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how labor markets work**

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Insights From Behavioral Economics on How Labor Markets Work

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Abstract

I discuss some key issues raised by behavioral economics for better understanding the working of the labor market. Amongst the key points in this paper are: (i) a revised modeling of the labor supply curve, with a specific focus on the target income approach (ii) elaborating on the importance of effort variability for understanding labor supply, including a narrative on efficiency wage and x-efficiency theory (includes the importance of fairness) (iii) building upon x-efficiency and efficiency wage theory to better understand the demand side of the labor market (iv) discussing some of the cognitive/informational/institutional factors affecting decision-making, including modeling the role of errors or biases in labor market decisions for both the supply and demand side of the labor market (v) insights of experimental economics for labor market behavior (vi) the importance behavioral economics for better understanding the stylizing facts of labor markets. This paper also compares conventional to behavioral theoretical approaches labor markets, their different underlying assumptions, and analytical predictions, with implications for public policy and institutional design. Also compared are the errors and biases and the bounded rationality approaches labor market analysis. They produce different analytical predictions as well as having different implications for public policy and institutional design.

JEL Classification: B41, C9, D1, D2, D6, D8, E24, E32, J2, J3, J5, J6, L2, L5,

Keywords: Behavioral economics, bounded rationality, efficiency wages, effort discretion, errors and biases, fairness, information asymmetries, target income approach, involuntary employment

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1 Introduction

In this chapter, building upon and adding to the standard economics toolbox, I interrogate some of the contributions of behavioral economics to modeling both the supply and demand sides of the labor market. I also discuss some of the implications of this for analytical prediction, cause and effect analysis, and public policy. In this more focused review of the literature, taking a more pluralistic approach, I analyze the target theory of labor supply, where the supply of labor is a function of an individual's target income.² In the standard model labor supply is product of the wage rate and income. I also discuss the implications of the variability of effort supply to the firm, which directly relates to demand side of the labor market, affecting the marginal value product. In standard economics the supply of effort is assumed fixed, often at some maximum.

Moreover, I discuss the theoretical and policy implications of incorporating the fact that individuals have limited information processing capabilities and must also make decisions in a world of complex, costly and asymmetric information (often referred to as bounded rationality). These same individuals' decisions are affected by how information is framed and by the institutional parameters within which decision are made. Decisions are also affected by norms, social context, and past behavior (path dependency). This can result in errors in labor market decisions, generating outcomes that are inefficient from both the individual's and society's perspective and can affect both the supply and demand side of the labor market.³

² For broader surveys and ones with a different orientation from what's presented here see, for example, Berg (2006), Charness and Kuhn (2011), Pencavel (1986), Killingsworth and Heckman (1987), and Rogerson, Shimer, and Wright (2005).

³ The notion of errors in decision-making is inconsistent with the worldview of leading proponents of the conventional or standard economic wisdom, following upon the arguments of Alchian (1950) and Friedman (1953), that competitive markets will force efficiency in the market, also referred to as the efficient market hypothesis. However, possible errors in decision-making are a focal point of contemporary behavioral economics and behavioral finance (Altman 1999; Altman 2005b; Akerlof and Shiller 2009; Leibenstein 1966; Shiller 2001; Thaler and Sustein 2008). When market forces aren't 'perfect', and they usually aren't, product market inefficiencies, sometimes a product of errors in decision-making can be pervasive. In the stock market short term bubbles with long term consequences are of

This speaks to the notion that the labor market as a social institution, promoted by Robert Solow (1990). This understanding has deep roots in behavioral and institutional economics (Akerlof 1982, 1984, 2002; Bowles and Gintis 1990; Commons 1934, 1950; Cyert and March 1963; Duesenberry 1949; Dunlop 1944; Frank 1985, 1999; Kaufman 1989, 1999a, 2003a, 2003b, 2008; March and Simon 1968; Tomer 1987; Slichter 1920; Simon 1987; Veblen 1899, 1904) and overlaps with aspects of feminist economics (Folbre 2001, 2009; Nelson 2009).⁴ Thus, workers, employers, and the unemployed, can't be modeled like apples, wheat, or computers. Unlike inanimate commodities humans can and do react to changes in economic and social variables by varying the quantity and quality of their effort levels and hours of market labor supply. And humans respond to economic incentives differently, depending on circumstances, which, in turn, impacts on labor market behaviors. This does not replace standard demand and supply analysis of the labor market. It rather enriches it, with an enhanced economic toolbox. One can still fruitfully exploit basic supply and demand analysis. But now the slopes and positions of the demand and supply curves are impacted by psychological, sociological, and institutional variables, as they are in real-world labor markets.

2 What is Behavioral Economics

Following in the tradition of Hebert Simon, behavioral economics and, therefore, behavioral labor, aspires to build models based upon more realistic simplifying behavioral assumptions by importing and integrating into the economics toolbox insights from psychology, sociology, and institutional analyses. These can be expected to simulate more

importance. And, market forces can do little mitigate errors in consumer or in labor market choices. One focus of behavioral economics is to explain errors in decision making as well as economic inefficiencies that may or may not be a product of such errors (Simon 1987).

⁴ Simon (1978, 499) writes: “The principal forerunner of a behavioral theory of the firm is the tradition usually called Institutionalism. It is not clear that all of the writings, European and American, usually lumped under this rubric have much in common, or that their authors would agree with each other’s views. At best, they share a conviction that economic theory must be reformulated to take account of the social and legal structures amidst which market transactions are carried out. . . . The name of John R. Commons is prominent—perhaps the most prominent—among American Institutionalists.”

robust descriptions of labor market behavior and generate more accurate analytical predictions and credible cause and effect analyses. More realistic modeling assumptions minimize the probability spurious correlations, convoluting correlation with causation, linking specific behavioral and institutional facts on the ground with predictions.

Assumptions are embedded in the realistic worldview of the brain as a scarce resource, with limited processing capabilities (bounded rationality), as well as the reality of imperfect and asymmetric information, heterogeneous decision makers, transaction costs, the importance of social norms for decision-making, effort as a variable in the production function, and institutional parameters which differentially affect the decision-making process, inclusive of bargaining-power, and the choices individuals make. This adds to the traditional economics toolbox, which is more focused on the importance of prices and income to decision-making. As a consequence, behavioral economists anticipate that individuals will often behave in the manner inconsistent with the predictions of standard theory (Akerlof 1982, 1984, 2002; Altman 2005, 2006b, 2008a; Berg 2006; Gigerenzer 2007; on complex information, see Hayak 1945; Kahneman 2011; March 1978; Simon 1955, 1978, 1979, 1987; Smith 2003; Todd and Gigerenzer 2003).

Behavioral labor is influenced by two different, but sometimes overlapping, approaches to behavioral economics. In one approach, pioneered by Daniel Kahneman and Amos Tversky (Kahneman and Tversky 1979; Kahneman 2003, 2011; Tversky and Kahneman 1981; Tversky, A. and D. Kahneman 1981, 1986), it is assumed that individuals tend to be error-prone and biased in decision-making because of how the brain is hardwired. This generates persistent errors and biases in decision-making that can be sub-optimal from both the individual's and society's welfare maximizing perspective. Sub-optimality is defined as deviating from traditional economic benchmarks of optimal behavior. Such sub-optimal decisions need be corrected by the intervention of experts, often through the auspices of government (Thaler and Sustein 2008; Babcock, Congdon, Katz, and Mullainathan 2010).

Pioneered by Herbert Simon (1955, 1978, 1979, 1987), the alternative, bounded rationality approach, it is not assumed that individuals are hardwired to behave in a sub-

optimal errors-prone and biased manner. There can be decision-making errors, but such sub-optimal behavior can often be corrected by improvements in the decision-making environment and through education. Also, bargaining power considerations can affect decision-making outcomes—this has nothing to do about errors or biases in decision-making. Moreover, individuals can deviate from standard economic decision-making norms, but this often results in superior economic outcomes (Altman 2005, 2008a; Gigerenzer 2007; on the importance of power, see Rothschild 2002; Smith 2003).

3 Modeling Labor Supply: A Standard Rendering

A good entry point for introducing behavioral ideas into labor market theory is the standard labor-leisure model of individual labor supply. It hinges upon two behavioral assumptions that underlie and drive much of contemporary labor economics: (1) leisure (more generally, non-market activities inclusive of sleep) is preferred to work and is modeled as a normal good so that changes in real income are positively and causally related to market labor supply; (2) making leisure more expensive, by increasing the real wage, holding real income constant, will increase the supply of labor and lowering the real wage will reduce the supply of labor (Becker 1965). It is implicitly assumed that individuals gain no positive utility from labor market activities. However, in reality, utility is accrued not only from the economic benefits of work, but also from the non-economic or ‘spiritual’ benefits (Frey and Stutzer 2002; Helliwell and Huang 2011; Jahoda 1981; Sherman and Shavit 2009). In addition, it is assumed that individuals can afford *not* to work on the market—that people who do not participate on the labor market can live on leisure alone. But if the wage rate is too low, many individuals will simply not supply labor to the market and will not accept job offers at such low wage rates. Given these standard assumptions, the substitution effect predicts that as the price (wage rate) of leisure increases, one will supply more labor to the market and therefore consume less leisure. But as the wage increases, income goes up, resulting in increasing the demand for leisure (income effect). The supply of labor is a product of the interaction of the substitution and income effects. Labor supply increases as wages increase—the labor supply curve is upward sloping—as long as the substitution effect dominates the income effect. But

when the income effect dominates, this yields the ‘classic’ backward bending labor supply curve.

These points are illustrated in Diagram 1, by labor supply curve 1. At W^* , market labor supply is zero—wages are simply too low to compensate prospective workers for sacrificing the good feelings generated from the consumption of leisure time. As wages increase, market labor supply goes up until wages rise to W_2 . Thereafter, the income effect dominates the substitution effect and market labor supply falls. All along the individual’s labor supply curve the individual is assumed to be maximizing his or her utility or wellbeing, even if the individual is unemployed at a particular wage rate or is working seven days week, 12 hours per day.

What underlies (the micro-foundations) this type of labor supply curve is illustrated in Diagram 2. The fact that the income-non-labor market indifference curve is nonlinear and convex to the origin, presumes that income and non-labor time (‘leisure’) are substitutes. In this diagram, the individual increases labor supply from N_0N_1 to N_0N_2 , given indifference curves U_0 and U_1 , as the wage rate or the price of nonmarket time increases from 1 to 2. Labor supply keeps on increasing as wages rise as long as the substitution effect outweighs the income effect. But when the wage rate diminishes, from 2 to 1, individuals substitute out of the market labor to nonmarket time and market labor supply falls as long as this substitution effect outweighs the income effect of falling real income.

Related to assumption (2), individuals will accept a wage offer only if their reservation wage—the minimal acceptable wage—is high enough. Policy, such as improvements to minimum wages, unemployment insurance and social welfare, that increase the reservation wage will reduce the percentage of wage offers accepted, increasing unemployment, whereas policy that reduces that reservation wage has the opposite effect. Changes in the reservation can also affect the supply of labor, by affecting the expected cost of leisure time. Increases to the reservation rate will reduce the supply of labor to the extent that individuals expect a higher wage rate to compensate them for sacrificing a unit of leisure (shifting the labor supply curve to the left). Moreover, increases in the reservation wage are

predicted by the standard model to increase the overall wage rates paid by firms across the spectrum from low to high wage firms, increasing average production costs and, thereby, increasing unemployment.⁵

A critical problem with the standard model of labor supply is that it fails to provide any reasonable predictions on the timing and direction of changes in labor time. Rather, once one knows the shape of the labor supply curve, what tends to be argued is that a particular change in the relationship between the substitution and income effect ‘caused’ a change in labor supply. By assumption, other possible causal variables, even those that are more plausible from a reality-based perspective are not ever brought into consideration (this is a serious omitted variable problem).

There is no empirical or theoretical basis to predict when, or the extent to which, there should be a change in the relationship between income and substitution effects such that labor supply increases and then diminishes. Moreover, one can’t predict, *ex ante*, under what circumstances there would be a reversal in the dominance of the substitution and income effects causing labor supply to increase again, generating an s-shaped labor supply curve (Diagram 1, supply curve 2) (For problems and issues with contemporary labor supply theory see, for example, Altman 2001; Pencavel 1986; Prasch 2000; see Dessing 2002 and Sharif 2000, on s-shaped supply curves in less developed economies).

In the real world, we have witnessed such s-shaped labor curves, wherein hours worked per week initially fell in currently developed economies, in the late nineteenth century, when workers often worked six to seven days a week, often for more than ten hours a day, with little or no vacation time. More recently, in many of these economies, hours worked per week increased from lows of less than 40 hours per week (Messenger, Lee, McCann 2007). What is required is a model of market labor supply that *ex ante* predicts labor market

⁵ Friedman (1968) and Mulligan (2013), respectively, provide the old and new versions of this perspective. They argue that the long run equilibrium rate of unemployment (which is often referred to as the ‘natural’ rate of unemployment is best reduced by cutting if not eliminating safety or social security programs that have the effect of increasing the reservation wage.

behavior, generating analytical predictions using credible behavioral and institutional assumptions.

4 A Behavioral Model of Labor Supply: A Target Approach

In the target approach, real target income and target non-market activities are introduced into the modeling of market labor supply (see Altman 2001 and Camerer, Babcock, Lowenstein, Thaler 1997; Baxter 1993; and Kaufman 1989, 1999, for more details).⁶ It is argued that individuals' labor supply decisions can be more robustly modeled by making the simplifying assumption that individuals are most concerned with their target income and their target non-market activities. This is opposed to the standard focus on the relative price of leisure and the capacity of individuals to purchase more leisure time. The notion that target income can be important to market labor supply decisions is not new, but has not had much impact on the standard labor supply literature.

One can write the target theory as market labor supply being a function of target market income, target nonmarket activities, nonmarket income, and the real wage rate (Altman 2001). This argument can take the form of:

$$L^{SM} = F(TY, TNML, NMY, w)$$

TY is real target income, TNML is target nonmarket time, NMY is real nonmarket income, and w is the real wage rate. Market labor supply can be measured by hours supplied to the labor market. Given real target income, labor supply is given by the real wage rate, *conditional* upon target nonmarket time and real nonmarket income, or:

$$L^{SM} = \frac{TY - NMY}{W}, \text{ conditional upon } TNML$$

Given TY, NMY, and W market labor supply is determined. It is important to note the importance of TNML, such as childcare and care of disabled loved-ones, for example, in determining TY.⁷ The higher the TNML, the lower the market labor supply. Such would be

⁶ There are some points of intersection between the target theory and the arguments presented in Prasch (2000).

⁷ More generally, Kaufman (1989), building upon the work of social psychologist Abraham Maslow, (1954) makes the case that labor market choices are determined, among other variables, by the hierarchy of needs of the individual, where realizing these needs can

the case with single-parent female led households with no affordable childcare. On the other hand, artists or musicians who are happy (maximizing utility) at a low target income so that more time is devoted off-market to painting and music, will supply minimal labor to the labor market. Overall, *ceteris paribus*, one can model increasing target minimum nonmarket time as shifting the market labor supply curve to the left whilst reducing this target shifts the market labor supply curve to the right.

Real target income is defined inclusive of expenses required to earn a particular level of target real income, such as taxes, daycare, appropriate clothing, and transportation costs. Once target income is known, one can more accurately predict the price effect (the slope of the labor supply curve) of a change in wages. Moreover, *ceteris paribus*, changes in target income affects the extent to which changes in wages affect labor supply, since the ability to realize a given level of real target income is a product of real wages and hours worked.

For example, if real target income is met at a given real wage and number of hours worked, increasing real wages will reduce the supply of labor.⁸ If real target income increases, on the other hand, the supply labor would increase at any given real wage to meet the increased target income. Moreover, if real target income exceeds what can be realized at the current real wage and a given (maximum) labor supply, increasing real wage can be expected to have no effect on labor supply until the real wage is high enough, in combination with hours worked, to achieve the target income. And, at this point, if real target income increases, labor supply would not fall in the face of increasing real wages if these higher wages, in combination with the existing level of market labor supply, are required to either approach or realize the higher level of target income.

overwhelm any predicted substitution and income effects of the standard model. This often generates preference functions characterized by a lexicographical or L-shaped indifference curves. Individuals are motivated to realize their needs contained by the hierarchy of needs one step at a time, beginning with the lower order needs.

⁸ Camerer, Babcock, Lowenstein, and Thaler's (1997) target model of labor supply focuses on taxi drivers, where the evidence suggests that, on average, target income is fixed, thus increasing wages reduces the supply of labor. This model builds on very short run objective functions. See Farber (2005) for a critique of the Camerer, Babcock, Lowenstein, and Thaler (1997) rendition of the target income approach.

It is important to note that there is evidence supportive of the hypothesis that target income increases over time resulting in a persistent and sometimes growing gap between actual real income of the individual or household and the real target income of the individual or household (Altman 2001; Berry 1994; Lebergott (1993, p. 65). This might very well be a product of sellers promoting new products by creating new wants (Frank, 1985, 1999, 2005; Galbraith 1965; George 2001), the desire of individuals to maintain their relative income position in relation to their peers (Duesenberry 1949; Easterlin 2001; and Leibenstein 1950) and, possibly related to this, the increasing material aspiration levels of individuals (Easterlin 2001; Lebergott 1993; Mach 1956; March and Simon 1968; Sanders 2008; Shane and Loewenstein 1999; Stutzer 2004). If real target income did not increase over time in developed economies, most people there would not have to work very much at all today to purchase what their forefathers and foremothers purchased in the early twentieth century. No more than 10-15 hours work per week would be required to achieve the average income of early twentieth century Americans and no more than 10-15 minutes per week to reach the income levels of the Kapauku Papuans of the Pacific Islands (Altman 2001; Lebergott 1993, p. 65).

Hours worked have declined over the past-100 odd years in economies that are currently developed but not nearly as much as they should have if target real income had not increased. Moreover, hours of work tend to decline quite dramatically amongst developing low-income economies but only in a fashion consistent with increasing real income. And, amongst the developed wealthy economies there is little relationship between hours worked per week and increases in real wages (Messenger, Lee, McCann 2007). In all instances, the evidence tends to support the hypothesis that real target income increases over time.

Whatever the cause, the fact that real target income has and does increase is critically important to understanding the evolution of market labor supply and to predicting future movements in market labor supply. Here we have an evidenced-based variable (unlike the substitution and income effects) that drives market labor supply over historical time. This allows for more substantive economic predictions and causal analyses.

A key point of the target approach is that the market supply of labor is driven by the basic needs and the unsatisfied wants of individuals.⁹ In this instance, substitution effects are often of little analytical consequence. Indeed, when market labor supply is fixed for target income reasons the individual's indifference curve for income and nonmarket or leisure time will be L-shaped as with indifference curve U_3 in Diagram 2—we have lexicographic indifference curves. As the wage rate changes from 1 to 3 or from 3 to 1, there is no change in the preferred amount of nonmarket activities and, therefore, in market labor supply. Individuals are not willing sacrifice real income to obtain more nonmarket activities. Labor supply changes here, not as a consequence of changes in the price of nonmarket or 'leisure' time (substitution effect), but as a function of changes in target income and whether an increase in the wage rate yields a real income that exceeds the current target income. If the latter occurs, there is a decrease in labor supply as a result of the target income being surpassed at the higher real wage and the given amount of hours worked. Once one knows an individual's target income, one can predict market labor supply as the real wage rate changes.

The trade-off between market income and nonmarket activities is illustrated in Diagram 3. In the target income model, since the indifference curves are assumed to be L-shaped, the individual's market labor supply decision is based on target income, as opposed income-'leisure' trade-offs in terms of substitution effects. As the wage rate increases, from 1 to 2, the individual can choose to maintain his or her prior supply of market labor (N_0N_1) and maximize income, at $0C$, forthcoming from the increased wage. On the other hand, the individual can reduce market labor supply to N_0N_2 , and increase income to $0B$. In this case, BC of income is sacrificed in order to increase nonmarket activities from $0N_1$ to $0N_3$. These choices, based on an individual's target income, can all be utility maximizing and is given by the tangency of indifference curves U_1 , U_2 , and U_0 , to their respective price lines.

In one plausible scenario, one begins a market labor supply narrative at very low real wages and a very high level of market labor supply, such as 60 hours (a ten hour workday of

⁹ This generalized target income modeling of labor supply is based on Altman (2001).

six days) per week, not uncommon in the nineteenth century industrial world. Increasing nonmarket time as real wages increase *eventually* proves to be a higher order need than a further increase in real income (Altman, 1999e; Cross, 1988). In Diagram 3, utility is maximized at a low level of nonmarket activities, such as $0N_1$, in an attempt to meet target income. Initial increases in real wages can be expected to have no effect on target nonmarket activities if target income has yet to be met at the still relatively very low real wage rates. But as real wages increase further, the next step in the hierarchy of needs and wants would be to increase nonmarket time from its very low levels, and utility would be maximized at N_3 of nonmarket time. In this case, both nonmarket time and real income increases (to $0D$ from $0C$). Once the need for more nonmarket time is met, it becomes possible to meet higher order needs as real wages increase, which can be either more nonmarket time or more market goods. If target real income increases whilst target nonmarket time is being met, further increases in real wages can be expected to have no effect on the supply of labor. In this scenario, utility can only be increased by increasing real income as wages rise. Increasing nonmarket time cannot compensate an individual for any reduction in income—the indifference curve is L-shaped. In this modeling of labor supply the substitution effect is zero while the income effect depends on the time-specific ranking of market income and nonmarket time.

The resulting labor supply curve, $FGHJ$, mapped out from this indifference curve analysis, is illustrated in Diagram 3a. This is a type of long run market labor supply curve, where two independent variables are changing, both the wage rate and preferences for goods and services. At low levels of real income, the labor supply curve is perfectly inelastic, at $0L_1$, to changes in the real wage rate. There is a backward bend to the labor supply curve at point G , at wage rate W_2 . Thereafter, as the wage rate increases from W_3 , the labor supply curve is once again inelastic to increases in the real wage rate. This type of labor supply curve is consistent with the evidence across time and place (Messenger, Lee, and McCann 2007, p. 33). Based on the target theory of labor supply, one would predict a drop in market labor supply only if the target wants of individuals cease increasing in pace with increasing real wages.

It is also important to emphasize that this modeling of labor supply has not taken into consideration the utility that individuals obtain from market work (Frey and Stutzer 2002; Helliwell and Huang 2011; Jahoda 1981; Sherman and Shavit 2009). This utility can be quite rational—as the act of working and working with others, being part of a group, can make people feel better. This psychological variable, itself, can set a floor to market labor supply. Even if real target income is met, labor supply may not diminish if the given level of labor supply is utility maximizing in terms of the psychological kick the individual obtains from working. Any increase in the utility an individual obtains from market work can be modeled as an outward shift in the labor supply curve, such as from labor supply curve 1 to 2 in Diagram 1. However, if the work environment is nasty, this does not imply that an individual will reduce her or his supply of labor. This is especially the case when a given amount of market labor is required to meet the real target income of the individual. Still, one could predict that a poor work environment can, on the margin, in higher income societies, have the effect of shifting the labor supply curve inward to the left.

Another important psychological shift factor for the labor supply curve is referred to as the discouraged worker effect. An individual becomes discouraged if she loses confidence in his ability to find work and stops actively searching for work. This person, in effect drops out of the labor market, even while still desiring market employment. This shifts the market labor supply curve to the left. Whilst increasing aggregate demand, invigorated animal spirits, improved job search mechanisms, reduce the discouraged workers' effect, shifts the economy-wide market labor supply curve outward to the right (on the importance of animal spirits see, Akerlof and Shiller 2009).

An important footnote to this target theory of labor supply is that individuals' ability to choose their preferred amount of labor supply, given the wage rate and their target income, is affected by the political-legal environment in which labor market decisions are made. Standard labor market theory assumes an institutional environment wherein individuals choose how much to work based on the wage rate—the opportunity cost of nonmarket time or 'leisure'. But at one extreme, where free labor markets do not exist, such as with slavery or

serfdom, individuals are not free to choose and choice is severely constrained by the employer, slave owner, or landlord. Where free labor markets predominate, individuals own their labor power—they are legally endowed with private property rights over their labor power—and individuals' market labor supply decisions are effected by institutional parameters such as labor unions and nonmarket income such as unemployment insurance and social security (social welfare payments). The target labor supply theory can incorporate various types of institutional parameters. For example, where labor has limited legal rights, labor supply can be constrained to the physiological maximum and the labor supply curve would be perfectly inelastic at this maximum supply of market labor, such as labor supply curve 3 in Diagram 1. Where more labor rights obtain, workers can choose to supply less labor as real wages increase, if this choice set maximizes their utility. Here, the slope of the market labor supply curve changes. It goes from being completely inelastic to somewhat elastic.

Labor market discrimination can also affect labor supply, shifting the economy-wide market labor supply curve to the left. If particular groups in society are precluded from labor market participation, members of these groups can't participate even if they are willing to work at prevailing wage rates. Their revealed preference for market work is stymied by institutional variables. Their absence from the labor market has nothing to do with the substitution and income effects. It has much to do with legal, cultural, and social constraints on choice behavior. Reducing labor market discrimination should shift the market labor supply curve to the right, as more individuals, women for example, choose to seek employment to meet their target income and to meet their psychological need to participate in the world of work. The extent of this shift can be in part determined by estimating the shortfall between actual real income and target income.

5.1 Non-Labor Market Income and Labor Supply

Increasing nonmarket sources of income would not reduce labor force participation unless target income is met with the assistance of the nonmarket sources of income and market work has no positive effect on utility. This point speaks to the introduction of or increases in 'social welfare' payments or unemployment insurance and their potential impact

on labor supply. The standard model predicts that such nonmarket increases in income will reduce labor supply whereas a decrease in such income will increase labor supply through the income effect, assuming that nonmarket time is a normal good. These so-called demogrants shift the labor supply curve (Friedman 1968; Mulligan 2013). Such predictions pay no attention to the individuals' target income, their target level of nonmarket time, their physical capacity to work, their hierarchy of wants, and the rules and regulations that dictate the terms under which individuals are entitled to demogrants of one type or another (Altman 2004a, 2004b). Also, no attention is paid to the utility gained from the act of engaging in market work (Sherman and Shavit 2009). Such utility diminishes the impact that demogrants might otherwise have on labor supply. The utility gained from working on the market and with others might overwhelm the utility gaining from non-market activities. The traditional model's prediction needs to be modified to incorporate these non-economic variables.

Overall, increasing social welfare would reduce labor supply only to the extent that such income meets the individual's target real income and the individual gains no utility from working on the labor market. Where such utility exists, the social welfare payments would have to exceed market income to compensate for the loss of work-related utility (Sherman and Shavit 2009). The target approach to labor supply would predict that as long as target income is *not* met, *ceteris paribus*, labor supply should not be reduced by the introduction or increases in the level of social welfare. In this case, social welfare would form a basis of economic support for individuals who prefer to work but are unable to obtain employment. The predicted impact of increases of social welfare on labor supply is much more complex than in the standard model, requiring information on target income and the utility of market work.

For work capable individuals, the target approach suggests that such individuals would be on social welfare because they have a low target income (covered by social welfare), do not gain utility from working, have a higher order preference for nonmarket activities, cannot find work (or are discouraged work searchers) or are not capable of work (disabled population). Behavioral economics would be open to the hypothesis that lack of job

opportunities can result in individuals being on social welfare even though they prefer to work—the demand side of the labor market affects the supply side. Also, market work might also be discouraged, when jobs are available, if the tax rate on market work results in net income being greater if one does not accept available and otherwise acceptable job offers. This is an important institutional parameter requiring consideration. To increase labor supply here requires a change and/or restructuring of the tax rate and more job opportunities; not the elimination of social welfare (Organisation for Economic Co-operation and Development 2003; Starky 2006).

Individuals who are not in the labor market for psychological reasons might also not increase their labor force participation even if, as a consequence, they must suffer economic losses (their target income drops). The psychological cost of entering the labor market might outweigh possible benefits, especially if they have very negative views of labor market conditions. Reducing social welfare would, in this case, simply increase the level of economic deprivation amongst these individuals. Other means would be required to increase labor supply inclusive of overcoming individuals' biases and misinformation on the state of the labor market.

Overall, eliminating or reducing social welfare should increase labor supply, but realistically, not by much, given the small percentage of the population in most countries on social welfare. This increase in labor supply would have little to do with the income or substitution effects as specified in the standard model. What is critical to understanding labor market dynamics with regards to social welfare, from a behavioral perspective, is to better understand the non-economic, inclusive of psychological, sociological, and institutional, factors underlying why individuals are outside of the labor market.

For example, the disabled who are not work capable can't work, so reducing social welfare simply increases these individuals level of economic deprivation. Stay-at-home moms might be on welfare (low target income) so as to take care of their children, absent childcare facilities, for example. Reducing social welfare might force some of these individuals onto the

labor market, shifting the labor supply curve outward and reducing the wage rate thereby reducing the level of economic sustenance provide by the market (Solow 2003). But this has nothing to do with traditional income effects. It has more to do with mothers being forced unto the labor market to meet minimal target incomes at the opportunity cost of taking care of their children. This can also have the long-term effect of reducing the supply of labor controlling for quality, by reducing the labor market capabilities of children. However, single mothers, can reduce target income as social welfare is cut, so as to be able to take care of their children, increasing the economic deprivation within their household. In this case, any increase in labor supply predicted by the standard model would not take place or would be mitigated. This being said, unless a vibrant labor market accompanies cuts to social welfare, the increased labor supply generated by such cuts, simply increases the number of unemployed and reduces the equilibrium wage. A key determinant of poverty and social welfare dependency is the absence or lack of work, hence the significance of vibrant labor markets, *ceteris paribus* (International Labour Organization (2010). *World Social Security Report 2010/11: Providing Coverage in Times of Crisis and Beyond*. Geneva: International Labour Organization; Rice et. al., 2012; Solow 2003).

5.2 Unemployment Insurance and Labor Supply

The above discussion is also pertinent to an understanding of unemployment insurance, which the standard model predicts should result in increasing unemployment by affecting labor market behavior. The standard model argues that unemployment insurance serves to increase the rate of unemployment by various means. Unemployment rates are predicted to increase by attracting into the labor market individuals who intend to quit their new jobs so as to collect this benefit, by increasing the voluntary job search time of those unemployed workers who are already in the labor force, by inducing increasing quit rates of the currently employed so that they can search for better jobs, and by increasing the market wage thereby increasing the price of labor and reducing the overall competitiveness of the economy. Moreover, following upon the efficiency wage literature, unemployment insurance is expected to reduce the effort incentive effect of a given rate of unemployment

(unemployment is viewed as a disciplinary device to keep effort levels at higher levels, both forcing up real wages to compensate and, thereby, increasing the unemployment rate) (see below for a detailed discussion of efficiency wages) (Altman 2004a; Holmlund 1998; Shapiro and Stiglitz 1984).

The standard approach also assumes that the increased duration of short-term job search by the unemployment induced by unemployment insurance can have no positive effect on long term employment rates. It is further assumed that higher real wages necessarily or typically generate higher production costs and thereby higher rates of unemployment. Neither of these assumptions need hold. It is further assumed that the marginal worker maximizes utility or economic wellbeing at low levels of real income thus allowing unemployment insurance to serve as a utility maximizing ‘wage of being unemployed’. Thus, some workers maximize their utility by getting themselves laid off so as to take advantage of unemployment insurance, which is always less than the income one earns at work.

The available empirical evidence provides no unambiguous support for the conventional proposition that unemployment insurance damages the economy (Altman 2004a; Holmlund 1998; Atkinson and Micklewright 1991; Howell and Azizoglu 2011; Howell and Rehm 2009). For example, to the extent that unemployment increases search time and this produces a better match between job searcher and job, this can reduce job turnover and thereby reduce the long-term unemployment rate (Altman 2004a). Also, since unemployment insurance is typically much less than market income, individuals won’t quite their jobs to earn unemployment insurance unless their target income is relatively quite low and they attach little or no utility to market work. Also, most workers are not eligible for unemployment insurance if they simply quite their jobs. This institutional reality, critical to a behavioralist analysis, often precludes unemployment insurance from actually directly causing an increase in the unemployment rate (Holmlund 1998; Atkinson and Micklewright 1991). Finally, one can’t easily predict the extent to which unemployment insurance increases the market wage and the extent to which this increases costs and thereby unemployment. Efficiency wage theory and especially x-efficiency theory predicts different plausible outcomes wherein

increasing wages have a positive effect on productivity that can offset any wage increases (see below).

It is critically important from both an analytical and public policy perspective to develop a theoretical framework that incorporates the empirics suggesting that unemployment insurance generates no long run negative economic effects, inclusive of reducing labor supply—shifting the labor supply curve inwards. Introducing more realistic behavioral and institutional assumptions into ones modeling of unemployment insurance contributes to this task of developing and testing a variety of hypotheses relating unemployment insurance to labor supply and employment.

6 Non-Economic Variables and Errors or Biases in Labor Market Decision-Making

Labor supply can be affected by psychological variables such as inaccurate perceptions about labor market opportunities. Some behavioral economists define and interpret these as cognitive illusions (Babcock, Congdon, Katz and Mullainathan 2010). This overlaps with the severely critiqued ‘culture of poverty’ literature wherein it is maintained that poverty persists because of the cultural (and related innate biases) of the poor (Gorski 2008; Wilson 1997). But these misperceptions can also be viewed as a product of poor or incorrect information sets, cognitive costs, loss or risk adverse behavior in a world of uncertainty, peer effects, social capital, or psychological depression, all consistent with the Herbert Simon’s perspective on behavioral economics (see also March 1978). In this case, one has rational individuals whose choices might be improved (even from their own perspective or objective function) with improvements in the decision-making environment. Either way, introducing non-economic variables into the analytical mix allows one to better explain certain aspects behavior and to suggest policy to improve labor market outcomes.

Of critical importance, is the now established fact that persistent involuntary unemployment causes depression and other mental health issues, including loss of self-esteem and loss of a sense of control amongst the unemployed. This has negative, possibly long term, repercussions on the families of the unemployed, which can have long-term negative labor market consequences for all family members. Basically, long-term unemployment results in

the depreciation in the human capital stock of the unemployed. This is probably one reason why the long-term unemployed tend to end up with jobs paying less than their former jobs. Long-term unemployment also reduces, on average, the long run capital stock of family members. Moreover, such unemployment sends negative signals to prospective employers resulting in the long-term unemployed being less likely to secure future employment than individuals who are short term unemployed. It appears that in a world of asymmetric information, employers use long-term unemployment as a signal for relatively poorer future performance and employability—a form of statistical discrimination. These variables cause a downward shift in the demand curve for labor.

Long-term unemployment also increases the probability of morbidity, reduces life expectancy, and increases the probability of family violence. The mental health effects of unemployment feed into the human capital side of the story, contributing to reducing human capital stock, which reduces the probability of get a job, which increases mental health problems, which reduces human capital stock. In addition, because of depression (related to this, loss of self-confidence), due to unemployment, there is a lower probability of job search amongst the long-term unemployed—this relates to the discouraged worker effect. Overall, long-term unemployment by reducing human capital stock per prospective employee reduces the employability of such individuals at any given real wage rate. For this reason, persistent long-term unemployment can have the effect of increasing the equilibrium rate of unemployment. And, by increasing the discouraged worker effect, fewer workers are searching for jobs and this reduces the amount of employment, assuming that a percentage of such job searches would secure employment (Adams 2012; Babcock, Congdon, Katz and Mullainathan 2010; Darity and Goldsmith 1996; Jahoda 1981; Linn, Sandifer, and Stein 1985; Paul and Moser 2009; Stuckler and Basu 2013; Zukin 2009).

Applied economics is increasingly integrating these findings into its corpus. And many economists recommend that it is critically important to reduce long-term unemployment, not only for the mental anguish it causes the unemployed and their families, but also because of the serious deleterious effects it has on productivity. So, a big public

policy question relates to how can one most effectively and efficiently reduce the long run unemployment rate given the importance of these particular non-economic variables.

With regards macroeconomic policy, behavioral economics places close attention to the importance of psychological variables, such as confidence and animal spirits, in moving the economy forward. It's not only about monetary and fiscal policy (Akerlof and Shiller 2009). Rather it is about such policy contextualized within decision-making parameters wherein psychological variables play a vital determining role on the extent and timing of spending (see below for a detailed discussion).

Behavioral economics also pays close attention to informational concerns, capital market imperfections, and uncertainty, affecting labor market behavior. Unemployed workers can and do underestimate the probability of securing employment at preferred real wages rates and annual income. This can be a product individuals suffering from a loss of confidence who then might become discouraged workers. In this case, individuals significantly underestimate the probability of securing a job that falls within their job offer acceptance set. This market failure, related to errors in decision-making, can be corrected by more direct intervention by job search agencies and client specific advisors who can provide individuals with more direct information on job prospects and facilitate the interview process. In this instance the default is that the job search agency leads the job search process as opposed to the traditional default where the unemployed are left to take the initiative. The traditional default does not work effectively when workers are literally psyched out of the job search process and subject to imperfect and even misleading information. Workers may also not have the financial means to engage in effective job search—inadequate funds for transportation, presentable clothing, and childcare. This can be addressed by more direct intervention in the job search process, facilitating such individuals moving into the job market, to correct for market failure. In this case, the intervention increases the job search capabilities of the unemployment as opposed to building policy based on the conventional assumption that adequate capabilities are in place and the unemployed would rather engage in 'leisure' activities than find a job.

This approach does not assume that individuals are engaged in biased decision-making—an assumption made by many behavioral economists. Rather, ‘real’ variables generate correctable decision-making errors. Given these ‘real’ variables, changing the defaults affect decision-making in terms of how the new defaults provide better information, reduce uncertainty and transaction costs, and help compensate for under-confidence amongst the unemployed.

Moreover, behavioral economics, in the tradition of institutional economics pays close attention to components of long-run unemployment that are structural. Many unemployed will not find employment in jobs that require their former skill set because of the changing nature of the economy. To move forward in the job market, adequate job retraining is required as is accurate information on job opportunities and the necessary skills sets necessary for available jobs. In a world of asymmetric information and imperfect capital markets individuals may not have the capacity to invest in skill upgrading. In this case, either subsidized or public job retraining programs would be required to fix such a market failure.

But there is another approach to the causes of long-run unemployment embedded to the Kahneman-Tversky errors and biases approach to behavioral economics (for a survey of this see, Babcock, Congdon, Katz, and Mullainathan 2010). In this approach, individuals are assumed to suffer from a range of biases, such as present or status quo bias, loss aversion (losses are weighted more heavily than gains), hyperbolic discounting (procrastination). This results in such individuals not knowing what’s in their own best interest. As a result, the unemployed engage in inadequate job search and reject job offers that should be accepted given the objective labor market conditions. In this case, workers actually suffer from errors in decision-making based on an overconfidence bias. Part of the problem specifically relates to the unemployed setting their reservation wage too high, based on the wages in their former jobs, which no longer reflects the objective reality of the labor market. The difference between their former wage and current and lower wage offers (the former wage is regarded as an anchor) are also treated as a loss of income by the unemployed. And, given loss aversion, this type of framing of job offers incentivizes the unemployed to reject what are objectively

optimal job offers. In summary, these various biases result in too many of the unemployed procrastinating in job search, not spending enough time searching for a job, and rejecting what are the best possible jobs offers. All this causes the rate of unemployment to be greater than it should otherwise be—what it would be in a de-biased world.

Given the existence of unemployment insurance, one solution to this type of biased decision-making would be to provide wage-loss insurance to the unemployed that would temporarily subsidize a worker's income when he or she accepts a relatively low-paying job. This reduces perceived income loss (as well as loss aversion) and therefore incentivizes individuals to increase their job search and increase the acceptance rate of relatively low paying job offers. It is also argued that framing wage loss insurance explicitly in the pay statement will help push wage expectations downwards towards an objectively given lower level. All of this would serve to reduce long-run rate of unemployment by pro-actively dealing with the biased decision-making of the unemployed.

This errors and biases approach to long-run unemployment does not deny the importance of inaccurate information and information processing costs as possible causes of errors in decision-making. But the focus is on cognitive biases. In a very real sense, the biased decisions of unemployed are an importance cause of persistent unemployment. A key prior assumption here is that there exists a supply of jobs available to meet the demand for jobs given that price of labor is right—in this case the real wage rate must be low enough. In other words, the demand side is not a problem. It is also assumed that there is no negative efficiency wage effect of dropping the wage rate. It is assumed that a lower wage rate won't cause such a drop in productivity that employing the lower wage, less efficient worker, becomes unprofitable.

In the bounded rationality approach, where individuals are largely rational and smart, correcting information errors, more accurately framing information, providing less costly access to information, reducing job search costs, improving individual capabilities to engage in job search, job re-training, and addressing depression induced lack of confidence, is of greater importance to achieve the objective of reducing long-run unemployment, both from

the demand and supply side. From the perspective of the bounded rationality approach, correctable errors in decision-making and inadequate capabilities amongst the unemployed are thought to be the larger problem. This does not deny, however, the possibility of biases in decision-making. And, of course, given optimal conditions on the supply side, jobs offer must be available to the job searchers. Otherwise, these individuals will remain unemployed irrespective of ideal supply side conditions that explicitly deal with decision-making problems related to cognitive, informational, and transaction costs issues.

7 Demand for Labor and the Supply of Effort

Labor supply does not simply comprise of hours worked, although this is the point of focus of standard and even much of heterodox labor economics. Also of importance is the quality and quantity of effort supply per unit of employed labor. In other words, a given hour of work can be characterized by a wide range of effort inputs that, in turn, can have a very large effect on the quantity and quality of output. This effort dimension of effort supply is a critical point of focus of the behavioral economics originating in the work of Akerlof and Leibenstein (Akerlof 1982, 1984, 2002; see also Akerlof and Yellen 1986, 1988, 1990; Akerlof, Dickens, Perry 1996, 2000; Altman 1998, 2005, 2006a; Bowles and Gintis 1990; Frantz 1997; Leibenstein 1957, 1966, 1979; and Solow 1979, 1990). Variations in effort supply, in turn, are important determinants of the demand for labor, by affecting the marginal product of labor and therefore the marginal value product.

In the standard model, effort per unit of hour worked is assumed fixed, invariant to any circumstance in which labor, management, or owners might find themselves. This assumes away the potential importance of effort as a critical component of labor supply. Introducing effort variability into the production function as well as into the objective function of firm members allows one to better model how individuals might respond to a variety of incentive environments. Two critical areas of research incorporating effort variability fall under the nomenclature of efficiency wage and x-efficiency theory. Much of this literature assumes rational individuals who are smart, consistent, and goal oriented. But they are not necessarily motivated to maximize their effort inputs.

One should note that there is an abundance of evidence demonstrating that effort is a variable in the production function, inclusive of the research of Akerlof and Leibenstein (see above; for a review of the literature see also Altman 2002; Frantz 1997). It is also clear that effort varies with a variety of variables, inclusive of wages, other aspects of working conditions, relations with the employer, and the known costs of shirking from ‘maximum’ effort inputs. Studies of firms across economies and over time strongly suggest that productivity varies across firms, controlling for traditional economic variables. An important determinant of such productivity differentials is variations in effort input per unit of labor. From these studies, it is clear that effort variability is significantly affected by managerial design, working conditions, and the extent of cooperation, trust, and fairness within the firm across agents, especially between and amongst agents and principles (Akerlof 2002; Altman 2002, 2006a; Bewley 1999; Buchele and Christainsen 1999; Gordon 2006, Leibenstein 1983; Levine and Tyson 1990; Logue and Yates 1999; McKersie and Klein 1983; Pfeffer 1995; Tomer 1987; Winther and Marens 1997).

Moreover, research in experimental economics, largely using classroom experiments, affirms what one finds in the real world. Experiments suggest that wages and effort inputs are highly and positively correlated. In some experiments, hypothetical workers reward hypothetical employers for paying higher wages by increasing effort and punish such employers for reducing wages by cutting effort input. This is referred to as reciprocal punishment. Thus, there is a cost involved in not paying employees what is perceived to be a fair wage (Boyd, Gintis, Bowles, and Richerson 2003; Fehr and Gächter 2000, 2002; Henrich, Boyd, Bowles, Camerer, Fehr, Gintis and McElreath 2001; Ben-Ner and Putterman 2009; Putterman 2012; for a critical and more nuanced perspective on effort variability and wages, see Rigdon 2002).¹⁰ Some of this experimental literature is reviewed in Charness and Kuhn

¹⁰ This experimental research is closely related to the Ultimatum Game, pioneered by Güth, Schmittberger, Schwarze (1982), experiments where there is a proposer and responder. In this type of game, usually done in a university classroom setting, the proposer is allocated a sum of money (usually tokens which have some real monetary value) from which he or she must make an offer (a percentage of the proposer’s allocation to the responder). If the responder refuses the offer, then both parties end up with nothing. The standard economic prediction is

(2011; see also Falk and Fehr 2003; for a more critical perspective on field experiments, see Edwards 2012).¹¹

The real world firm-based research that speaks to effort variability examines and sheds light upon the importance of labor relations and economic and noneconomic incentives affecting labor productivity and therefore the overall size of the economic pie. Efficiency wage and x-efficiency theory models effort variability and often informs and helps structure empirical analyses on the subject, including ongoing research in experimental economics.

Some of the key features of the assumption of effort variability for labor supply are illustrated in Diagram 4. In the standard model, effort is invariant to differences in wage rates. It is fixed, such as at $0m$, and is perfectly inelastic with respect to changes in the wage rate. It is typically assumed that $0m$ is a maximum in terms of both the quality and quantity of effort input. Once effort is assumed to be variable, one has an effort supply function, the form of which is an empirical question. In Diagram 4, there are three effort supply functions, illustrating diminishing returns, constant returns, and increasing returns subject to eventually diminishing returns. At a particular wage rate, the behavioral effort function converges to the standard one, where effort supply is maxed-out and is perfectly inelastic to further increases in the wage rate. In the behavioral model, for each hour worked, there can be a multiplicity of effort levels and therefore productivity levels as a function of the wage rate and, more generally, the level of working conditions and the state of industrial relations. Therefore, unlike in the standard model, the demand curve for labor cannot be derived independently of the wage rate and working conditions. As effort inputs change, by changing the marginal

that the proposer should offer next to nothing and the responder should accept the offer since something is better than nothing. For this reason, this is what a 'rational' material maximizing individual should do. However, the results from multiple such experiments, including some field experiments, offer that are below 30-40 percent of the proposer's allocation is rejected, even in one-shot games. Responders are willing to punish proposers, even at a cost to themselves, for what are deemed to be unfair offers. And, often proposers make fair offers from the get go. Subjects are not acting neoclassically rational. But they are rational, if fairness is part of their objective function. Results are affected by social and cultural context, however.

¹¹ For some limitations to classroom experiments see, for example, Levitt and List (2008).

value product of labor, this shifts the demand curve for labor. Effort input becomes a demand-side shift parameter in the behavioral model.

One can also derive an effort labor supply curve building on the standard labor supply curve, which relates wage rate to the supply of hours of labor. In this case, effort supply is given by hours supply scaled by effort input per hour of labor supplied. This is illustrated in Diagram 4a. S1 assumes that effort input is inelastic to changes in wages. So, S1 is given by hours of labor supplied per wage rate scaled by a fixed amount of effort per hour supplied—this is standard assumption. S2 assumes that effort increases with wages. In this case, S2 pivots outward as wages increase. This assumes that workers work harder and smarter as wages increase—the behavioral assumption.

8 Efficiency Wage and X-efficiency Theory

Efficiency wage theory was originally formulated by Leibenstein (1957) to explain persistent unemployment in less development economies. It specifies that there is a unique profit-maximizing wage (the efficiency wage), yielding a unique profit maximizing level of effort input per unit of labor input. This was partially based on the argument that if wages were cut at low levels of nutrition, workers effort input would collapse, cutting into firm profits. Thus, rational decision-makers, maintain wages above their market-clearing rate, yielding persistent voluntary unemployment.

Akerlof's contemporary rendering of efficiency wage theory, makes the case for an above market-clearing unique efficiency wage, constructed by rational decision-makers, for social and psychological as opposed nutrition-related reasons. These include, social norms or fairness, reciprocity, moral sentiment, insider power, asymmetric information, and employers' fear of retaliation by employees for perceived unfair treatment (Akerlof 2002; Akerlof, Dickens, Perry 1996, 2000; Akerlof and Shiller 2009; Bewley 1999).

Pioneered by theory Leibenstein (1966, 1979), x-efficiency theory offers a richer more nuanced modeling of effort variability, one that can be used to better explain issues such as involuntary unemployment as well as sub-optimal economic performance in terms of per capita output and in terms of unit costs and profitability. X-inefficiency is traditionally

defined as output being less than it can potentially be given factor inputs and technology. This sub-optimal level of output is a function of the quantity and quality of effort being inputted into the production process than would be the case under best practice industrial relations and competitive (product market) environment. In terms of efficiency wage theory, a wage lower than the efficiency wage would yield x-inefficiency in production.

In the original specification of x-efficiency theory Leibenstein focuses on effort variability of management and owners. *Ceteris paribus*, reducing the quality and quantity of managerial effort increases unit production costs, by reducing firm productivity, making the firm less competitive, unless protected from competitive pressures. Such reductions in firm productivity would also have the effect of reducing the firm's demand for labor shifting inward the firm's market demand curve. In this modeling scenario, firm decision-makers, members of the firm hierarchy, might very well be maximizing their utility by reducing their effort levels below some reasonable potential high. But to sustain x-inefficiency in production the firm must be operating in an imperfect product market environment or obtain protection or support from government to survive as high cost firms. Or, such firms can survive if there are firms that are no more x-efficient (lower average cost) in the market.¹²

One way of illustrating this particular take on labor supply is in terms of a very simple economy where labor is the only costed input (Altman 2005).

1.
$$AC = \frac{w}{\left(\frac{Q}{L}\right)}$$

where AC is average cost, w is the wage rate and (Q/L) is the average product of labor, Q is total output, and L is labor input measured in terms of hours worked. If managerial effort

¹² Simon (1987, p. 223) makes the point: "In the biological world at least, many organisms survive that are not maximizers but that operate at far less than the highest achievable efficiency. Their survival is not threatened as long as no other organisms have evolved that can challenge the possession of their specific niches. Analogously, since there is no reason to suppose that every business firm is challenged by an optimally efficient competitor, survival only requires meeting the competition. In a system in which there are innumerable rents, of long-term and short-term duration, even egregious sub-optimality may permit survival."

input is reduced, firm productivity falls and this yields, *ceteris paribus*, higher average costs. Of course, increasing effort levels increases firm productivity, thereby reducing average costs. In a more complex model where labor is not the only input in the production function, the implications of varying effort inputs remain the same (see, for example, Altman 2006a). But in this case, increasing the wage rate only increases average cost by less than the percentage increase in wages. So, for example, if labor comprises 50 percent of input costs, a 10 percent increase in wages only increases average cost by 5 percent (50 percent of 10 percent) as opposed to 10 percent. In this model, the competitively sustainable minimum effort levels are given by the extent to which x-inefficient firms are protected from competitive pressures.

One of the key predictions from this model is that more competitive markets yield, *ceteris paribus*, higher levels of x-efficiency. This would increase the demand for labor. Competitive pressures force firm decision-makers into increasing their effort levels, even if this higher level is not preferred. This, however, might end up being an unstable equilibrium with regards to the higher effort levels forthcoming firm decision-makers if their preferences for lower effort levels remain stable. Therefore, if environmental constraints change and are relaxed, one would predict a reversion to lower levels of effort and higher levels of x-inefficiency. Another prediction flowing from this model, is that firms (members of the firm hierarchy) invest in sheltering activity in an attempt to preserve an institutional environment where they can choose lower levels of effort input thereby increasing their level of utility at the cost to the firm and society of higher average costs and lower levels of x-efficiency.

But x-efficiency theory speaks to a much broader spectrum of labor effort supply than simply the supply of managerial (or decision-makers') effort. Leibenstein (1982) introduces the multi-agent firm, where conflict and conflict resolution in the context of cultural and institutional variables (inclusive of power relationships across agents) play a key role in determining the levels of effort levels supplied across agents to the firm. Leibenstein regards the determinants of principle-agent related x-inefficiency as analogous to a potential Prisoner's Dilemma-type problem that can only be resolved by changing the industrial relations system—injecting trust, honesty, fairness, transparency, legal recourse to conflict

resolution, and conventions into the system—so that agents make choices consistent with Golden Rule or maximum x-efficiency outcomes. Cooperation and trust across agents is the penultimate solution to maximizing the effort dimension of labor supply whilst minimizing various transaction costs related to effort monitoring (Leibenstein 1978; 1982, pp. 92-94; 1983). The alternative, adversarial method of managing the firm incentivizes agents to veer towards the low productivity solution (Nash equilibrium) to the firm-based Prisoners' Dilemma problem.¹³

In a more generalized behavioral model of effort-related labor supply and x-efficiency (Altman (1992, 1996, 1998, 1999, 2001b, 2002), unlike in the efficiency wage literature, the wage rate is only one determinant of effort as part the overall system of industrial relations. X-efficiency is maximized given the appropriate mix and level of material and nonmaterial incentives, although material incentives are typically quite important. Increasing x-efficiency can be a product of voluntary cooperation across agents to maximize output and economic payoffs to workers and members of the firm hierarchy. Or it can be a product to shocks to the system such as increasing wages and improved working conditions or increased competitive pressures that force firm decision-makers as well as agents (workers) to revolve Prisoner Dilemma-type problems so as to remain competitive given the new binding constraints facing the firm.

Unlike with efficiency wage theory, with a unique equilibrium wage, this behavioral model allows for multiple equilibria with regards to the wage and the overall compensation package and work environment. There is a wide array of levels of labor compensation consistent with some unique unit cost of production. Average unit cost is inelastic with respect to changes in the level of x-efficiency if productivity increases are just offset by changes in the level labor compensation, inclusive of the costs related to changes in the work

¹³ Leibenstein argues: "The main general point is that merely obtaining an acquiescent nonshirking effort is of limited value. Freely offered effort, inclusive of attentiveness and caring about the quality of effort, in return for what is viewed as a good deal (in the long run) is likely to result in higher productivity."

environment. Increasing wages, for example, need not increase unit cost, while cutting wages need not reduce unit cost. For this reason, changes in the rate of labor compensation need not effect the competitive position of the firm. More specifically, increasing the level of x-inefficiency need not make a firm less competitive, whilst reducing the level of x-inefficiency need not make a firm more competitive. More or less competition need not affect the level of x-inefficiency in this behavioral model, since changes in the level of x-inefficiency need not affect average cost. Cost minimizing firms, can choose from a relatively large set of wage rates (or more comprehensively, compensation packages and work environments), contingent on the preferences of firm decision-makers and the power relationships across agents, for example. Therefore, in this model there is no unique efficiency wage that must be chosen by rational cost minimizing, profit maximizing decision-makers. This behavioral model provides an analytical framework that allows for the persistence of x-efficiency under different competitive environments as well for multiple equilibria in terms of levels of x-efficiency and in-firm conventions. In this model, product markets can even be perfectly competitive or at least contestable. Moreover, wages can vary across firms without there being any difference in average costs. But if wages and compensation packages do vary, then there must be a compensating variation in effort inputs related to such variations in systems of industrial relations.

This type of effort related labor supply modeling can help explain how and why firms and economies with different wage rates and working conditions can persist over time and, related to this point, how x-inefficient firms can persist over time. The survival of the fittest (or the most x-efficient) does not hold when changes effort inputs compensate for changes in labor costs. Decision-makers can choose a utility maximizing combination of x-inefficiency and wages and working conditions that maximize their utility. An x-inefficient utility maximizing choice for firm managers and owners can be consistent competitive average costs and profits, but could be well below the x-efficient level of production and could yield relatively low levels of utility or wellbeing to the firms' workers. In terms of the demand for labor, when labor costs changes are just offset by changes in productivity, there would be no

change in the demand for labor as wages change, since shift in the demand curve just offsets changes in labor compensation.

Some of the points are illustrated in Diagram 5. In the standard approach, given the assumptions being made about effort variability, any increase in wages or improvements to working conditions generates an increase in average cost. Any decrease in the value of these variables result in a drop average cost. This is given by ACW. The slop of this curve is determined by production function parameters. The efficiency wage story is illustrated by curve EW. There exists some unique wage, W_1 , that yields a unique minimum average cost at A, given by e_1 . Any wage that differs from the efficiency wage generates a higher average cost. No rational cost-minimizing firm would choose a wage that differs from the efficiency wage, in this case, W_1 . The more general behavioral (x-efficiency) narrative is illustrated by curve BM. As wages increase or fall from a to e_3 , there are no changes to average cost. There exists some horizontal constant cost linearity to this particular average cost function. This is based on the assumptions being made with regards to the causal relationship between wages, overall working conditions, industrial relations, effort inputs, and productivity. After a certain point, effort increases with regard to increases in costs, hit a wall of seriously diminishing returns and the behavioral narrative and cost curve reverts to the standard one wherein increases in wages and related costs generate increasing average costs. Output consistent with wage W_3 would be consistent with the Golden Rule outcome or solution to the productivity problem. In this case, the pie size is maximized. On the other hand, at wage W_0 , for example, pie size is much smaller and one is veering towards a Prisoner's Dilemma solution to the productivity problem. In the behavioral model, the constraint of higher wages can also be predicted to incentivize technological change shifting the cost curve from BM to BMTC, allowing wages higher than W_3 to be consistent the competitive and prior average cost of OA (Altman 2009).

Further to the behavioral model, there are short terms costs involved in either increasing or decreasing the wage rate. This is given by FD or e_1B . This is one reason that efficiency wage scholars find the nominal wage rate is sticky downward over the business

cycle (Bewley1999). Also, improving efficiency as wages increase involves short term costs, which can deter firms from engaging in higher wage-x-efficient strategies on their own (utility maximizing) volition, given trust levels and the uncertainty of future outcomes.

9 Some Labor Market Implications of Generalized X-Efficiency Theory

X-efficiency theory provides some insight into the observed effect of minimum wages and unions upon employment. The standard economics' prediction is that these variables will negatively affect the economy by reducing employment—making the marginal workers unemployable—and by making firms less competitive by increasing their average cost. To the extent that increasing wages, from minimum wage legislation or through collective bargaining, induces more effort and, thereby, productivity offsets to the increased labor costs, the predicted negative effects of minimum wages and unions need not transpire. It is even possible that minimum wage and union-type shocks to the economy might increase productivity to such an extent that employment actually increases. The extent or size of the productivity offsets is an empirical question. In Diagram 5, increasing wages, up to a point (such as from W_0 to W_3), does not increase average cost and do not make firms less competitive.

In the standard model, increasing minimum wages (or even introducing minimum wages) or allowing unions to increase wages from some theoretical market clearing norm, causes employment to fall and labor supply to increase. In Diagram 6, the increase in the wage rate from W_1 to W_{MWUN} , yields an excess supply of labor, $L_{EF}L_0$. However, to the extent there is a x-efficiency effect of increasing the wage, the labor demand curve (based on marginal product curve) shifts outward from L_B^D to L_G^D or to L_C^D , for example. In latter case, the labor market would clear at c, but at a *higher* level of employment. In the former case, there remains an excess supply of labor, only because one is assuming that more individuals are attracted onto the labor market by the increase in the wage rate. But the induced increased labor productivity restores employment to its prior level of L_1 . The extent to which the labor demand curve shifts outward is an empirical question. A similar argument can be made with respect to the impact of labor unions on the labor market. The evidence supports such a shift

in the labor demand curve. (Doucouliagos and Stanley 2009; Freeman and Medoff 1984; Card and Krueger 1995; Kaufman 2010; Reich, Jacobs, and Dietz 2014).

The flip side of this argument relates to the implications of wage cuts that might be a function of introducing rules and regulations that drive wages below the market-clearing wage in the context of standard supply and demand analyses (Altman 2006a, 2006b). If such low wages can be maintained for institutional reasons, the standard model predicts that the supply of market labor falls and the demand for market labor increases along the respective supply and demand curves. But if this cut in wages has a negative impact on the supply effort per unit of labor, the demand curve for labor (based on marginal product curve) shifts inward, yielding a new but low wage equilibrium, with less employment than when wages are higher. This point is illustrated in Diagram 6, with the initial labor market equilibrium at c ; with demand L_C^D and labor supply L_{FR}^S . The wage rate drops to W_0 for institutional reasons leading to an excess supply of labor (ag or L_0L_3). The new labor supply curve is given by L_{UNFR}^S . But the x-efficiency effect of the lower wage is to reduce effort inputs thereby reducing labor productivity, shifting the labor demand curve inward to L_A^D . And the market now clears at a , at the lower wage W_0 yielding employment L_0 .

This particular behavioral model of effort labor supply also casts some light on the efficiency wage theory of involuntary unemployment (Altman 2006a, 2006b). Efficiency wage theory relies upon the assumption that there is a unique efficiency wage that yields an excess supply for labor—it is too high to clear the labor market (Akerlof 2002; Akerlof, Dickens, and Perry 1996, 2000; Bewley 1999). But, to the extent that there is no unique efficiency wage, involuntary unemployment can be resolved from the supply side to the extent that relatively high wages are compensated for by relatively high levels of labor productivity and, therefore, higher levels of x-efficiency. Simply put, in the efficiency wage literature, there would be an efficiency wage given by W_{MWUN} , for example, in Diagram 6. This wage rate is too high to clear the labor market at L_1 and is, therefore, a supply side impediment to increasing employment. But the efficiency wage is given by rational cost minimizing-profit maximizing considerations. Cutting the wage to W_1 wouldn't work since

workers would reduce their effort inputs as a consequence, shifting the labor demand curve to the left, to L_A^D , keeping employment at its prior low level.

This leads efficiency wage economists such as Akerlof and Fehr to posit that fairness considerations can generate excess levels of unemployment. One solution to this problem of the downward sticky real (and nominal) wage is to find a way of reducing the real wage whilst avoiding the predicted negative efficiency wage effect. This can occur if one assumes money illusion; that workers are quasi-rational and won't respond to mild inflation induced cuts to real wages (for transaction-cognitive costs reasons). In this case, the labor market clears at b at wage rate W_1 , along labor demand curve L_B^D . The labor demand curve does not shift inward, since effort inputs do not change as the real wage falls with mild inflation, for reasons of money illusion (Akerlof 2002; Akerlof, Dickens, Perry 1996; 2000). This reintroduces the traditional long run Phillips Curve wherein there is a long run trade-off between inflation and unemployment—more inflation yields more employment and thereby lower rates of unemployment.

However, the behavioral-x-efficiency model suggests that money illusion is not required to restore full employment (Altman 2006b). This is consistent with the vertical, inelastic, Philips Curve—there need not be a long run trade-off between inflation and unemployment (Friedman 1968). Rather, if the higher wage W_{MWUN} is associated with a higher level of x-efficiency such that the labor demand curve associated with this wage rate is L_C^D , the labor market clears at c and with L_{EF} employment. If there is some linearity with regards to the wage-average cost relationship, then higher wage can yield the cost offsets necessary to allow the labor market to clear at the higher wage rates. Higher wages need not be the obstacle to 'full' employment suggested by standard economic theory and by the efficiency wage literature.

This point is further illustrated in Diagram 7. Assume that full employment is given by N_2 and W_2 , in the standard model, given by marginal product of labor curve MP_2 . The market clears at e_2 . Efficiency wage theory assumes a market distorting efficiency wage of W_1 and an equilibrium at e^* . Employment is at N_1 , below full employment. Decreasing the

wage to W_2 is assumed to generate a reduction in effort inputs such that the marginal product curve shifts inward to MP_3 . In this case, decreasing the wage rate does not have the standard predicted effect of increasing employment. Only if workers are subject to money illusion will the marginal product curve be invariant to changes in the wage rate, allowing for full employment to be achieved by cutting real wages. But if increasing the wage rate from w_2 to w_1 yields a x-efficiency effect of shifting the marginal product curve upwards to MP_1 , full employment is obtained at N_2 at the higher wage rate. The high wage x-efficiency full employment equilibrium is obtained at e_1 .

This is consistent with the evidence that across countries there is a positive relationship between wage rates and employment rates (Blanchflower and Oswald 1995). There need not be a strict labor market constraint preventing the realization of full employment where the extent of x-efficiency is a function of the wages rate, working conditions, and system of industrial relations. Seeking means to increase productivity by increasing the extent of x-efficiency and induced technological change is a plausible supply-side alternative to increase employment in contrast to the traditional focus on cutting real wages.

10 Conclusion

Behaviorial models of labor markets are informed by how decision-making is affected by psychological, sociological, and institutional variables. A common concern of behavioral economists is that there are all too many empirical occurrences that are inconsistent with key elements of standard labor economic theory. As well, standard labor economics can't explain all too many labor market phenomenon. To better explain labor market behavior and outcomes requires revisiting and revising some key simplifying modeling assumptions that are the mainstay of standard labor market theory.

In this chapter, I focus on three key areas where behavioral economics provides considerable theoretical insight. One area is the determinants of labor supply. This brings us to a discussion of a target theory of labor supply. Target income and target non-labor time in

the context of an individual's hierarchy of wants play a key role in explaining labor supply, in contrast to the standard theory's focus on the income and substitution effects. Secondly, the importance of the multi-dimensional nature of labor supply with regards to effort variability is discussed. I pay critical attention to the fact that labor supply consists not only time but effort as well. This contrasts with the standard view that effort inputs are fixed. Introducing effort variability impacts one's understanding of the demand side of the labor market through its impact on labor productivity. Related to this, it also impacts one's understanding of involuntary unemployment as well as the implications of unions and minimum wages for employment and efficiency.

I also discuss the analytical and public policy insights behavioral economics provide into what many behavioral economists argue are errors and biases in decision-making with regards to the labor market issues. These are said to produce inefficient labor market outcomes for the individual and for society at large. And, it has the effect of shifting the labor supply curve inward. In the standard modeling individuals are assumed to be calculating and omniscient, not subject to errors or biases in decision-making. Decisions are assumed to be optimal and not subject to regret. Other behavioral economists, coming from the bounded approach, often identify inefficient and sub-optimal decision-making as a product of rational or smart decisions that are product of the constraints individuals face, inclusive of psychological, sociological, and institutional constraints.

Each school of behavioral economics, based on different methodological approaches to decision-making, proffers different solutions to correct for inefficient decision-making outcomes. If one assumes that individuals are fundamentally error-prone and biased then it become critical to de-bias decision-making. The alternative is to induce or force individuals to behave in a manner that's inconsistent with their preferences, but which is consistent with optimality and efficiency from the perspective of the expert.

If one assumes that individuals are largely rational and un-biased but sometimes do make error-prone decisions or decisions that are not optimal socially or even from the perspective of the decision-maker, the public policy focus is on changing the incentive and

information environment and on changing the capabilities of the decision-makers. This stands a good chance of inducing and facilitating choices that are more in line with individuals' own self-interest and that of society at large.

Both approaches to behavioral economics recognize and identify the gaps in the standard approaches to the labor market modeling. Both approaches also have implications for understanding both the supply and demand sides of the labor markets. Behavioral dimensions to decision-making, rational or not, affect our understanding of how much labor is supplied on the market as well as the determinants of labor productivity, which impacts on the demand side of the market. Behavioral economics thereby enriches the price and income-focused traditional economic toolbox, generating alternative hypotheses to be tested and public policy designs to be evaluated.

References

- Adams, Susan (2012). "New Study: Long-Term Unemployment Viewed By Hiring Companies As Worse Than A Criminal Record," *Forbes Magazine*. Available at: <http://www.forbes.com/sites/susanadams/2012/09/18/new-study-long-term-unemployment-viewed-by-hiring-companies-as-worse-than-a-criminal-record/>.
- Akerlof, G.A. (1982), 'Labor contracts as partial gift exchange', *Quarterly Journal of Economics*, 97, pp. 543-569.
- Akerlof, G.A. (1984), 'Gift exchange and efficiency-wage theory: four views,' *American Economic Review, Papers and Proceedings*, 74, pp. 79-83.
- Akerlof, G.A. (2002), 'Behavioral macroeconomics and macroeconomic behavior', *American Economic Review*, 92, pp. 411-433.
- Akerlof, G.A. and J.L. Yellen (1990), 'The fair wage hypothesis and unemployment', *Quarterly Journal of Economics*, 105, pp. 255-283.
- Akerlof, G.A. and J.L. Yellen eds., (1986) *Efficiency Wage Models of the Labour Market*, Cambridge, England and New York: Cambridge University Press.
- Akerlof, G.A. and J.L. Yellen (1988), 'Fairness and unemployment', *American Economic Review, Papers and Proceedings*, 78, pp. 44-49.

- Akerlof, G.A., Dickens, W.T. and Perry, G.L. (1996) 'The macroeconomics of low inflation', *Brookings Papers on Economic Activity* 1, pp. 1–59.
- Akerlof, G.A., Dickens, W. and Perry, G. (2000) 'Near-rational wage and price setting and the long-run Phillips curve', *Brookings Papers on Economic Activity* 1, pp. 1–60.
- Akerlof, G.A. and R.J. Shiller (2009). *Animal Spirits: How Human Psychology Drives the Economy, and Why it Matters for Global Capitalism*. Princeton: Princeton University Press.
- Alchian, A.A. (1950). "Uncertainty, Evolution and Economic Theory," *Journal of Political Economy*, 58: 211-221.
- Altman, M. (1998) 'A high wage path to economic growth and development', *Challenge: the Magazine of Economic Affairs*, 41: 91–104.
- Altman, M.(1999) 'The Methodology of Economics and the Survivor Principle Revisited and Revised: Some Welfare and Public Policy Implications of Modeling the Economic Agent,' *Review of Social Economics*, 57: 427-449.
- Altman, M. (2001) 'Preferences and labor supply: casting some light into the black box of income – leisure choice', *Journal of Socio-Economics*, 31: 199 – 219.
- Altman, M. (2002) 'Economic theory, public policy and the challenge of innovative work practices,' *Economic and Industrial Democracy: An International Journal*, 23: 271 – 90.
- Altman, M. (2004a) 'Why unemployment insurance might not only be good for the soul, it might also be good for the economy', *Review for Social Economy*, 62: 517–541.
- Altman, M. (2004b) 'The efficiency and employment enhancing effects of social welfare', in M. Oppenheimer and N. Mercurio (eds.) *Law and Economics: Alternative Economic Approaches to Legal And Regulatory Issues*, Armonk, New York: M.E. Sharpe Publishers, pp. 257-285.
- Altman, M. (2005a) 'Behavioral Economics, Rational Inefficiencies, Fuzzy Sets, and Public Policy,' *Journal of Economic Issues*, 34, 683-706.

- Altman, M. (2005b). 'Reconciling altruistic, moralistic, and ethical behavior with the rational economic agent and competitive markets,' *Journal of Economic Psychology*, 26: 732-757.
- Altman, M. (2006a) 'What a difference an assumption makes: effort discretion, economic theory, and public policy', in M. Altman (ed.) *Handbook of Contemporary Behavioral Economics: Foundations and Developments*, Armonk, New York: M.E. Sharpe, pp.125–164.
- Altman, M. (2006b) 'Involuntary unemployment, macroeconomic policy, and a behavioral model of the firm: why high real wages need not cause high unemployment', *Research in Economics*, 60: 97–111.
- Altman, M. (2008a) 'Behavioral economics, economic theory and public policy', *Australasian Journal of Economic Education*, 5, 1-55.
- Altman, M. (2008b) 'Towards a Theory of Induced Institutional Change: Power, Labor Markets, and Institutional Change' in N. Mercurio and S.S. Batie (eds.) *Alternative Institutional Structures* (London: Routledge), pp. 300-329.
- Altman, M. (2009) 'A behavioral-institutional model of endogenous growth and induced technical change', *Journal of Economic Issues*, 63: 685-713.
- Altman, Morris (2012) *Behavioral Economics for Dummies*. Mississauga, Canada: Wiley.
- Atkinson, A. B. and Micklewright, J. (1991) 'Unemployment compensation and labor market transitions', *Journal of Economic Literature*, 29: 1679 – 727.
- Babcock, L., W.J. Congdon, L.F. Katz, and S. Mullainathan (2010) "Notes on Behavioral Economics and Labor Market Policy," *Brookings Institute*
<http://www.brookings.edu/research/papers/2010/12/29-behavioral-econ-labor-market-policy>. Accessed May 10, 2012.
- Baxter, J.L. (1993) *Behavioural Foundations of Economics*. New York: St. Martin's Press.
- Becker, G.S (1965) 'A Theory of the Allocation of Time,' *Economic Journal* 75: 493-517.
- Becker, G.S. (1996) *Accounting for Tastes*. Cambridge and London: Harvard University Press.

- Ben-Ner, A. and L. Putterman (2009) "Trust, communication and contracts: An experiment," *Journal of Economic Behavior & Organization*, vol. 70(1-2), pp. 106-121.
- Berg, N. (2006) 'Behavioral labor economics,' in M. Altman, ed., *Handbook of Contemporary Behavioral Economics*, New York: M.E. Sharpe, pp. 457-478.
- Bewley, Truman (1999) *Why Wages Don't Fall During a Recession*. Cambridge, MA: Harvard University Press.
- Blanchflower, D.G. and Oswald, A.J. (1995) 'An introduction to the wage curve', *Journal of Economic Perspectives*, 9: 153–167.
- Bowles, S. and H. Gintis (1990) 'Contested Exchange: New Microfoundations for the Political Economy of Capitalism,' *Politics and Society*, June: 165-222.
- Boyd, Robert, Herbert Gintis, Samuel Bowles, and Peter J. Richerson (2003) 'The evolution of altruistic punishment,' *PNAS*, 100, pp. 3531-3535.
- Buchele, R. and Christansen, J. (1999) 'Labor relations and productivity growth in advanced capitalist economies', *Review of Radical Political Economics*, 31: 87–110.
- Camerer, C., Babcock, C., Lowenstein, G. and Thaler, R. (1997). 'Labor supply of New York cabdrivers: one day at a time', *Quarterly Journal of Economics*, 112: 407–441.
- Card, D. and Krueger, A.B. (1995) *Myth and Measurement: The New Economics of the Wage*. Princeton: Princeton University Press.
- Charness, G. and P. Kuhn (2011) 'Lab Labor: What Can Labor Economists Learn from the Lab?,' *Handbook of Labor Economics*, Elsevier, vol. 4, Part A. San Diego: Elsevier Science, pp. 229-330.
- Cherchye, L., B. De Rock, and F. Vermeulen (2012) 'Married with children: a collective labor supply model with detailed time use and intrahousehold expenditure information', *American Economic Review* 102: 3377-3405.
- Commons, J.R. (1934) *Institutional Economics: Its Place in Political Economy*. New York, NY: Macmillan.

- Commons, J.R. (1950) *The Economics of Collective Action*. Madison, WI: University of Wisconsin Press.
- Cyert, R.M. and J.C. March (1963). *A Behavioral Theory of the Firm*. Englewood Cliffs, N.J.: Prentice-Hall.
- Darity, W. Jr. and Goldsmith, A.H. (1996), 'Unemployment, social psychology, and macroeconomics', *Journal of Economic Perspectives*, 10: 121–140.
- Dessing, M. (2002) 'Labor Supply, the Family and Poverty: The S-Shaped Labor Supply Curve,' *Journal of Economic Behavior and Organization*, **49**: 443-458.
- Doucouliafos, Chris and T. D. Stanley (2009). "Publication Selection Bias in Minimum-Wage Research? A Meta-Regression Analysis," *British Journal of Industrial Relations*, 47: 406-428.
- Duesenberry, J.S. (1949) *Income, Saving and the Theory of Consumer Behavior*, Cambridge, MA: Harvard University Press.
- Dunlop, J. (1944) *Wage Determination under Trade Unions*. New York: Macmillan.
- Easterlin, R.A. (2001) 'Income and Happiness: Towards a Unified Theory', *Economic Journal* 111: 465-484.
- Edwards, P. (2012), 'Experimental Economics and Workplace Behaviour: Bridges Over Troubled Methodological Waters?' *Review of Socio-Economics*, 10: 293-315.
- Ervasti, Heikki and Takis Venetoklis (2010). "Unemployment and Subjective Well-being: An Empirical Test of Deprivation Theory, Incentive Paradigm and Financial Strain Approach," *Acta Sociologica*, 53: 119-139.
- Falk, Armin and Ernst Fehr (2003), 'Why labour market experiments?' *Labor Economics*, 10, pp. 399-406.
- Farber, H.S. (2005) 'Is Tomorrow Another Day? The Labor Supply of New York City Cabdrivers,' *Journal of Political Economy*, 113: 46-82.
- Fehr, E. and S. Gächter (2000) 'Fairness and Retaliation: the Economics of Reciprocity', *Journal of Economic Perspectives*, 14, 159–81.

- Fehr, E. and S. Gächter (2002) 'Altruistic Punishment in Humans', *Nature*, 415, 137-140.
- Folbre, Nancy (2001) *The Invisible Heart: Economics and Family Values*. New York: The New Press.
- Folbre, Nancy (2009) *Greed, Lust and Gender: A History of Economic Ideas*. New York: Oxford University Press.
- Frank, R. (1985). *Choosing the Right Pond: Human Behavior and the Quest for Status*. New York: Oxford University Press.
- Frank, R. (1999). *Luxury Fever Why Money Fails to Satisfy in an Era of Excess*. Princeton, N.J.: Princeton University Press.
- Frank, R. (2005). "The Mysterious Disappearance of James Duesenberry," *New York Times*, available at: http://www.nytimes.com/2005/06/09/business/09scene.html?_r=0.
- Frantz, R. (1997) *X-Efficiency Theory: Evidence and Applications*, 2nd edition. Boston/Dordrecht/London: Kluwer Academic Publishers.
- Freeman, R.B. and Medoff, J.L. (1984) *What Do Unions Do?* New York: Basic Books.
- Frey, B.S. and Stutzer, A. (2002) *Happiness and Economics: How the Economy and Institutions Affect Human Well-Being*. Princeton, NJ: Princeton University Press.
- Friedman, M. (1953). "The methodology of positive economics," in M. Friedman, *Essays in Positive Economics*. Chicago: University of Chicago Press, pp. 3-43.
- Friedman, M. (1968) 'The role of monetary policy,' *American Economic Review*, 58: 1-17.
- Galbraith, J.K. (1958) *The Affluent Society*. New York: New American Library.
- George, D. (2001) *Preference Pollution: How Markets Create the Desires We Dislike* (Ann Arbor: University of Michigan Press).
- Gigerenzer, G. (2007) *Gut Feelings: The Intelligence of the Unconscious* (New York: Viking).
- Gordon, D.M. (1998) 'Conflict and cooperation: an empirical glimpse of the imperatives of efficiency and redistribution,' in S. Bowles and H. Gintis (eds.) *Recasting*

- Egalitarianism: New Rules for Communities, States and Markets*. London: Verso, pp. 181–207.
- Gorski, P. (2008) ‘Myth of the culture of poverty,’ *Poverty and Learning*, 65: 32-36.
- Güth, W., Schmittberger, R., & Schwarze, B. (1982) ‘An experimental analysis of ultimatum bargaining.’ *Journal of Economic Behavior and Organization*, 3, pp. 367-388.
- Hayek, F.A. (1945) ‘The Use of Knowledge in Society’, *American Economic Review*, 35, 519-530.
- Helliwell, J.F. and Huang, H. (2011) ‘Well-being and trust in the workplace’, *Journal of Happiness Studies*, 12: 747-67.
- Henrich, J., R. Boyd, S. Bowles, C. Camerer, E. Fehr, H. Gintis and R. McElreath (2001) ‘In Search of Homo Economicus: Behavioral Experiments in 15 Small-Scale Societies,’ *American Economic Review, Papers and Proceedings* 91, pp.73-78.
- Holmlund, B. (1998) ‘Unemployment insurance in theory and practice’, *Scandinavian Journal of Economics*, 100: 113 – 41.
- Howell, D. And Azizoglu, B., (2011). “Unemployment Benefits and Work Incentives: The US Labor Market in the Great Recession.” Political Economy Research Institute, Working Paper No.257.
- Howell, D. and Rehm, M., (2009). “Unemployment Compensation and High European Unemployment: A Reassessment With New Benefit Indicators,” *Oxford Review of Economic Policy*, 25: 60-93.
- International Labour Organization (2010). *World Social Security Report 2010/11: Providing Coverage in Times of Crisis and Beyond*. Geneva: International Labour Organization.
- Jahoda, M. (1981) ‘Work, employment and unemployment: Values, theories and approaches in social research’, *American Psychologist*, 36: 184-91.
- Kahneman, D. and Tversky, A. (1979) ‘Prospect Theory: an Analysis of Decisions Under Risk’, *Econometrica*, 47, 313-327.
- Kahneman, D. (2003) ‘Maps of Bounded Rationality: Psychology for Behavioral Economics’, *American Economic Review*, 93, 1449-1475.

- Kahneman, D. (2011) *Thinking Fast and Slow*. New York: Farrar, Strauss, Giroux.
- Kaufman, B.E. (1989) 'Models of man in industrial relations research', *Industrial and Labor Relations Review* 43: 72–88.
- Kaufman, B. E. (1999a) 'Expanding the behavioral foundations of labor economics,' *Industrial and Labor Relations Review*, 52: 361–92.
- Kaufman, B. E. (1999b) 'Emotional arousal as a source of bounded rationality', *Journal of Economic Behavior and Organization* 39: 135-44.
- Kaufman, B. E. (2003a). 'Sumner Slichter on Personnel Management and Employee Representation in the Pre-New Deal Era,' in Kaufman and Lewin, eds., *Advances in Industrial and Labor Relations*, 12: 223-269.
- Kaufman, B. E. (2003b). 'The Organization of Economic Activity: Insights from the Institutional Theory of John R. Commons,' *Journal of Economic Behavior and Organization*, 52: 71-96.
- Kaufman, B. E. (2008) *Managing the Human Factor: The Early Years of Human Resource Management in American Industry*. Ithaca, NY: Cornell University Press.
- Kaufman, B. E. (2010) 'Institutional economics and the minimum wage: broadening the theoretical and policy debate,' *Industrial and Labor Relations Review*, 63: 425-453.
- Killingsworth, M.R. and J.J. Heckman (1987) 'Female Labor Supply: A Survey,' in O. Ashenfelter & R. Layard (eds.), *Handbook of Labor Economics*, ed. 1, vol. 1, Amsterdam: Elsevier, pp. 103-204.
- Lebergott, S. (1993) *Pursuing Happiness: American Consumers in the Twentieth Century*. Princeton: Princeton University Press.
- Leibenstein, H. (1957) 'The theory of underemployment in densely populated backward areas', in H. Leibenstein, *Economic Backwardness and Economic Growth: Studies in the Theory of Economic Development*, New York: John Wiley and Sons, pp. 58 – 76.
- Leibenstein, H. (1966), 'Allocative efficiency vs. 'X-efficiency', *American Economic Review*, 56, 392-415.
- Leibenstein, H. (1979), 'A Branch of Economics Is Missing: Micro-Micro Theory.' *Journal*

- of Economic Literature*, 17, 477-502.
- Leibenstein, H. (1982), 'The Prisoner's Dilemma in the Invisible Hand: An Analysis of Intrafirm Productivity,' *American Economic Review*, 72, pp. 92-97.
- Leibenstein, H. (1987), *Inside the Firm: the Inefficiencies of Hierarchy*. Cambridge. Cambridge, Mass. and London: Harvard University Press.
- Lester, R.A. (1946) 'Shortcomings of Marginal Analysis for Wage-Employment Problems,' *American Economic Review* 36: 63-82.
- Lester, R.A. (1964) *The Economics of Labor*, 2nd edition. New York: Macmillan.
- Levine, D.I. and L. D'Andrea Tyson (1990) 'Participation, Productivity, and the Firm's Environment', in Alan S. Blinder (ed.) Paying for Productivity: A Look at the Evidence. Washington, D.C.: Brookings Institute: 183-237.
- Levitt, S. D. and J.A. List (2008) 'Homo Economicus Evolves,' *Science*, 319, pp. 909-910.
- Linn, M.W, R. Sandifer, and S. Stein (1985) "Effects of Unemployment on Mental and Physical Health American," *Journal of Public Health*, 75: 502-506.
- Logue, J. and J.S. Yates (1999) 'Worker Ownership American Style: Pluralism, Participation and Performance,' Economic and Industrial Democracy 20 (2): 225-252.
- Mack, R.P. (1956) 'Trends in American consumption and the aspiration to consume,' *American Economic Review*, 46: 55-68
- March, J.G. (1978) 'Bounded Rationality, Ambiguity, and the Engineering of Choice', *Bell Journal of Economics*, 9, 587-608.
- March, J. G. and Simon, H. A. (1968) *Organizations*. New York: John Wiley.
- McKersie, Robert B. and Janice A. Klein (1983), 'Productivity: The industrial relations connection,' *National Productivity Review*, 3, pp. 26-35.
- Messenger, J.C., S. Lee, D. McCann (2007) *Working Time Around the World: Trends in Working Hours, Laws, and Policies in a Global Comparative Perspective*. New York: Routledge.

- Mulligan, C.B. (2013). *The Redistribution Recession* *How Labor Market Distortions Contracted the Economy*. New York: Oxford University Press.
- Nelson, J.A. (2009) 'Rationality and Humanity: A View from Feminist Economics,' *Occasion: Interdisciplinary Studies in the Humanities*, 1: 1-19, <http://occasion.stanford.edu/node/32>.
- Organisation for Economic Co-operation and Development (2003). "Making Work Pay, Making Work Possible," Chapter 3 in *OECD Employment Outlook 2003: Towards More and Better Jobs*, pp. 113-170. Available at: <http://www.oecd.org/dataoecd/62/59/31775213.pdf>.
- Paul, K. I., & Moser, K. (2009). "Unemployment Impairs Mental Health: A Meta Analyses," *Journal of Vocational Behavior*, 74: 264-282.
- Pfeffer, J. (1995). 'Producing Sustainable Competitive Advantage Through the Effective Management of People', *The Academy of Management Executive* 9 (1): 55-69.
- Pencavel, J.H. (1986) 'Labor supply of men: a survey', in O. Ashenfelter and R. Layard (eds.) *Handbook of Labor Economics*, vol. 1, Amsterdam: North Holland, pp. 3–102.
- Prasch, R.E. (2000), 'Reassessing the Labor Supply Curve', *Journal of Economic Issues* 34, 679-692.
- Putterman, L. (2012) 'How much inequality is needed to support a strong economy?' *Psychology Today*, Available at: <http://www.psychologytoday.com/node/100949>. Accessed September 15, 2012.
- Reich, M., K. Jacobs, and M. Dietz, eds. (2014). *When Mandates Work Raising Labor Standards at the Local Level*. Berkeley, CA: University of California Press.
- Rice, J.K., K.F. Wyche, D. Bowker-Turner, H. Bullock, K. Gamble, B. Lott, D.L. McDonald, S. Riger, J.H. Rollins, L. Rubin, J. Sanchez-Hucles, H. Spears (2013). "Making 'Welfare to Work' Really Work: Improving Welfare Reform for Poor Women, Families and Children," *American Psychological Association*. Available at: <http://www.apa.org/pi/women/programs/poverty/welfare-to-work.aspx>.

- Rigdon, Mary L. (2002). 'Efficiency wages in an experimental labor market', *PNIS*, 99, pp. 13348-13351.
- Rogerson, R., R. Shimer, and R. Wright (2005), "Search-Theoretic Models of the Labor Market: A Survey,' *Journal of Economic Literature*, 43: 959–988.
- Rothschild, K.W. (2002), 'The Absence of Power in Contemporary Economic Theory', *Journal of Socio-Economics*, 31, pp. 433–442.
- Rutherford, M. (2001). Rutherford, M. (2011). *The Institutional Movement in American Economics, 1918-1947*. Cambridge, England: Cambridge University Press.
- Sanders, S. (2008). "A Pedagogical Model of the Relative Income Hypothesis." Available at SSRN: <http://ssrn.com/abstract=1262991> or <http://dx.doi.org/10.2139/ssrn.1262991>.
- Shane, F. and G. Loewenstein (1999) 'Hedonic adaptation,' In D. Kahneman, E. Diener, and N. Schwarz (eds.), *Well Being: The Foundations of Hedonic Psychology*. New York, NY: Russell Sage Foundation, pp. 302–329.
- Sharif, M. (2000) 'Inverted 'S' – The Complete Neoclassical Labour-Supply Function,' *International Labour Review*, 139: 409-35
- Shapiro, C. and Stiglitz, J.E. (1984) 'Equilibrium unemployment as a worker discipline device', *American Economic Review*, 74: 433 – 44.
- Sherman, A. and Shavit, T. (2009) 'Welfare to work and work to welfare: The effect of the reference point: A theoretical and experimental study', *Economics Letters*, 105: 290-92.
- Simon, H.A. (1955) 'A Behavioral Model of Rational Choice', *Quarterly Journal of Economics*, 69, 99-188.
- Simon, H.A. (1978) 'Rationality as a Process and as a Product of Thought', *American Economic Review*, 70, 1–16.
- Simon, H.A. (1979) 'Rational Decision Making in Business Organizations', *American Economic Review*, 69, 493-513.
- Simon, H.A. (1987). 'Behavioral Economics', in J. Eatwell, M. Millgate, and P. Newman (eds.) *The New Palgrave: A Dictionary of Economics* (London: Macmillan), pp. 266-

267.

- Slichter, S.H. (1920) 'Industrial Morale,' *Quarterly Journal of Economics*, 35: 36-60.
- Smith, V.L. (2003) 'Constructivist and Ecological Rationality in Economics', *American Economic Review*, 93, 465–508.
- Solow, R.M. (1979) "Another possible source of wage stickiness", *Journal of Macroeconomics* 1: 79–82.
- Solow, R.M. (1990) *The Labor Market As a Social Institution*. New York: Blackwell.
- Solow, R.M. (2003). "Lessons Learned from U.S. Welfare Reform" *Prisme*, Cournot Centre for Economic Studies. Available at: <http://www.centre-cournot.org/index.php/2003/11/26/lessons-learned-from-u-s-welfare-reform/#more-276/>.
- Starky, S. (2006). "Scaling the Welfare Wall: Earned Income Tax Credits," *In Brief*, PRB 05-98E. Ottawa: Parliamentary Information and Research Service Library of Parliament.
- Stuckler, D. and S. Basu (2013) *The Body Economic: Why Austerity Kills*. London: Allen Lane.
- Stutzer, A. (2004) 'The role of income aspirations in individual happiness,' *Journal of Economic Behavior & Organization*, 54: 89-109.
- Thaler, R.H. and C. Sustein (2008). *Nudge: Improving Decisions about Health, Wealth, and Happiness* (New Haven and London: Yale University Press).
- Todd, P.M. and G. Gigerenzer (2003) 'Bounding Rationality to the World.'" *Journal of Economic Psychology*, 24, 143–165.
- Tomer, J. (1987) *Organizational Capital—The Path to Higher Productivity and Well-Being*. New York: Praeger Publishers.
- Tversky, A. and D. Kahneman (1981). 'The Framing of Decisions and the Psychology of Choice', *Science*, 211, 453-458.
- Tversky, A. and D. Kahneman (1986) 'Rational Choice and the Framing of Decisions', *Journal of Business*, 59, 251-278.

- Veblen, T.B. (1899) *The Theory of the Leisure Class: An Economic Study in the Evolution of Institutions*. New York, NY: Macmillan.
- Veblen, T.B. (1904) *The Theory of Business Enterprise*. New York, NY: Charles Scribners.
- Wilson, W. J. (1997) *When Work Disappears*. New York: Random House.
- Winther, G. and R. Marens (1997) 'Participatory Democracy May Go a Long Way: Comparative Growth Performance of Employee Ownership Firms in New York and Washington States,' *Economic and Industrial Democracy*, 18, 393-422.
- Zukin, C. (2009). "The Anguish of the Unemployed," Report, John J. Heldrich Center for Workforce Development, Rutgers, The State University of New Jersey. Available at: http://www.heldrich.rutgers.edu/sites/default/files/content/Heldrich_Work_Trends_

Diagram 1

The Backward Bending Labor Supply Curve

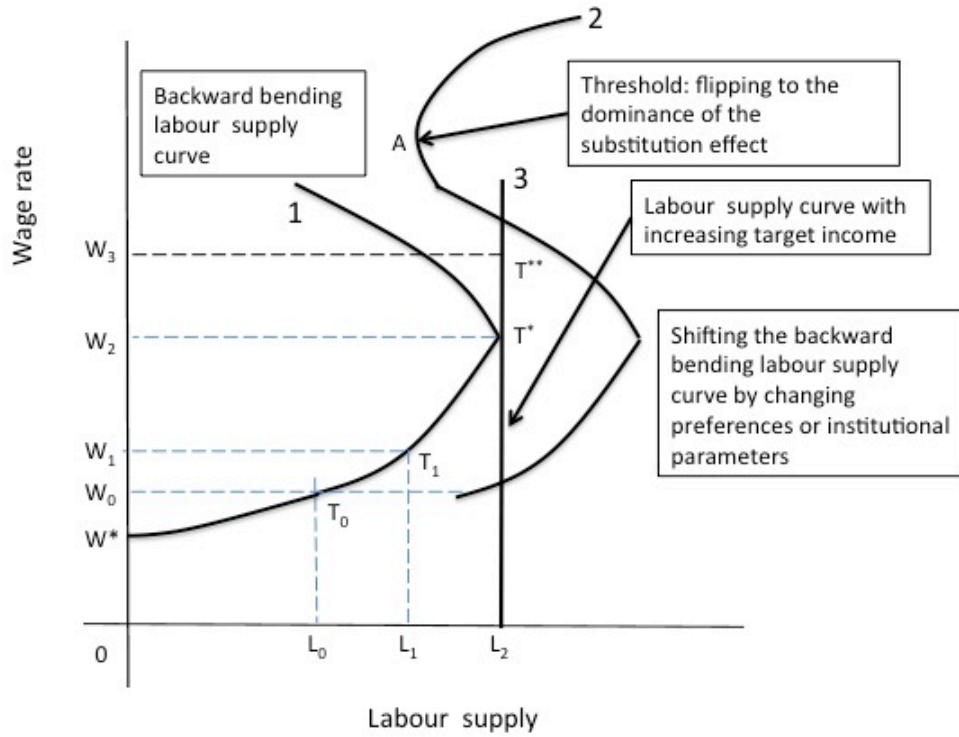
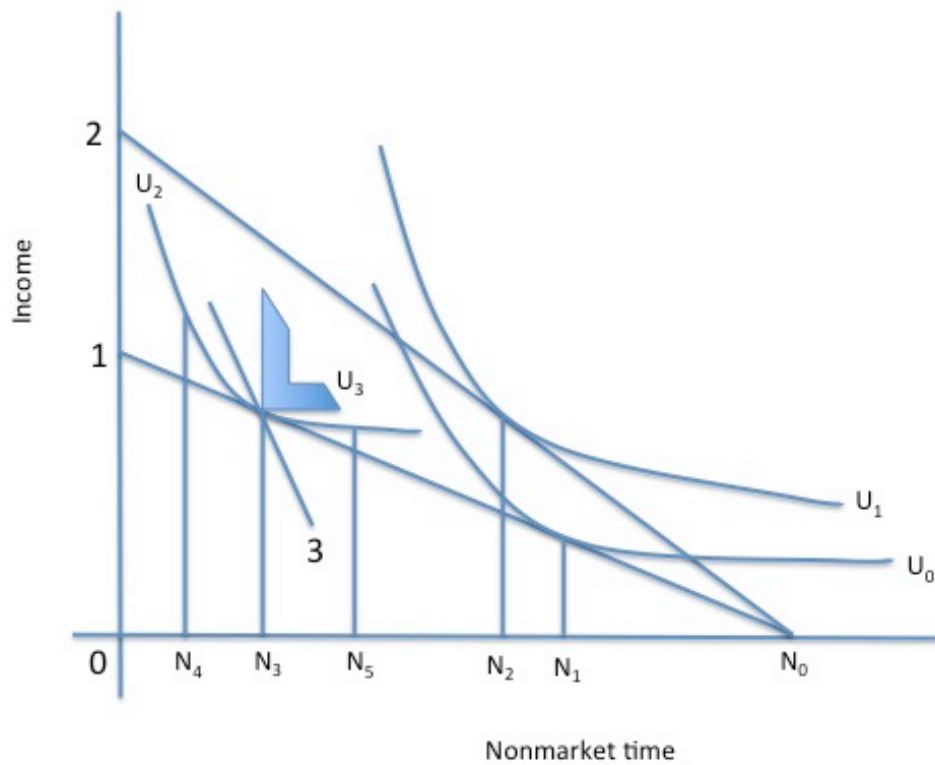


Diagram 2

Aspects of the Conventional Model



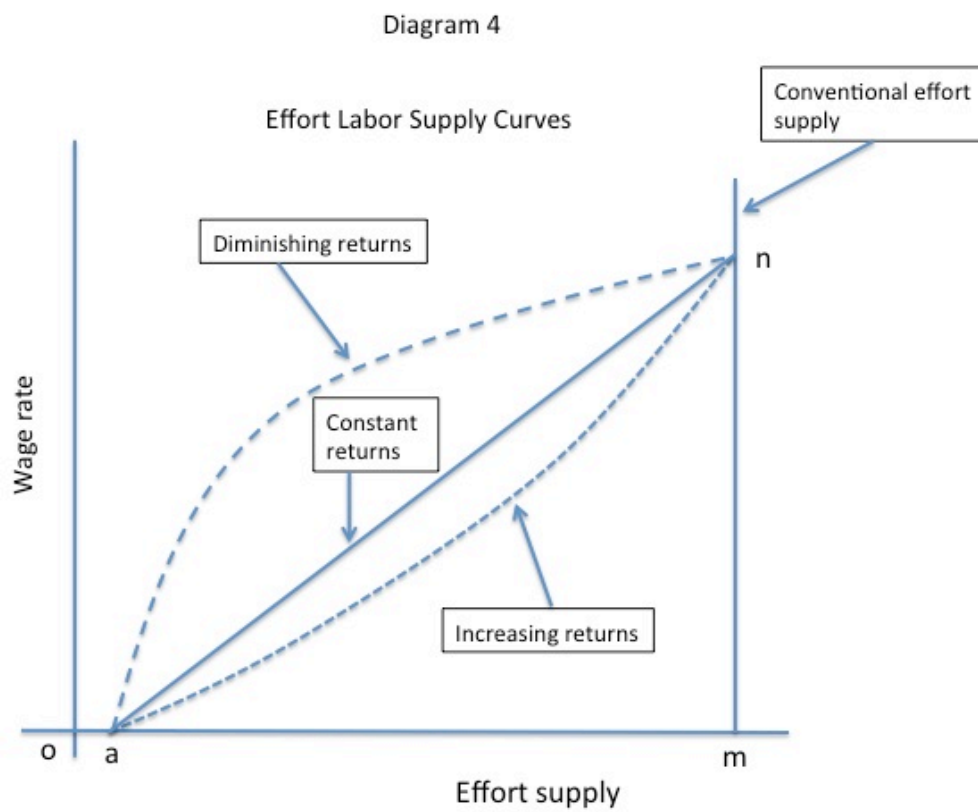
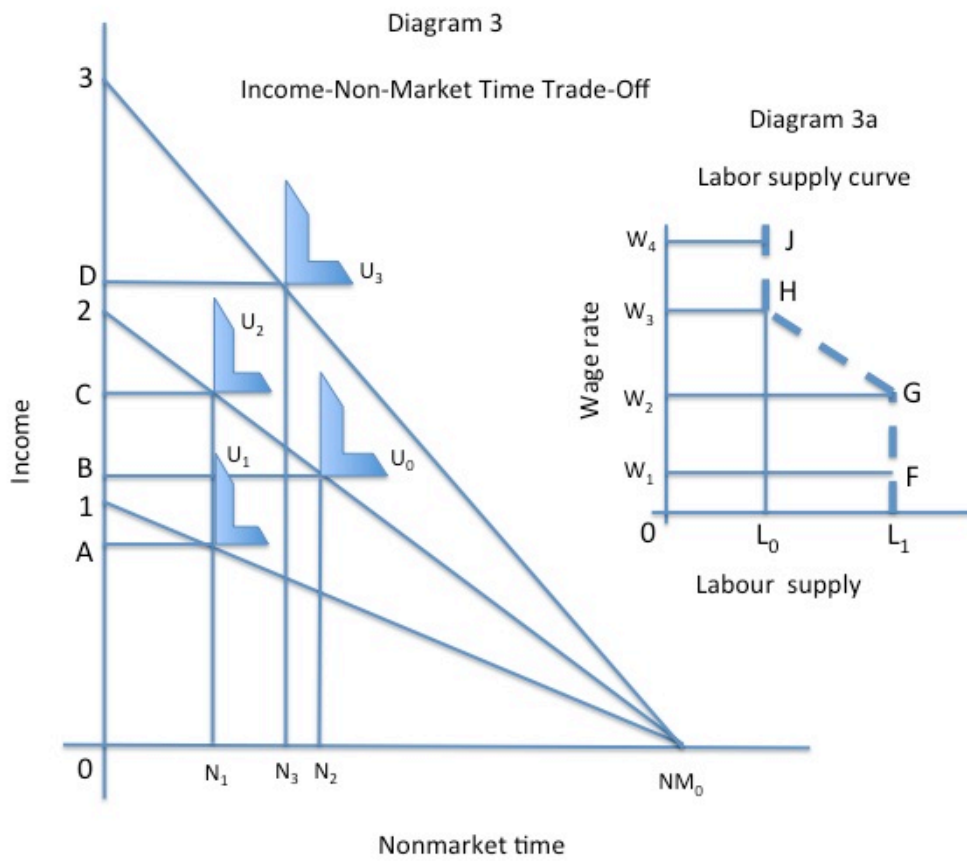


Diagram 5

Labor and Production Costs

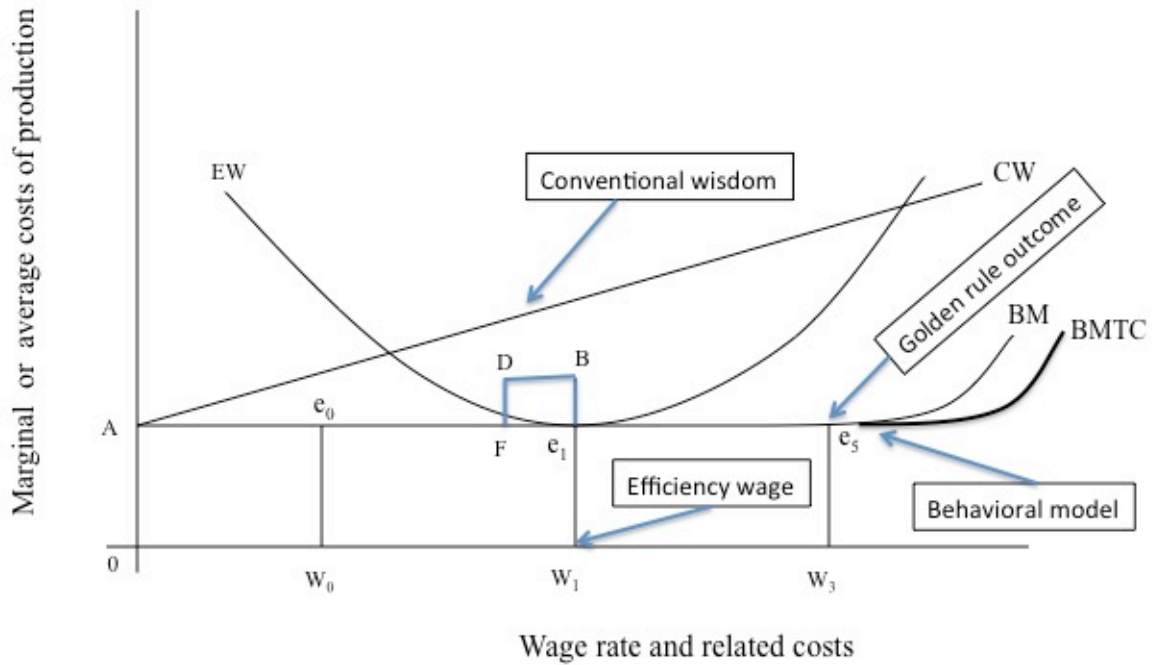


Diagram 6

Unions and Minimum Wages and Labor Markets

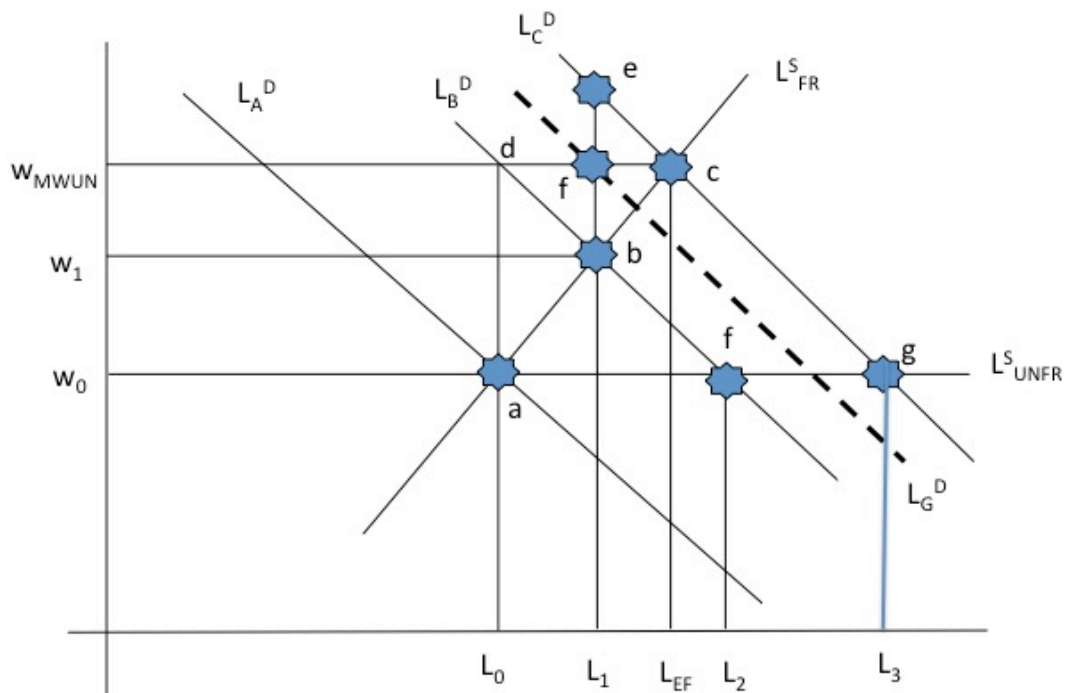


Diagram 7

Labor Demand and Marginal Product

