expanded to a three or four period model in order to account for changes in wage and the effect of experience on wages. This would also give individuals in the model the chance to come out of or go into default at different points in their lives rather than

only having two options. Moreover, recent surveys of college students would give more accurate data to parameterize new models.

Another question to research from my findings is how exactly immeasurable factors like race and gender play into the default decision and the decision to go to college. This could give even more insight into how different groups react to new government policies. This would also allow more policies to help economically disadvantaged students who want to go to college but are afraid that they cannot afford it.

Finally, in order to completely capture the effects of defaulting on student loans, it is important to incorporate different capital markets into a model of human capital accumulation. Both federal and private loans need to be accounted for in the model and borrowing constraints should be present. My interest is particularly in those students who borrow the maximum amount allowed by the federal government, as this would indicate that they are from a low income background and are trying to go to college. Looking at all of these factors together would prove instrumental in developing policies so that more students have access to higher education.

Conclusions

Overall, this model proves my hypothesis that an increase in the costs of default will lead to an increase in the ability level needed in order to choose to go to college. This is alarming, as the default rate has been rising for the past ten years and could have a negative effect on future generations, especially those students from disadvantaged backgrounds. My research has provided another perspective on human capital accumulation in America and can be used to

develop new policy recommendations to reform the student loan system, some of which I will propose in the next subsection.

This model is also a good representation of how policies that are meant to improve the overall economy may have adverse effects on different groups. Higher costs of default in the distribution of wages had a positive impact; less people would choose to default. Higher costs of default on the individual level, however, proves detrimental to underprivileged students.

Appendix A

Equations

Lifetime Utility:

$$U[w_1^u(1-e)-p+B+d]$$

$$+\ \beta\left\{\pi\left[\int_0^{\frac{\frac{d(1+r)}{1-\varphi}}{\theta h(e)}} U(\theta h(e) w_2^s \varphi - s)dG + \int_{\frac{\frac{d(1+r)}{1-\varphi}}{\theta h(e)}}^{w_2^s} U(\theta h(e) w_2^s - d(1+r) - s)dG\right]\right.$$

$$\left.+\ (1-\ \pi)\left[\int_0^{\frac{d(1+r)}{1-\varphi}} U(w_2^u \varphi - s)dG + \int_{\frac{d(1+r)}{1-\varphi}}^{w_2^u} U(w_2^u - d(1+r) - s)dG\right]\right\}$$

Critical Thetas:

$$\theta_d^* = \frac{\left[\left(\frac{w_2^u - s}{R} + w_1^u e + p - d - B\right)R - (1-\ \pi)(w_2^u \varphi - s)\right]}{w_2^s h(e)\varphi\pi} + s$$

$$\theta_r^* = \frac{\left[\left(\frac{w_2^u - s}{R} + w_1^u e + p - d - B\right)R - (1-\ \pi)(w_2^u - d(1+r) - s)\right]}{\pi w_2^s h(e)} + \frac{d(1+r)+s}{w_2^s h(e)}$$

Appendix B

Other Models, Variables, and Tests

Lochner and Monge-Naranjo Earnings Function for h(e) function:

Years of Direct Foregone earnings by AFQT quartile

Years of College	Direct Expenditures	Foregone Earnings AFQT Quartile 1	Foregone Earnings AFQT Quartile 2	Foregone Earnings AFQT Quartile 3	Foregone Earnings AFQT Quartile 4
1	6,322	3,604	8,560	6,716	6,841
2	12,343	8,689	19,446	17,530	15,476
3	58,275	14,844	30,467	29,257	26,288
4	75,880	21,222	40,825	40,350	39,106

Variables:

B – parental contribution

d – average debt

e – proportion of time spent in school

h(e) – returns to education subject to $h'(e) > 0$ and $h''(e) < 0$

p – average tuition and fees

r – interest rate on federal Direct student loans

R – inflation adjustment for period 2

s – savings based on expected disposable income

w_1^u – unskilled wage in period 1 when individual is in school

w_2^u – unskilled wage in period 2

w_2^s – skilled wage in period 2

φ – wage garnishment between 0.9 and 1

π – probability of getting a job in the skilled market

Θ - individual ability

Tests:

Variable	valueC1 in	valueC2 out	valueT1 in	valueT2 out	valueT3 in	valueT4 out	valueT5 in	valueT6 out	valueT7 in	valueT8 out	valueT9 in	valueT10 out	valueT11 in	valueT12 out
pi	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
debt	0.02895	0.02895	0.02895	0.02895	0.02895	0.02895	0.02895	0.02895	0.02895	0.02895	0.034	0.034	0.032	0.032
interest rate	0.0429	0.0429	0.0429	0.0429	0.0429	0.0429	0.0429	0.0429	0.0429	0.0429	0.0429	0.0429	0.0429	0.0429
price	0.034208	0.126972	0.034208	0.126972	0.034208	0.126972	0.034208	0.126972	0.034208	0.126972	0.034208	0.126972	0.034208	0.126972
wageu1	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
wageu2	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
wageS2	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
education	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	1.75	2.75
h(e)	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575	0.11125575
B	0.032	0.032	0.032	0.032	0	0	0	0	0.032	0.032	0.032	0.032	0.032	0.032
savings	179.9969808	179.9969808	179.9969808	179.9969808	179.9969808	179.9969808	179.9969808	179.9969808	89.9984904	89.9984904	179.9964541	179.9964541	179.9969808	179.9964541
phi	1	1	0.9	0.9	1	1	0.9	0.9	1	1	1	1	0.9	0.9
theta	3	3	3	3	3	3	3	3	3	3	3	3	3	3

critical theta repay		over C1 and C2	
C1	5.087946368	1	
C2	5.088678654	1	
T1	5.087946368	1	
T2	5.088678654	1	
T3	5.088198979	1.000049649	
T4	5.088931264	1.000049642	
T5	5.088198979	1.000049649	
T6	5.088931264	1.000049642	
T7	10.16828955	1.998505648	
T8	10.16902184	1.998361958	
T9	10.16829085	1.998505903	
T10	10.16902314	1.998362213	
T11	10.17839475	2.000491753	
T12	10.18923145	2.002333442	

critical theta default		over C1 and C2 repa	over C1 and C2 default
C1	184.3812709	36.23883931	1
C2	184.3820031	36.23376827	1
T1	185.4328968	36.44552897	1.00570354
T2	185.4337104	36.44044418	1.005703958
T3	184.3815235	36.23888896	1.00000137
T4	184.3822558	36.23381791	1.00000137
T5	185.4331775	36.44558414	1.005705062
T6	185.4339911	36.44049934	1.005705481
T7	94.73449063	18.61939647	0.513796711
T8	94.73522291	18.61686095	0.513798642
T9	184.3807064	36.23872837	0.999996939
T10	184.3814387	36.23365734	0.999996939
T11	185.4440971	36.44773033	1.005764286
T12	185.4556135	36.44474846	1.00582275

wage dist	skilled	unskilled
PHI = 1	infinity	infinity
PHI = .95	1.809162223	0.6038391
PHI = .9	0.904581112	0.30191955

BIBLIOGRAPHY

Abel, J. R., Deitz, R., & Su, Y. (2014). Are recent college graduates finding good jobs? *Current Issues in Economics and Finance*, *20*(1).

Carnevale, A. P., Rose, S. J., & Cheah, B. (2011). The college payoff: Education, occupations, lifetime earnings. *Georgetown University Center on Education and the Workforce.*

Chatterjee, S., & Ionescu, F. (2012). Insuring student loans against the financial risk of failing to complete college. *Quantitative Economics, 3*(3), 393-420.

Cochrane, Debbie and Reed, Matthew. (2015). Student Debt and the Class of 2014. The Project on Student Debt. *The Institute for College Access and Success.*

Frotman, Seth. (2015). Annual Report of the CFPB Student Loan Ombudsman. *Consumer Financial Protection Bureau.*

Hakim, Sam Ramsay, & Rashidian, M. (1995). Student Loan Default: Borrower Characteristics, Institutional Practices, and the Business Cycle. *Journal of Educational Finance,* Vol. 20, No. 4, 449-466.

Haughwout, Andrew, Donghoon Lee, Joelle Scally, and Wilburt van der Klaauw. (2015). Student Loan Borrowing and Repayment Trends, 2015. *Federal Reserve Bank of New York.*

Johnson, M. (2013). Borrowing constraints, college enrollment, and delayed entry. *Journal of Labor Economics* 31 (4), 669-725.

Keane, M. and K. I. Wolpin (2001). The effect of parental transfers and borrowing constraints on educational attainment. *International Economic Review* 42 (4), 1051-1103.

Klobuchar, A. (2013). The Causes and Consequences of Increasing Student Debt. *Joint Economic Committee*. United States Congress.

Li, W., & others. (2013). The economics of student loan borrowing and repayment. *Business Review*, (Q3), 1–10.

Lochner, L. J., & Monge-Naranjo, A. (2011). The Nature of Credit Constraints and Human Capital. *American Economic Review*, *101*(6), 2487–2529. http://doi.org/10.1257/aer.101.6.2487

Lochner, L., & Monge-Naranjo, A. (2002). Human capital formation with endogenous credit constraints. *National Bureau of Economic Research*. Retrieved from http://www.nber.org/papers/w8815

Lochner, L., & Monge-Naranjo, A. (2015). Student Loans and Repayment: Theory, Evidence and Policy. *National Bureau of Economic Research*. Retrieved from http://www.nber.org/papers/w20849

Looney, A. & Yannelis, C. (2015). A crisis in student loans? How changes in the characteristics of borrowers and in the institutions they attended contributed to rising loan defaults. *Brookings Papers on Economic Activity*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.697.355&rep=rep1&type=pdf

Shen, H., & Ziderman, A. (2009). Student loans repayment and recovery: international comparisons. *Higher Education*, 57(3), 315–333.

Singleton, J. J. (2014). EXTREME DEBT RELIEF FROM CREDITORS AND DEBT COLLECTORS. Retrieved from http://www.stage2omega.com/wp-content/uploads/2014/03/Extreme_Debt_Relief_from_Debt_Collectors.pdf

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Operated POS machine, handled money, greeted customers, made specialty drinks, kept restaurant clean and orderly
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