The Missing Motivation in Macroeconomics

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October 2, 2005

Preliminary Draft: Presidential Address

American Economic Association, Chicago, IL, January 7, 2007

[*]This paper is based on a long-term research program with Rachel Kranton on the implications of identity for economic behavior and also a manuscript we are currently writing on the missing motivation in economics. Our previous joint papers (Akerlof and Kranton (2000), (2002) and (2005)) have explored implications outside of macroeconomics of utility functions dependent on people's notions of *what ought to be.* Conversations with Kranton have also been the basis for the section on economic methodology. I have also benefitted from conversations with Robert Shiller, with whom I am co-authoring work on behavioral macroeconomics. In addition, I wish to thank Robert Akerlof and Janet Yellen for invaluable advice. E-mail address: akerlof@econ.berkeley.edu.

I. Introduction

Macroeconomics changed between the early 1960's and the late 1970's. The macroeconomics of the early 1960's was avowedly Keynesian. This was manifested in the textbooks of the time, which showed a remarkable unity from the introductory through the graduate levels.[1] It was even manifested in the appearance of John Maynard Keynes on the cover of *Time* Magazine.[2] Milton Friedman was famously quoted, "We are all Keynesians now," although in a later disclaimer, he said, almost surely correctly, that he had been quoted out of context.[3] But this love-fest was not long-lasting. A little more than a decade later Robert Lucas and Thomas Sargent (1979) wrote "After Keynesian Macroeconomics."

The decline of the old-style Keynesian economics was due in part to the simultaneous occurrence of increased inflation and increased unemployment, an event that seemed impossible with the simple non-accelerationist Phillips Curves of the early 1960's. But it declined also because of a change in the world of ideas. The early Keynesians derived the major components of their model, such as the consumption function, the investment function, and price and wage equations from intuition. For example, they let the consumption function depend upon disposable income and investment depend upon current profits and current cash flow. Regarding wage setting, a key relation was the Phillips Curve, where nominal wage inflation depended upon the unemployment rate (as an indication of the looseness of the labor market). In part the

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[1]See for example Samuelson (1964), Dernburg and McDougall (1967), and Ackley (1961). The econometric model of Klein and Goldberger (1955) provides a useful synopsis of the variables that the early Keynesians thought most important for a macroeconomic model, and how they would be included.

[2]*Time Magazine,* December 31, 1965. His appearance on the cover was especially remarkable because *Time* covers are rarely posthumous. Keynes had died in 1946.

[3]See http://www.libertyhaven.com/thinkers/miltonfriedman/miltonexkeynesian.html, which quotes Friedman, *Dollars and Sense,* p, 15.

Keynesians took these functions from their observations as to how the various actors in the economy would behave; they also tempered their judgments by looking at statistical relations.[4]

But another school of thought objected to the casual ways involved in this methodology. They said that the relations of macroeconomics should instead be derived from sound economic principles. They should be derived from the behavior of profit maximizing firms and utility-maximizing consumers with objective arguments in their utility functions.

This new methodology had a profound effect on macroeconomics, because it failed to re-produce the components of the standard macroeconomic models. It revealed at least five neutrality results: independence of consumption and current income (given wealth), the Modigliani-Miller theorem, natural rate theory, inability to stabilize output in the presence of rational expectations, and Ricardian equivalence. The excitement these results generated among macroeconomists—among both those who tried to dismiss them and those who accepted them—makes it clear that these neutralities had been unexpected. They were seen as tell-tales that the macro-economists of the previous generation had been thinking in the wrong way. In the new view, scientific reasoning was producing a newer, leaner, more precise economics.

The neutralities are important because they are all believed to hold with some generality. For that reason they are useful benchmarks for macroeconomics. The neutralities commonly describe equilibria of competitive economies with complete information. This means that they are not completely general, but they still have enough generality to be useful as benchmarks. They will hold in a competitive model with perfect information and the usual definition of general equilibrium *irrespective of people's preferences, as long as those preferences*

[4]A good example of this methodology can be seen in Phillips' (1958) mixture of light theory and statistical analysis in his estimation of the relation between wage inflation and unemployment.

correspond to economists' typical descriptions of them. Such generality makes them useful as null hypotheses for statistical testing. Furthermore the mind's eye can often roughly extrapolate how different departures from the pure model will affect the equilibrium outcomes. Indeed in some cases the neutralities will still continue to hold, even though the economy is no longer perfectly competitive or information no longer perfect.

But the usefulness of the neutralities as benchmarks in all of these cases depends upon their independence of preferences. If, on the contrary, economists' view of people's motivation is not realistic, then the neutralities may no longer hold. In that case they no longer serve as a good null for the behavior of *real* people in *real* macroeconomies.

In addition, insofar as the behavior assumed by the Keynesians differs from the behavior that produces the neutralities there is likely to be a bias. This bias favors the Keynesians, who based their models on their observation of motivations, rather than on abstract derivations. If there is a difference between real behavior and behavior derived from abstract preferences, the neoclassical methodology has no way to pick up those differences. In contrast, models based on observations of such behavior, will systematically incorporate it, even though, as with any method, there is the possibility for error. It would be no coincidence then if the deviation between Keynesian macro behavior and the behavior derived from the neutralities is due precisely to components of preferences that had been observed by the Keynesians, but were by assumption excluded from neoclassical models.

The innovation of this lecture is to interpret such behavior through preferences that include norms, which are people's views regarding how they, and others, *should* or *should not* behave. Such preferences are a central feature of sociological theory, but they have been all but

totally ignored by economists. Inclusion of such norms in utility functions makes Keynesian views of the macroeconomy consistent with maximizing behavior—the maximizing behavior of real people. It simultaneously invalidates each of the five neutralities.

That is the subject of this lecture.

None of the behavior revealing of such norms will be new. On the contrary, I have purposefully chosen phenomena that have been emphasized since *The General Theory* by macroeconomists (including Keynes himself) who have voiced their continuing doubts about classical interpretations of macroeconomic behavior. Others—especially including those approaching economics through psychology rather than through sociology—have given different interpretations to the exact same behavior. In most cases there is no inconsistency. We are seeing the same phenomena—just through a different lens.

II. The Five Neutrality Results

This section will now describe in turn each of the five neutrality results.

1. ***Dependence of consumption on wealth, not income:***

Standard theory tells us that under only somewhat special conditions, consumption depends on *wealth*, which is the value of current assets plus the discounted value of future earnings.[5] Thus there is no tendency for people to make their expenditures conform to the pattern of their income receipts (as long as their wealth is given).

Changes in the pattern of current income that leave overall wealth constant are *neutral* in

[5]See Friedman (1957) and Modigliani and Brumberg (1954).

their effects on current consumption.

2. ***The Modigliani-Miller Theorem***:

One version of the Modigliani-Miller theorem says that a firm's investment strategy is totally independent of its liquidity position.[6] Thus, for example, a corporation with an unexpected windfall will not spend any additional investment dollars. Instead it will pass the windfall on to shareholders or seek other financial investments, since it will only make investments whose risk-adjusted rate of return exceeds the rate of return on capital.

Changes in the firm's finances will thus be *neutral* in their effect on current investment.

3. ***Natural Rate Theory*****:**

According to Natural Rate Theory there is some *single* rate of unemployment that is the only level that could be permanently maintained without ever-increasing inflation or ever-increasing deflation.[7] A fiscal/monetary policy mix that sought to maintain employment that was any higher would result in *permanently increasing* inflation. A fiscal/monetary mix that sought to maintain employment that was any lower would result in *permanently decreasing* inflation.

Changes in the fiscal/monetary mix that affect long-term inflation will thus be *neutral* in their effects on long-term unemployment.

4. ***Rational Expectations*****:**

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[6]See Modigliani and Miller (1958).

[7]See Phelps (1968) and Friedman (1968).

According to Rational Expectations Theory a systematic response of monetary policy to the business cycle will have no effect on the stability of the macroeconomy.[8] Wage and price setters will foresee the systematic component of monetary policy; they will raise or lower prices and wages exactly proportionally, and thereby neutralize its effect on demand.

The stability of the economy is thus *neutral* with respect to the systematic reaction of monetary policy to the business cycle.

5. *Ricardian equivalence:*

According to Ricardian equivalence, under somewhat special conditions, a representative consumer who receives a lump sum intergenerational transfer (for example, in the form of a social security payment) will not spend a single dime extra.[1] Instead she will pass on the whole extra income, dollar for dollar to her heirs, who will have to pay the higher tax bills necessary to retire the increased debt incurred in funding the transfer to the previous generation.

The transfer is *neutral* in its effect on current consumption.

III. The Missing Motivation*:* Norms

Each of the neutralities is based on the assumption that the respective decision makers are utility maximizers, but their utility functions have been very narrowly described. The utility functions of the decision-makers depend *only* on real outcomes. For example in the consumption-neutrality models, utility depends on consumption and leisure; in Modigliani-

[8]See Lucas (1972), Sargent (1973) and Lucas and Sargent (1979).

[1]See Barro (1974) for the modern reincarnation of these ideas, first discovered by Ricardo.

Miller it depends only on the discounted real return to shareholders.[2]

But as early as the beginning of the Twentieth Century, Vilfredo Pareto pointed out that such characterizations of utility missed important aspects of motivation.[3] According to Pareto people typically have opinions as to how they *should*, or how they *should not*, behave. They also have views on how others *should*, or *should not*, behave. Accordingly, they lose utility insofar as they, or others, fail to live up to these standards. Such notions are central to motivation in sociology, but they are absent from economists' representations of utility. People's views of how they, and others, *should* or *should not* behave, are called *norms*. Even though these views may be held with great conviction, they are usually not moral or ethical views. For example, there is no great ethical principle that women *should* wear a hat in a church and men *should* not (a leading example in Homans' *Introduction to Pareto).* Nor are these views always social. For example the protagonist of *Rice Mother* thought she *should not* wear red with black.[4]

It is useful to understand why sociologists have considered norms to be central to motivation. People tend to be happy when they live up to how they think they should be; they tend to be unhappy when they fail to live up to those views. George Loewenstein (1999) has illustrated this principle by asking why climbers pursue mountaineering. There are few tasks that are as distant from the conventional view of utility as mountaineering. It may be very costly. It is extremely arduous. And it is dangerous. People pursue it nonetheless. One of the

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[2]This section is especially based on previously published articles written with Rachel Kranton (Akerlof and Kranton (2000), (2002), (2005)). The rendition here is taken from our joint manuscript explaining the role of norms in economics. I am especially grateful to her for allowing me to present this joint work as motivation for this lecture.

[3]See Pareto (1920). Homans and Curtis (1934) give an excellent summary of Pareto that is fully consistent upon the emphasis here. Elster (1989) also presents a similar conception of norms.

[4]Manicka (2002).

primary motivations for the mountaineer is the pleasure of framing a view of who he is, and then having the pleasure of living up to those standards.

Mountaineering is of course an extreme activity. But sociologists think that similar motivation applies to a wide variety of every-day activities. Sociologists view people engaged in these activities as having an ideal for how they should behave and then obtaining pleasure from living up to that ideal.[5] Sociologists also think people often conceive of that ideal in human terms. The ideal may correspond to the performance of someone they know, of someone they do not know, or even of some fictional character in their imagination.

Teaching provides a mundane example that is familiar to all of us. A teacher usually has a clear view of what it means to be a good teacher. If she lives up to that standard, she feels good about herself; if she falls short she may even feel quite miserable. The same feelings apply to most any activity, from playing golf to being a parent. It applies to the conduct of most jobs. Randy Hodson (2001), who surveyed ethnographies of the US workplace, found that most employees care about their dignity at work. They want to conceive of what they do as useful. And they feel a lack of dignity if they are thwarted, either by their own actions or the actions of others. Those who are unable to get such satisfaction are likely to show their displeasure by acting up in some way or other.[6]

The sociologist Erving Goffman (1961) has illustrated the pleasure derived from pursuing an appropriate activity with the delight of toddlers in riding the merry-go-round. In contrast, for older children, there is a gap between their conception of how they should behave and riding the

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[5]See especially Akerlof and Kranton (2005).

[6]Akerlof and Kranton (2005) illustrate such motivation by the behavior of Mike, a Chicago steelworker who is interviewed by Studs Terkel (1972). Mike is extremely alienated from his routine job and takes it out by getting into tavern brawls after work.

merry-go-round. For them the merry-go-round is age-inappropriate. They show their discomfort by playing the clown. But such misbehavior is not just the stuff of kids. In surgical operations, because of their inexperience, medical students are given tasks that are ridiculously easy.[7] They respond in the same way as the older children at the merry-go-round: they act the clown. These examples are illustrative of behavior that is pervasive. Sociology is dense in examples of people's views as to how they and others should behave, their joy when they live up to those standards, and their discomfort and reactions when they fail to do so.

The Milgram experiment (1963, 1965) has many different interpretations; but one valid interpretation, which is especially popular among sociologists and social identity theorists, suggests the strength of people's motivation to do what they think they should do. Recall the experiment. The experiment begins as the subject is told by the white-coated experimenter that he will participate in a study of learning. He draws straws with a third person, who also seems to be another subject, to decide who will play the role of *learner* and who will play the role of *teacher*. Unbeknown to the subject, however, the third person is a trained actor and a confederate of the experimenter. Also the drawing is rigged to assign him automatically to be the *teacher.* He is then instructed on what he *should* do as the teacher. He is told that the learner is wired (another deception) to a machine that allows the teacher to give him electric shocks. Whenever the learner makes a mistake, the teacher is told that he should administer electric shocks of escalating voltage. There are many different versions, but all give a surprising fraction of subjects who escalate their shocks to a lethal dose of 450 volts. For example in the trial where the confederate grunts and moans at 75 volts; asks to be let out of the experiment at 150 volts;

[7]Goffman (1961) observed the behavior of such students in medical operations.

and refuses to give any more answers at 300 volts, more than 60 percent of subjects went all the way.[8]

Subjects' motivation to do what they think *should* be done in the Milgram experiment is not just a curious example from the laboratory. Milgram's motivation for the experiment was to examine the psychology of those responsible for the Holocaust. The experiment and the reality correspond. *Ordinary Men* (Browning, 1992) shows the detailed history of the anti-Jewish rampage of one police SS unit in Poland. Like Milgram's subjects the members of this unit were just ordinary people, recruited from the most ordinary walks of life. They conceived that their duty as recruits was to obey. Surprisingly, they needed almost no persuasion to pursue their orders, even for the grizzliest tasks. In their first village round-up and massacre, they were even given the opportunity to opt out with no questions asked. None did.

The Milgram experiment, and its counterpart in the Holocaust reality, are examples *in extremis* of the motivation that is missing from the five neutralities. The utility functions used in derivation of those neutralities fail to take into account people's wide range of views regarding how they think that they, and others, *should* or *should not* behave.

Framing and Norms

While the presence of norms in this form has been notably absent from economics, there is one prominent line of thinking that can be naturally interpreted in this fashion. Daniel Kahneman and Amos Tversky (1979) have interpreted experimental results of people's unwillingness to take favorable odds in small bets as due to *loss* aversion. They represent loss

[8]Different trial conditions yield different fractions of subjects who go the full way.

aversion mathematically with utility functions that are convex (rather than concave) for losses. Kahneman and Tversky say that people have a *mental frame*, which makes them reluctant to take losses. But there is another way to interpret both the aversion to these gambles and Kahneman and Tversky's utility-representation of it. In this interpretation people have a norm which says that they *should not* take losses.[9] Accordingly, they lose utility if they make them.[10] In this interpretation, the findings of Kahneman and Tversky are very real, but they are revealing of a phenomenon much more general than loss aversion. In this interpretation people have a view of how they should behave. Insofar as they fail to behave that way they will lose utility.

Prospect theory, and also the Milgram experiment with the interpretation we gave of it, serve another useful purpose. They illustrate that there is no necessary conflict between sociological norm-based approach to preferences and much recent work in behavioral economics, which, for the most part, has interpreted departures from standard utility-maximization in terms of mental frames (and cognitions) rather than in terms of preferences. The two types of interpretations can be interchangeable: for example when the cognitive biases conform to subjects' views of how the world should or should not be.

We now turn to applying the role of norms to each of the five neutralities.[11] In each case

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[9]Calibrations by Rabin (2000) suggest that such loss aversion is needed to explain experimental subjects' risk aversion with relatively small stakes. With life-time incomes in the millions of dollars for the typical subject it is hard to explain such risk aversion with a globally concave utility function.

[10]Our interpretation of the Kahneman-Tversky results is consistent with experimental results obtained by John List (2003) regarding the trading of sports cards. List found that amateurs exhibit loss aversion, but dealers do not. Of course such a difference is exactly what would be expected with our interpretation of loss aversion as due to norms, if *dealers* think they "*should"* trade if they can make a profit, but amateurs view the cards they own as part of a "collection," which *"should not"* be traded.

[11]Some years ago, at a conference in Spoleto, Italy, Edmund Phelps gave a still unpublished lecture wondering why the economics of the 20th Century had failed to discover what was central to most of the arts, which was the role of subjectivity. This paper is about the direct relevance of such subjectivity for macroeconomics. I have very much benefitted from enjoyable conversations with Professor Phelps. He has summarized for me the content of that talk in an email.

we shall ask whether people's views as to how they *should* behave might not change the utility function. In each case we shall see that such views will nullify the respective neutrality result. Indeed, we shall see that in each and every case there will be a natural norm consistent with the early Keynesians' views of economic behavior.[12]

IV. Ricardian Equivalence

We shall begin our detailed discussion with Ricardian equivalence. Since it is the simplest of the five, it is also the best place to begin—although it was chronologically the last of the neutralities to be appreciated by modern economists.[13] If there is missing motivation in the utility function, it should be easiest to see here.

A very simple model demonstrates the essence of Ricardian equivalence.[14] There are just two periods, periods 1 and 2. There are just two people, a parent and her child. The utility of the parent depends directly upon her own consumption, in period 1; it also depends upon the utility of her child. That utility depends upon his consumption, in period 2.

The parent's utility function can be expressed simply as $U_1(c_1, U_2(c_2))$, where c_1 is the consumption of the parent, c_2 is the consumption of the child, U_1 is the utility of the parent, and

[12]It is useful to make an explicit disclaimer, although it should be obvious. For each of the five neutralities we see that the inclusion of broader preferences, inclusive of norms, will bring Keynesian behaviors back to life. But, of course, that does not mean that the competitive forces and the maximizing behaviors responsible for the five neutralities are not important, as well.

[13]That appreciation is of course due to Barro (1974).

[14]This model is quite close to Ricardo's original discussion. It is a considerable simplification of Barro's model. His model had a sequence of overlapping generations, each of which lived for two periods. Barro's contribution was not only to show Ricardian equivalence in the two-generation model, but also its extension to a sequence of generations when parents' utility only depended on their own utility and the utility of their own children. Ricardo's discussion, which is close to the two-generation model here, was then subsequently rediscovered. There is no uncertainty and all taxes are lump-sum. This proposition may be generalized, for example, following Barro to a model with *m* overlapping generations each of which have different consumption when young and old. Each parent derives utility from his own consumption and the utility of his child.

U_2 is the utility of the child. The parent chooses her consumption in period 1 to maximize her utility. Whatever wealth is left, she bequeaths to her child.

Ricardian equivalence takes the following form in this model. Suppose that the government gives a transfer, which we will call a social security payment, to the parent in period one; but then in period 2 it taxes the child to retire the debt caused by this transfer.[15] In this case the consumption of a parent who maximizes the utility function U_1 and who leaves a bequest to her child will be unaffected by her receipt of social security.

The logic of this result is simple. With and without social security the discounted value of consumption of the parent and the child is constrained by the discounted value of the family's earnings (plus its initial wealth). Social security leaves that constraint unchanged. If the parent found (c_1^*, c_2^*) the optimal division of consumption between herself and her child in the absence of a social security payment, this same division of consumption between herself and her child will optimize her utility with a social security payment.

Is there missing motivation regarding the parent's bequest decision in the preceding model?[16] A bequest is a type of gift, and if there is any type of economic transaction that tends to be governed by norms, it is the giving of gifts.[17] People have a view of how much they *should* give in gifts (dependent of course upon the circumstances). Corresponding to our description of norms and how they affect behavior, people will gain utility if they live up to those norms; they lose utility insofar as they fail to meet them. Let us suppose that the parent believes that she

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[15]The tax and the transfer are both lump-sum.

[16]Her utility function then will not be fully described by $U_1(c_1, U_2(c_2))$.

[17]The literature on gift-giving is of course replete with the notion that gift-giving will be determined by what assets people consider to be *theirs* and how much of those assets should be given to *others* (Benedict (1946)), rather than by the final utility outcomes for the gift-giver and for the gift-receiver.

should leave a bequest to her son. She gets added utility from accomplishing what she thinks she *should* be doing. (Laitner (2002) presents a model with such motivation; the parent in that model experiences "joy" in giving a bequest.) It can be expressed formally by the addition of a new argument to the parent's utility function U_1. She will receive more utility as she bequeaths more.

Let's now re-consider the effect of an inter-generational transfer such as a lump-sum social security payment with such a norm regarding bequests. A social security payment will *not* be neutral. It changes the equilibrium amount of the bequest because it changes what the parent considers to be *hers*. The greater is her receipt of social security, the greater will be her (pre-bequest) assets. With given consumption by the parent (with given c_1^* in our notation), her gift will be larger the greater is her receipt of social security. If she has declining marginal utility to gift-giving, as would be the normal case, she will give a greater bequest to her child the greater her social security benefit. But her bequest will not increase one-for-one with the social security payment. She will also consume more for herself as well. This positive effect of social security on spending is exactly how the pre-Ricardians had imagined the representative consumer would respond.

There is a vast literature explaining different reasons why Ricardian equivalence is not empirically correct.[18] Seater (1993) has compiled a list, including (1) infinite, rather than finite, horizons; (2) strategic bequests to obtain the attention of one's heirs while alive; (3) childless families; (4) uncertainty, including bequests made because of uncertainty about the age of death; (5) differential borrowing rates between the government and the public; (6) growth of the

[18]The conventional wisdom is of course that social security will affect aggregate savings. Feldstein (1974) and Feldstein and Pellechio (1979) act as if increases in social security of the current generation will result in increased consumption so that the next generation will have a lower capital stock.

economy in excess of the interest rate allowing steady debt issuance; (7) lack of foresight regarding the effect of social security on future taxes; (8) foreign ownership of debt; and (9) tax distortions.[19] Except for the strategic bequests, all of these refer to frictions; they are constraints placed on the parent; none of them refers to her own motivation (or preferences).[20]

Consideration of the effects of these frictions, no matter how empirically important they may be, still fails to explain the *theoretical* novelty of Ricardian equivalence.[21] The rediscovery of Ricardian equivalence was not a surprise because of its empirical predictions; instead it was a theoretical innovation because the economists of the time had strong intuitions that social security payments to the current generation would raise consumption in the absence of frictions. With utility functions with norms for bequests, the surprise regarding the theoretical prediction vanishes.[22]

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[19]Barro (1989) also gives a careful review of the frictional reasons why Ricardian equivalence may not in fact occur.

[20]In the case of strategic bequests, the bequest is an unusual form of incentive payment for a service rendered. This argument suggests that a "bequest" is not really what it seems. This is an argument where the preferences of the parent do play a role, but quite different from the type of reason that I think would have surprised the Keynesians. I want to show that parents who make bequests for the conventional reasons, because they care about the welfare of their children, will still routinely violate Ricardian equivalence, even in the absence of most of the frictions that would be seen would almost surely invalidate exact Ricardian equivalence.

[21]Bernheim and Bagwell (1988) have shown that the assumptions underlying Ricardian equivalence produce many other neutrality results. Those results are yet more counterintuitive than the neutrality of intergenerational transfers. Given the nature of real families, and the network of gifts between them, Ricardian equivalence should extend way beyond the simple parent-child family. This extension of Ricardian equivalence to areas where its validity is especially dubious casts increased doubt on its empirical relevance. A utility function that reflects norms for bequests explains why the implausible neutralities of Bernheim and Bagwell are empirically false.

[22]Ricardo's own reason for dismissal of the argument is curiously consistent with this one. Ricardo said that the parent would alter her bequest because she would not take into account the added tax payments of the child. (See O'Driscoll (1977)). With quadratic utility and expected utility maximization with no norm regarding the size of bequests, uncertainty regarding the child's future tax payments will have no effect on the size of the parent's bequest. A better reason than uncertainty then why the parent does not consider the child's future tax payments is that she thinks that her bequest should depend on the amount of money that is *hers*. She ignores the size of the future tax payment because it is almost irrelevant to her bequest decision. The parent's failure to consider the child's tax payment and the norm regarding the size of her bequest in this case are not independent.

V. Excess Dependence of Consumption on Current Income

This takes us to the second neutrality, where a similar critique applies. According to this result, other than its contribution to a consumer's wealth, current income has no independent effect on the consumption of a utility-maximizing consumer.

Milton Friedman (1957) derived such consumption-income neutrality in the two-period model of Irving Fisher. In this model the consumer chooses her consumption between two periods. She maximizes her intertemporal utility function, given by the function $U(c_1, c_2)$. c_1 denotes her current consumption in the first period; c_2 denotes consumption in the second period.[23] If she maximizes $U(c_1, c_2)$, a dollar of income earned today will have the same effect on her current consumption as a discounted dollar earned in the next period. Thus her consumption will only depend on the discounted value of her current and future income and the rate of interest. This proposition is easy to prove. It generalizes to many different commodities and to many different time periods, and, with quadratic utility, to uncertain incomes.[24] It even generalizes, but in a slightly messy way, to the standard (hyperbolic discount) models of consumption with present bias.[25] In standard terminology, the value of her discounted income is

[23]She receives income of Y_1 in period 1, income Y_2 in period 2, and she can borrow and lend at the rate of interest r.

[24]The simple proof is that her utility maximizing consumption will depend upon the intercept and the slope of the budget line. The budget line states that the present discounted value of consumption is the present discounted value of her future income, which is what Friedman calls her *wealth.* The intercept of the budget line is her wealth. That is how much she could consume today if she consumed nothing tomorrow. And the slope of the budget line is determined by the rate of interest r: on the budget line for every unit of c_1 she gives up $(1 + r)$ units of c_2. Her consumption will be on the highest attainable utility indifference curve. That will be the indifference curve that is just tangent to the budget line. As a result we see that given the utility function c_1 will be a function of W and r. Note that current income does not come into this expression.

[25]Laibson (1997) shows that consumption with forward-looking consumers with hyperbolic discounting will balance the marginal utility of present consumption out of wealth against the marginal utility of future consumption according to an Euler condition. Such a condition is wealth-based. It is the generalization of the

called her *wealth*; the amount of that wealth that can be spent without its depletion is called *permanent income*.[26] An alternative expression of Friedman's hypothesis is that consumption depends on *permanent* rather than on *current* income.

As simple and general as Friedman's proposition may be, it contradicted prior thinking about the consumption function. Keynes, and his followers, believed that current income played an especially important role in the determination of current consumption.

> The fundamental *psychological law* [italics added], upon which we are entitled to depend with great confidence both *a priori* from our knowledge of human nature and from the detailed facts of experience, is that men are disposed, as a rule and on the average, to increase their consumption as income increases, but not by as much as the increase in income (Keynes, *The General Theory,* 1936, p. 96).

The General Theory also discussed many other factors that could affect consumption. The list was sufficiently rich that it not only included current income, but also all the other determinants of wealth, such as expected future income and the rate of interest. But that does not make Keynes' theory identical to Friedman's. In the Keynesian theory consumers are more sensitive to current income than to other changes in income that have similar effect on the consumer's wealth.

It turns out that it is surprisingly easy to test the hypothesis that current income plays no special role in the determination of current consumption. Campbell and Mankiw (1989) have conducted a test that nests both Friedman's view that consumption depends solely on wealth and the simplified Keynesian view, that consumption depends solely on income. They suppose that a

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tangency of the utility indifference curve to the budget line in the two-period model of Irving Fisher. Both Friedman and Laibson obtain consumption that is solely determined by current income if there is a constraint on current borrowing and consumers' desires for current consumption exceed their current income. There is nothing inherent in the preferences in either case that cause current consumption to be based on current income.

[26]Formally, permanent income is the product of the rate of interest and wealth.

fraction of consumers λ are pure Keynesians, while a fraction $(1 - \lambda)$ behave according to the permanent income hypothesis; they estimate λ from the extent to which consumption overreacts to changes that would be predictable from past changes in income and consumption. Usefully then, λ gives a natural measure of the departure from the permanent income hypothesis. The estimates of λ are both significant statistically and also of significant magnitude economically: between 40 and 50 percent (depending upon whether three or five periods are used to predict the change in current income). Many other studies corroborate such excess sensitivity: Shea (1985) for union members whose contracts specified their future wages; Wilcox (1989) for social security recipients who had been earlier notified of changes in cost-of-living adjustments; Parker (1999) for payers of social security taxes with predictable inter-year changes; Souleles (1999) for changes in disposable income net of tax refunds; and Banks, Blundell and Tanner (1998), and Bernheim, Skinner and Weinberg (2001) for retirees.

Textbooks are a useful source of how economists view this excess sensitivity. It is noteworthy that standard textbooks do not explain the violation of the neutrality as due to consumer motivation other than maximization of the standard utility function, $U(c_1, c_2)$. Instead of looking for missing motivation in consumer preferences, they explain this violation of the permanent income hypothesis by frictions. Dornbusch and Fischer (1987) stand out only because they are the most explicit: "Given that the permanent income hypothesis is correct [*sic*], there are two possible explanations."[27] Those two explanations are liquidity constraints for consumers and myopia in their projections of future income. Other textbooks discuss these same two causes for the breakdown, but they are vague regarding the exact number of such

[27]See Dornbusch and Fischer (1987, p. 284).

explanations, or the basis of their explanations on introduction of frictions into the two-period model of utility maximization.

But there is the alternative possibility: that it is the nature of the utility function itself that is responsible for the breakdown. Perhaps that was Keynes' precise intent in describing the dependence of consumption on current income as due to a *psychological* law.

A good place to search for such a psychological law occurs in what economists have systematically left out of utility functions: components of utility functions related to how people think they *should* or *should not* behave. There is considerable work in sociology that discusses the extent to which consumer choice at the micro level is not just determined by income. It is also dependent on what the consumer thinks he *should* consume. Bourdieu (1984), for example, has claimed that different patterns of cultural consumption, associated with norms of what people of different class origins think they should consume, plays an important role in the reduplication of the class structure itself from one generation to the next. However, we do not need to look at attitudes toward music or high culture (like Bourdieu and his followers[28]) to see such norms. As shown by a recent study (Woodward (2003)), the dependence of consumption decisions on how people think they should or should not behave, can be seen even at the most prosaic level: in the explanations of their home-furnishing choices by middle-class Australian homeowners. These housewives not only had varying criteria for their selections (for example between the weight placed on appearance versus the weight placed on comfort); tellingly, they also viewed their own choices as morally right, and the alternatives as morally wrong.

While consumers' concerns for their home furnishings or even their consumption of

[28]For example, Katz-Gerro (1999) uses data from the General Social Survey to show the different music preferences of different social classes.

culture and music will not affect macroeconomics one whit, related views regarding *how much* they should or should not consume will affect the consumption function. Such views will easily account for the special relation between current income and current expenditure. It is natural for people to think that they can consume more if they deserve it, and an increase in their current income gives the most natural reason why they might deserve more. Thus the very tight relation between consumption and disposable income may not occur only because it gives consumers a good way to discipline their spending to correspond to their income, but also because it corresponds to a moral calculus that when people do something they deem worthy, they think they deserve to spend more as well.[29] There are many signs that people have such a disposition. They include strong pay-day effects, whereby those paid monthly spend more in the aftermath of pay-day than over the rest of the month (Huffman and Barenstein (2003)). Or when people reach some milestone that takes some accomplishment, perhaps even the passing of yet another year, they think they deserve a celebration. The recent discoverer of what may be deemed the tenth planet expressed a similar thought: he was going to consume ten bottles of champagne.[30]

VI. Investment and Cash Flow and Income

The debate concerning the nature of the investment function has surprisingly close parallel to the debate about the consumption function. The early Keynesians emphasized two

[29]Such a mental calculus accords with equity theory in social psychology. The key relation in equity theory is that *profits* should be proportional to *investments,* a rule that sounds as if it comes from economics. The important distinction in equity theory in social psychology that is different from economics, however, is that both the *profits* and *investments* are to be seen not just in objective terms but in psychological terms as well. An excellent exposition is given by Brown (1986. pp. 74-88).

[30]Kenneth Chang and Dennis Overbye, "Planet or Not, Pluto Has Far-out Rival," New York *Times*, July 31, 2005, p. 1.

variables as determinants of investment: current cash flow (with profits as a major component) and also the firm's current holdings of liquid assets. Each of these variables is a measure of funds available to firms for investment without seeking outside finance.[31] In contrast, the later literature denied any special role of liquidity in the investment function.

The first such questioning came from Modigliani and Miller, who assumed that managers maximize shareholder value and that markets are frictionless and competitive. In this case a firm's liquidity position plays no role in its investment decisions. The argument for independence proceeds as follows. By construction, Modigliani and Miller show how a competitive equilibrium changes if a firm increases its debt. In the new equilibrium, investment will be unchanged; and shareholders will offset the increase in the firm's debt by a compensating decrease in the bonds in their respective private portfolios. The reason the equilibrium changes in this way is straightforward: If the markets for debt cleared in the old equilibrium, they will again clear in the new. If managers' choice of investment maximized shareholder value in the old equilibrium, the same choice of investment maximizes it in the new. Investment is therefore independent of the firm's finance decision about its current financial position, including its current liquidity position and its current cash flow.

The advent of q-theory further questioned a special place for current variables, such as cash flow and liquid asset holdings in the investment decision. In the original version of the theory, James Tobin (1969) suggested that a firm's optimal investment strategy arbitrages between the value at which it can sell a unit of its capital and its investment costs to produce a new unit of capital. In this case the firm will invest up to the point where the marginal cost of a

[31]See especially Meyer and Kuh (1957).

new unit of capital is the valuation of such a unit of capital in the stock market. That valuation is the market value of the firms' shares divided by its capital stock, called the q-ratio. If markets are efficient, q is also the expected discounted value of current and expected future profits per unit of capital.[32]

Similar to the way in which permanent-income consumption contradicted a special role for current income in the determination of current consumption, q-theory then contradicts both the special role of current cash flow and liquid asset holdings in the determination of investment. Since q-theory says that firms should invest in capital up to the point where the cost of an extra unit of capital stock is equal to the present discounted value of the stream of earnings from a unit of capital, again, as in Modigliani-Miller, investment is independent of the firm's finance decision. This should not be a surprise, because the assumptions of this version of q-theory are in accord with Modigliani-Miller: competitive financial markets and investment that maximizes shareholder value. Thus the firm's current financial position should play no role in investment. In q-theory current profits are just one component of the stream of current and future profits that determine the value of q. In this sense they play no special role in the determination of investment. This de-emphasis of current cash flow (and thus current profits) in investment is analogous to the denial of any special role of current income in the permanent income hypothesis.

The discussion of the empirical validity of q-theory then also follows in striking parallel to the empirical discussion of the consumption function. Just as Campbell and Mankiw showed that there was excess sensitivity to current income in the consumption function, Fazzari,

[32]See Abel (1979), Summers (1981), and Hayashi (1982).

Hubbard and Petersen (1988) have shown that investment depends not just upon *q*, but also upon the current cash flows that the early Keynesians had emphasized.

Economists have taken two different approaches to explain such excess sensitivity. In one approach, managers maximize stockholder value. But the difference in information between the managers and those who supply the financing of those projects results in a wedge between the cost of internal and external financing. This is clearest for firms that are credit-constrained. It is natural that the investment of credit-constrained firms will be especially sensitive to available liquidity.[33] This explanation is not without its critics. Kaplan and Zingales (1997) have found that credit constraint is fairly rare; they also find that the investment of those firms with the least credit constraint are especially sensitive to cash flows. Supporting this finding, it appears that firms with cash windfalls tend to invest in projects that would have otherwise not been pursued, as shown by a study of the capital spending of eleven firms that had won or settled corporate law suits (Blanchard, Lopez-de-Silanes (1992)). In a similar finding, in 1986, when the price of oil declined dramatically, non-oil subsidiaries of oil companies cut their investment relative to the median in their industry (Lamont (1997)).

Agency models offer a second type of explanation for excess sensitivity. This line of reasoning is also perfectly consistent with sensitivity of investment to cash flow, even in the absence of liquidity constraints. This view explains the excess sensitivity as due to self-interested decisions by managers. There are many different types of such behavior, including direct empire building, laziness and shirking, following the business strategies of others

[33]See for example Fazzari, Hubbard and Petersen (1988). Myers and Majluf (1984) also argued that cash flow would affect investment when managers had information not available to investors.

(herding), and aiming at short term gains at the expense of long-term earnings.[34] Such agency reasons for excess sensitivity of investment relative to the Modigliani-Miller theorem are exactly in line with the general view in this lecture. The five neutralities of macroeconomics fail to describe reality, not just because of market frictions, but also because they are based on too narrow a characterization of decision-makers' objective functions.

But considerations of self-interest are only one type of motivation that can explain investment sensitivity to firms' finances. While agency theory views managers as concerned about their own interests, the sociological approach to decision-making emphasizes the role of norms. According to this view employees—including managers—have a concept of their duties in their respective jobs. As mentioned earlier, work ethnographies indicate that most workers have a concept of the duties of their jobs, and they are frustrated when unable to accomplish them. The sociological approach to corporate planning then emphasizes that managers' various conceptions of what they *should* do in those jobs will affect decisions. There is even a body of law, on the role of fiduciaries, which says that this is how managers and other employees are legally obligated to behave.[35]

Different managerial conceptions of ideal behavior will then affect corporate decisions. Fligstein (1990) has illustrated the evolution of management conceptions of duty in the US with the history of mergers in the 20th Century. Following Fligstein, their conceptions have gone through three stages: In the beginning of the century, when corporate heads mainly had a production orientation, the purpose of mergers was primarily to augment productive capacity; in

[34]An excellent survey is given by Stein (2003). Jensen and Meckling (1976) pioneered the agency critique of Modigliani-Miller.

[35]See for example Einrib (1975).

the next phase when CEO's typically had a sales orientation, mergers were made with an eye to increase sales; in the third stage, with the increasing importance of finance, mergers have been rationalized as a way of increasing shareholder value. In terms of the investment decision, this means that managers in this final phase were acting like q-theory, Modigliani-Miller investors. In contrast, in the earlier phases they were conceiving of their jobs differently: respectively as maximizing output or as maximizing sales with the funds available to them. This yields investment functions in which cash flow and other financial variables play a special role.

This dichotomy between managers with sales and output orientations to their jobs and those with a finance orientation has been studied by sociologists. Zorn (2004) characterizes managerial orientations in these terms and believes that corporate behavior has changed over the past 40 years—perhaps not coincidentally since the discovery of Modigliani and Miller. He finds that in the early 1960's large corporations had a treasurer, whose job was to maintain accounts and produced the budgets. He was not a party to major decisions. In contrast, now more than 80 percent of the firms in his sample have, instead, a Chief Financial Officer, who is, typically, central to corporate decision making. Zorn characterizes the CFO's as viewing the firm as "a system of investment"; in contrast he characterizes those with sales or production orientations, as "view[ing] the firm as a production function." The investment orientation of the CFO's, of course, exactly corresponds to Miller and Modigliani. The autobiographies of two successful business leaders brings the distinction to life. According to Jack Welch's *Straight from the Gut*, under his regime at General Electric, business decisions (including mergers and acquisitions) were supposed to be made on the basis of cost-benefit analysis. In contrast according to John Pepper's (2005) *What Really Matters*, under his regime at Proctor and Gamble, business

decisions were supposed to be made based upon ability to produce brands that would please the consumer. Thus, for example, the criterion for a target in a merger and acquisition at P & G was its possession of assets needed to achieve the sales goals of planned or already- existing Proctor and Gamble brands.

A test for this theory would be that managers with different conceptions "over-do" what they think they ought to do relative to strict profit maximization. A prediction from Zorn's theory then is that mergers and acquisitions will be over-done in firms with strictly finance orientations. There is also some indication that this has been the case. Bruner's (2001) survey of the returns from mergers finds that acquiring firms exprience on average neither an increase nor a decrease in the their value. Such an *average* return of zero, suggests that the *marginal* returns to the acquirers is negative. A check whether management orientation affects business decisions would be to see whether the returns to acquisitions by companies with CFO's (as defined by Zorn) was higher or lower than in firms without them.

Summary. In summary, the investment function reveals another case where macroeconomic neutrality will hold only under very narrow assumptions regarding motivation. Furthermore, the early Keynesian view that investment might be sensitive to firms' liquidity is in concert with maximizing behavior. But this maximization occurs with a broader view of managerial preferences than in Modigliani-Miller. On the one hand the dependence of investment on cash flow may be due to managerial self-interest, as in agency theory. But it may also be due to managerial conceptions of how they should or should not behave.

VII. Natural Rate Theory

We now turn to natural rate theory. Once again the debate concerns the behavior of economic decision-makers. The early Keynesians viewed wage setters, and possibly also price setters, as setting nominal wages and prices, respectively, without taking full account of inflationary expectations. In contrast, New Classical revisionists have assumed that wage and price setters care only about *relative* wages or prices, and therefore wage and price setting will fully incorporate inflationary expectations. Such behavior yields a long-run neutrality result with severe limits on the ability of monetary and fiscal policy to affect unemployment and output.

The logic behind these limits is straightforward. When wage and price setters only care about relative wages or relative prices, accelerating inflation will occur if unemployment is below a critical level called the natural rate; accelerating deflation will occur if unemployment is above it.

Such inflation dynamics can be explained as follows. Suppose that unemployment is below the natural rate. In that case the demand for goods and for labor will be high. The representative firm will then want to charge a price for its own output that exceeds the price charged by other firms. Suppose that the firm sets its price for the next period accordingly; its price will then also include an adjustment for expected inflation. But then, since the typical firm is aiming for a price greater than that charged by others, actual inflation will exceed expected inflation. Such a gap between actual and expected inflation causes a further reaction. It will cause inflationary expectations to be adjusted upwards; and as these expectations are adjusted upwards inflation will rise higher still. When unemployment is below the natural rate, inflation then will then be ever *increasing*. Similarly, when unemployment is above the natural rate,

inflation will be ever *decreasing*. The natural rate then is the only sustainable level of unemployment without accelerating or decelerating inflation.

Acceptance of Natural Rate Theory

As revealed by textbook presentations, most macroeconomists do not just view natural rate theory as a useful null hypothesis. They also view it as a description of reality. Because of this acceptance and its implications for macroeconomic policy, I shall discuss this neutrality at considerably greater length than any of the other four. But the basis for questioning this neutrality will be remarkably similar to the other four; it will concern whether the assumed behavior is based on a realistic view of preferences. In this case the preferences concern the wages and prices that employers and consumers respectively think should or should not be set.

Economists accept natural theory for theoretical and empirical reasons. Theoretically, they view its assumptions as realistic. A standard criterion for an economic model is that participants in the economy care only about real outcomes. That is the fundamental assumption of natural rate theory. Also, unlike most other neutrality results, natural rate theory is relatively insensitive to the to deviations from the perfect information competitive model. As long as these "frictions," such as imperfect information or transaction costs, can be expressed solely in real terms, the neutrality result of natural rate theory will be robust.

Natural rate theory gained acceptance, not just for theoretical reasons, but for empirical reasons as well. The original Phillips curve showed a close fit between the rate of change of nominal wages and inverse of the unemployment rate for 97 years of British data, between 1861 and 1957. However, in the United States in the late 1960's and early 1970's such a simple

inverse relation between changes in nominal wages and unemployment broke down as both price and wage inflation rose, along with the unemployment rate. Natural rate theory offered an explanation for this occurrence: it explained the rise in inflation by the large oil supply shock and also an increase in inflationary expectations, both of which shifted the Phillips Curve outward; it explained the rise in unemployment by a decline in demand.

Furthermore, new estimates of Phillips Curves seemed to show that the theory closely fit the data. If inflationary expectations are formed as a simple lag of past inflation, estimates of Phillips Curves should find that the sum of coefficients on past inflation should sum to one. Many Phillips Curve estimates fail to reject that this sum is equal to one.[36, 37]

The textbooks thus typically present natural rate theory as a "just-so" story. It runs as follows. The previous Keynesian economists had posited a Phillips Curve without a dependence on inflationary expectations. Friedman (1968) and Phelps (1968) perceived that such a theory could not result from models where the participants in the economy are concerned only with real variables. They modified the relationship so that wage and price equations would be affected one-for-one by inflationary expectations. Such judicious use of economic theory explained the

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[36]See, for example, Gordon (1977, Table 3, p. 260, lines 6 and 7).

[37]Given the importance of such findings, it is remarkable that their robustness to specifications of time period, data, and exact specification of the Phillips Curve have never been subjected to tough tests—even though everything else about the Phillips Curve, including the natural rate of unemployment itself is considered to be estimated with great imprecision. Akerlof, Dickens and Perry (2000) show a range of estimates for both wage and price equations with many different specifications. These estimates, particularly when made for periods of low inflation, show considerable variation in the sum of the coefficients on lagged inflation, dependent on the specification. Another bit of evidence that suggests such estimates will be sensitive to specification comes from the high standard errors on the natural rate itself (Staiger, Stock and Watson (1997)); it would be surprising that the sum of lagged coefficients could be estimated precisely if another component of the Phillips Curve, the natural rate could be estimated only with very low precision. Gordon's own estimates show very different values for this sum of coefficients. Of course, there is a theoretical reason why estimates of such a sum should not be robust. With rational expectations, rather than a simple mechanical theory of formation of inflationary expectations, Sargent (1971) shows that there is no theoretical reason that they should sum to one.

otherwise-mysterious finding of the simultaneous increases in inflation and unemployment of the late 1960's/early 1970's.

Facts about Wage Behavior Suggesting Nominal Considerations

But a considerable body of findings run contrary to natural rate theory. They indicate that nominal considerations do affect decisions about wages and prices. I shall begin with a discussion of wages, and then later turn to prices. There are at least six observations that nominal considerations affect wage setting.

First, money wages are downwardly rigid. Such wage behavior can be easily perceived statistically since wage-change distributions are truncated at zero.[38] Careful studies have documented wage stickiness in the United States, Canada, New Zealand, Australia, Mexico, Japan, Switzerland, Germany, and the United Kingdom.[39,40] There seems to be no way to account for such *nominal wage* rigidity with the basic assumptions underlying natural rate theory: that participants in the economy only care about real prices and real wages.

Second, Truman Bewley (1999) has examined money wage rigidity, but from a very different perspective. His open-ended interviews sought to elicit the reasons why employers did

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[38]These distitbutions have accumulations at zero, and they are also asymmetric: there are more wage changes above zero than below zero. This suggests that the accumulations at zero do not just occur because there is a menu cost for changing wages.

[39]The following studies have all found significant signs of nominal wage rigidity: Bewley (1999), Card and Hyslop (1997), Kahn (1997), Lebow, Saks and Wilson (1999), and Altonji and Devereux (1999) for the United States, by Fortin (1996) for Canada, by Cassino (1995) and Chapple (1996) for New Zealand, by Dwyer and Leong (2000) for Australia, by Castellanos *et al* (2003) for Mexico, by Kuroda and Yamamoto (2003a, 2003b, 2003c) and Kimura and Ueda (2001) for Japan, by Fehr and Goette (2003) for Switzerland, by Bauer *et al.* (2003) and Knoppik and Beissinger (2003) for Germany, by Nickell and Quintini (2001) for the United Kingdom, and by Agell and Lundborg (2003) for Sweden.

[40]See, for example, O'Brien (1989) and Hanes (2000).

not cut money wages in the Connecticut recession of 1991-1992. Bewley concludes from his extensive interviews that, even though substitute labor was easily available, employers were reluctant to cut wages because of the negative effects of such cuts on morale. He says that firms are afraid that cuts in money wages will cause workers no longer to "identify" with their companies.[41] Even if there would be no immediate consequences from such cuts during the recession, Bewley's employers thought there would be future consequences when the labor market returned to normal. Workers would shirk, and they would also be more likely to quit. These stories indicate that workers are not just thinking about their wages in *real* terms, relative to the price level or the wages received by others, but they also have a special aversion to cuts in wages below their current nominal levels.[42] Such behavior fails to conform to the underlying assumptions of natural rate theory: that workers only care about relative wages and relative prices.

The Great Depression affords a third observation inconsistent with natural rate theory, at least as long as inflationary expectations are adaptive. An accelerationist Phillips Curve, as in the usual textbook rendition of natural rate theory, suggests that for the whole of the Great

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[41] In more detail Bewley (1999, pp. 1-2) summarizes his findings: "Other theories fail in part because they are based on unrealistic psychological assumptions that people's abilities do not depend on their state of mind and that they are rational in the simplistic sense that they maximize a utility that depends only on their consumption and working conditions, not on the welfare of others. Wage rigidity is the product of more complicated employee behavior, in the face of which manager reluctance to cut pay is rational. Worker behavior, however, is not always rational and completely understandable. A model that captures the essence of wage rigidity must take into account the capacity of employees to identify with their firm and to internalize its objectives. This internalization and workers' mood have a strong impact on job performance and call for material, moral, and symbolic reciprocation from company leadership." (1999, pp. 1-2)

[42] Following the argument by Chetty (2005) some employers may have been concerned with the fact that their employees had fixed mortgages that they would find difficult to pay with cuts in nominal wages. This puts the violation of natural rate theory in another place: why were these financial contracts in nominal rather than in real terms?

Depression, from 1930 to 1940, inflation should have been below inflationary expectations; with adaptive expectations there would then have been a steady decline in inflation. Such a prediction is far off the mark, not just for the United States, but for every country in the Great Depression for which pricing and unemployment data is available. The data reveal no evidence whatever in any country of constantly declining inflation, even under conditions of massive unemployment.[43] The United States experienced rapid deflation from 1929 to 1933, but thereafter inflation neither systematically rose nor fell for the next decade. A dynamic simulation in a sticky-money wage model of the US economy by Bill Dickens, George Perry and myself (1996) with sticky money wages and unemployment such as occurred in the Great Depression seems to offer an explanation. It fits the data all but exactly.[44]

Further phenomena indicate that wage bargains are not made with only *real* considerations in mind. Two questionnaire studies yield a fourth type of evidence that workers care about the their nominal wage, and not just their real wage. Shafir, Diamond and Tversky (1997) asked respondents to comment on a vignette about two young women who take their first jobs with the same initial income. Specifically they asked respondents *who will be better off*: Barbara, who receives a five percent raise in the presence of four percent inflation; or Ann, who receives a two percent raise when inflation is zero. 79 percent of respondents said that Barbara would be *worse off* than Ann economically. Nevertheless, 64 percent of respondents thought

[43]See Yellen and Akerlof (2004, p. 24).

[44]There are other possible reasons for this failure of the standard predictions from natural rate theory. Inflationary expectations may not have been adaptive; the failure of deflation to accelerate could be due to expectations that the price level would return to some normal level. In the US, the National Recovery Act, which encouraged firms to increase prices, and unionization, which gave a fillip to wages, could also have affected the trade-off between inflation and unemployment. But unemployment was so *very high* for so very long, and it's the absence of accelerating deflation was so universal across countries, this still seems to be a dog that did not bark. It seems to point to a problem with natural rate theory.

that Barbara would be *happier*.[45] Contrary to the assumptions of natural rate theory, these responses indicate that people's happiness is affected by the level of their nominal, and not just their real, wage increase.

It might be easy to dismiss the findings of Shafir *et al* as just an oddity from a single study. But another study, with a different form of questionnaire, independently found a similar response. Robert Shiller found that 49 percent of a sample of the general public either fully or weakly agreed with the following statement: "if my pay went up I would feel more satisfaction in my job, more sense of fulfillment, even if prices went up as much." An additional 11 percent of the general public were undecided, while only 27 percent *completely disagreed*. This, of course, is very similar to the public's view of Ann and Barbara. Notably, it is also in stark disagreement with the view of professional economists. 90 percent of economists weakly or strongly disagreed with the statement. 77 percent were in complete disagreement.[46]

This question was just one in Shiller's study with very large differences between economists and the general public regarding inflation. Such differences in response questions the theoretical basis of natural rate theory: that those who pay and those who receive wages have exactly the same mind-set as economists. They should be concerned only with real wages or real prices. They should not be happier if pay goes up even though prices go up as much. The views of professional economists accord with such a mental frame. This lack of concordance between professional economists and the public is contrary to the basic theoretical reason why natural rate theory is appealing.

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[45]Shafir, Diamond, and Tversky (1997, pp. 351-352).

[46]Shiller (1997, p. 37).

The absence of wage indexation in union contracts is a fifth tell-tale of problems with natural rate theory. Economists have advanced reasons why indexation will not be complete. But the reasons that have been advanced for incomplete indexation, are also reasons why wage bargainers will not act as if they first come to an agreement over a real wage in current prices, and then add in inflationary expectations. If wages are set as indicated by natural rate theorists—with bargains first determined in real terms and nominal wages and prices determined by adjustment for expected inflation—firms and workers with risk aversion will both have their welfare improved by contracts with wages indexed to inflation. Wage indexation, even in the unionized sector, is remarkably rare. Christofides and Peng (2004) analyzed a sample of almost 12,000 Canadian union contracts from 1976 to 2000. The mean length of these contracts was slightly more than two years (25 months). Yet only 19 percent of these contracts were indexed. And even in those with indexation, price increases were considerably less than fully covered (at only 58 percent) (Christofides and Peng (2004, Table 1, p. 38)).

Jo Anna Gray (1978) offers a theoretical explanation why wage indexation would be less than complete. The CPI, which is the measure of inflation used in most indexed contracts, is not only correlated with shocks to the money supply, which should not affect relative prices, but also correlated with real supply shocks, which do affect relative prices. In this case optimal indexation will be determined by the relative importance of demand shocks and supply shocks. Card (1986) and Ehrenberg, Danziger, and San (1983) have demonstrated that the facts fit the theory: at the microeconomic level correlations between input and output prices and the consumer price index are related, as predicted, to levels of indexation in union contracts.

But empirical findings still suggest that contracts are under-indexed. Christofides and

Peng (2004) construct measures of the variance of relative supply shocks and the variance of relative demand shocks. Given the previous findings of Card and Ehrenberg *et al* it is not surprising that indexation, contract length and the nominal wage adjustment depend on these variances, as the theory predicts. But, Christofides and Peng also find that indexation is correlated with the expected *level* of inflation, even with controls for the size of real shocks to supply and demand.[47] The theory had not predicted this result. In the language regarding consumption and investment behavior: these results suggest excess sensitivity of wage indexation to inflationary expectations.[48]

In addition, indexed contracts contain yet another anomaly. Many such contracts have COLA adjustment, but only after inflation has passed some trigger level.[49] It is difficult to explain such a provision under the assumption that wage contracts are made only with concerns about real variables.[50]

A sixth observation, regarding estimates of the Phillips Curves themselves, suggests yet another type of problem with natural rate theory. While some Phillips Curve estimates produce coefficients of unity on lagged inflation, others do not. William Brainard and George Perry

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[47]Ehrenberg, Danziger and San (1983, p. 222) compute a formula for the degree of indexation, which they call ϵ. In their elegant 1-period model they find that neither ϵ nor the fraction of contracts engaged in indexation will vary with the level of expected inflation. See Table 1, p, 223.

[49]See, for example, Ehrenberg, Dantziger, San (1983, p. 239). An indicator of the frequency of such provisions in such contracts is provided by Christofides and Peng (2004, p. 11): in roughly 1/3 of the indexed contracts in their investigation the COLA clause was never triggered. Another possible anomaly is that many contracts have caps in the amount of contingent wage adjustment that can be generated.

[50]There is a further anomaly. Since CPI-inflation may be correlated with real changes, wage contracts should not just be dependent on the aggregate CPI, but should also be based on industry-specific shocks to demand and supply. Why are unions and firms not more creative in indexing wages also to market-specific indicators of changes in demand? Card (1986, p. S150) asks: "Why not index-link wages directly to market-specific prices?"

(2000) made estimates of Phillips Curves allowing for the possibility of time variation in the distributed lag on past inflation. The sum of these lag coefficients was not constantly one, as would be the case with natural rate theory with adaptive expectations. Instead it varied considerably.

There is a systematic difference between times when the coefficients sum to unity and the times when they are considerably lower. William Dickens, George Perry and myself (2000) estimated Phillips Curves for the United States for periods of high inflation and for periods of low inflation. When inflation is high, the sum of coefficients on lagged inflation in both price and wage equations is close to one. But, in contrast, when inflation is low, that sum is close to zero for wage equations; for price equations it is not zero, but it is still much less than one. Estimates of Phillips curves with direct measures of expectations—the inflation expectations from the University of Michigan Survey of Consumers and from the Livingston Survey of the expectations of professional forecasters—yield similar results. In periods of high inflation the coefficients in both wage and price equations are both close to one. But, in times of low inflation the coefficient in wage equations is much less than one, averaging about .3 over many different model specifications; for price equations it averages .6. These findings question the universality of Phillips Curves with coefficients of one on proxies for expected inflation.[51]

Resolution with Economic Theory. The preceding findings suggest respective ways in which the assumptions or the predictions of natural rate theory are poor descriptions of economic

[51]The tests with direct measures of expectations do not suffer from econometric bias due to endogeneity of price expectations. Some econometric bias remains because of measurement error in inflationary expectations, but the estimated values of the coefficients are so very far from one, especially in the wage equations, that the discrepancy is unlikely to be explainable by econometric bias. Further study should be made of the likely size of this bias.

reality. One common amendment to standard economic method yields easy explanation of all these anomalies. Employees may care about nominal aspects of wages, not just about their wages in real terms. In each and every case they have a notion of what their nominal, and not just their real wage, *should be.* In terms of utility maximization, employees lose utility insofar as there is a gap between what they think their nominal wages *should* be and their actual value. Adding such concerns to workers' utility functions will explain each of the six anomalies. In some cases it is difficult to see how the anomaly could possibly be explained without such addition.

Let's first consider nominal wage rigidity. A belief that workers *should not* take wage cuts is sufficient to explain downward nominal wage rigidity. This would account for the asymmetric agglomeration of wage cuts precisely at zero. If there is another possible explanation for this finding, it is obscure. In agreement with common sense, Bewley's findings say it is the workers (rather than the firms) with such beliefs. Many different informants told Bewley in many different ways that firms do not reduce wages in recessions when labor is easily available and also cheaper because they are afraid of alienating their own workers by reducing their money wages. We also saw that the absence of accelerating decline of wages and prices in the Great Depression could be easily explained by such nominal considerations in worker utility functions.

Dislike of money wage cuts, however, may be just the tip of the iceberg. It is, of course, the form of nominal illusion that is clearest in the statistics. But if there is one way in which nominal wages enter utility functions, because employees have a notion of what their employer should or should not do, there could also be many other ways.

The next set of findings—from the questionnaires—takes us back to *Barbara* and *Ann.* There is an easy way to account theoretically for the findings that respondents thought that Barbara would be *happier* than Ann, even while acknowledging that she is *worse* off than Barbara economically: Barbara and Ann both have a nominal component in their utility function. They think that they *should* get a *nominal* raise. With such a utility function, insofar as Barbara gets a nominal raise and Ann gets none, Barbara may indeed be happier.[52] Furthermore this interpretation of the behavior of the utility function is exactly consistent with Shiller's finding. If people think that they *should* receive a nominal raise and they do receive it, then— just as they say—they will be happier if their wages go up and prices go up as much.

The same can be said about the anomalies regarding indexation of contracts. Let's consider the absence of indexation up to the inflation trigger. If the worker has only concerns about her real wage and wants to minimize her risk, there will be a preferable contract with a lower nominal wage but complete indexation. But failure to index can be an optimal solution up to a trigger, if the worker thinks that she *should* be receiving a nominal wage increase (and will lose utility insofar as it fails to occur). Such a utility function will also be consistent with the last of the six observations, in which wage bargains tend to ignore inflationary expectations when inflation is low, but add it on when inflation is high.

Consequences of Nominal Considerations. What are the consequences of such nominal considerations in utility functions? It is well-known that downward nominal wage rigidity will induce a long-run trade-off between inflation and unemployment, contrary to natural rate theory.

[52]A variant on the original question would involve changing the numbers. How much more than 1% difference in the real wage would be necessary to make Ann happier than Barbara?

In that case higher long-run inflation will be associated with lower long-run unemployment.[53] In addition, if workers derive satisfaction from nominal wage increases, there will also be such a trade-off. If workers like Ann and Barbara feel happier the higher their *nominal wage* increase, then higher steady-state inflation will be associated with lower steady-state unemployment.[54] The logic, as explained in the footnote, is straightforward.[55] Since triggering in indexed wage contracts suggests similarly that workers want nominal wage increases, this finding also suggests that there is a trade-off between inflation and unemployment, at least when inflation is low. And, also, if there is only a low coefficient on inflationary expectations in Phillips Curves when inflation is low, there is, once again, a long-run trade-off between inflation and unemployment.[56]

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[53]This proposition is known from Schultze (1959) and Tobin (1972). For a simulation and estimation of the trade-off, see Akerlof, Dickens and Perry (1996).

[54]Of course workers may be making cognitive errors. They may fail imperfectly distinguish nominal changes in wages from real changes in wages.

[55]The intuition comes straightforwardly from considering the consequences of an increase in the nominal rate of inflation. At the higher inflation rate, if unemployment were constant the bargain between firms and workers would result in lower real wages—since the typical employees, like Ann or Barbara, can be satisfied more easily. But such an increase in the real wage will depress the price that the representative firm wants to charge relative to other firms. It will fall below one. The rate of inflation will be decreasing if that desired price is below one; constant if it is equal to one; and increasing if its above one. It will take an increase in aggregate demand (with higher employment) then to keep inflation stable at the new higher level. At this new higher level of employment, the representative firm will want to charge a relative price of one. The rise in that price will be the resultant of three different factors: first, at the higher level of demand and of employment the labor market will be tighter, and therefore the bargained real wage will be higher; second, the marginal product of labor will have declined; and also the firm's mark-up of prices over wages may have changed.

The logic is more complicated than is usually understood. Most economists think that it is the increase in demand for labor at the lower real wage that will cause more labor to be hired at the higher steady-state inflation. With perfect competition—where the desired price that the firm wants to charge is the real wage divided by the marginal product of labor—the real wage will decline. A rise in the marginal product then can only occur if there is a fall in the real wage. But that logic is not at all general. In a standard model with monopolistic competition where firms have a constant mark-up of wages over costs, if production is proportional to labor input, the equilibrium real wage will be constant. What allows unemployment to fall with steady inflation in such a model is that at each unemployment rate the real wage that will come from labor bargains will be lower. Only at lower unemployment will that real wage be sufficiently high that the firm's desired real price be restored to one.

[56]There are three possible reasons for the violation of the neutralities. In this lecture we have explored preferences that include norms, which have been omitted from the preferences that yield the neutralities. Previous economists have emphasized the role of frictions. But there is yet a third way in which the neutralities may be violated: because of the wrong equilibrium concept. This is demonstrated in a set of experiments by Fehr and Tyran

High Inflation. Natural rate theory has not only limited economists' theoretical imaginations regarding trade-offs between inflation and unemployment *when inflation is low*; it has also limited their theoretical imaginations *when inflation is high*. At high inflation the psychological reaction to wage increases that just match inflation may be quite different from the reaction when inflation is low. In that case employees are fearful of it and watch it closely. Contrary to respondents' reactions to Barbara and Ann, and to the responses from Shiller's questionnaires, they may feel *worse off* if they receive a wage increase that just matches inflation. In this case higher inflation will shift the Phillips Curve outwards, not inwards. The usual natural rate models with rational expectations (Barro and Gordon (1983) and Rogoff (1987)) will then have sold credibility short: it will be even more important in the presence of overreaction than in the presence of rational expectations. The exploration of such areas has been unfortunately shut off by macroeconomists' concentration on models without overreaction. Such overreaction gives added reason why economic policy should aim for moderate inflation targets.

Prices

(2001). Following many simple quantity theory models (Akerlof and Yellen (1985), Ball and Romer (1989), Blanchard and Kiyotaki (1987)) the payoff of each individual subject in each trial depended on the price he chose, the average price chosen by other subjects, and the money supply. An equi-proportionate change of all prices and the money supply would result in no change in the real payoffs, so that the equilibrium is money-neutral. After a number of initial trails in each individual experiment, the quantity of money changed. Fehr and Tyran found that the approach to the new equilibria after the change in the money supply differed according to whether payoffs were denoted in real or in nominal terms. Money illusion complicated the approach to the new equilibria not just because individual subjects themselves might have money illusion, but especially because they might impute it to others. More than half of their subjects thought that others would interpret high nominal payoffs as indicators of high real payoffs. The study shows not only the role of nominal framing in determining the nature of equilibria, but that small amounts of nominal framing, even if imputed to others, can result in significant violations of money neutrality. Significantly neither frictions nor preferences could be implicated in the nature of this violation of monetary neutrality. There were no frictions, and the experimenters, by giving the payoffs, have determined that preferences are only denoted in real terms.

In addition to long-run trade-offs between inflation because of *employees'* preferences regarding the nominal value of their *wages* (or of their wage increases), such trade-offs may occur because *customers* have views regarding what *nominal prices* should be. Models by Iwai (1981), Rotemberg (1982), and Caplin and Leahy (1991) produce a trade-off between long-run inflation and long-run unemployment. Their key assumption is that there are real costs to *nominal* price changes. There would be no such trade-off if instead there were *real* costs to *real* price changes. In that case the assumptions of natural rate theory would not be violated. These models then pose the question why there should be such real costs from nominal price changes. The usual answer is that there are "menu" costs in making these changes known. But such costs are usually thought to be trivially small. An alternative possibility is that customers think that firms *should not* raise prices. In that case nominal price increases, or increases of greater size, are likely to induce some form of customer retaliation: for example, customers can switch from one supplier to another. Higher nominal inflation will then act as if customers have higher elasticities of product demand, which result in lower firm mark-ups, and thereby reduces equilibrium unemployment.

There is evidence that suggests that firms do not like to make price changes, especially in customer markets. Like wage changes, price changes also agglomerate at zero. Dennis Carlton (1986) has shown that prices are often sticky for significant periods of time.[57] Furthermore, prices seem to be especially sticky in customer markets. Alan Kackmeister has compared price changes at the end of the 19th century to such changes at the end of the 20th Century. Price changes of specific goods at retail stores were recorded over a 28-month period from June 1889

[57]See also Blinder and Choi (1990) and Blinder, Canetti, Lebow and Rudd (1998).

to September 1891 and then revisited for the same commodities for a comparable 28-month period from June 1997 to September 1999. In the 19th century, when customer-dealer relations were much more personal, the average spell of constant price for an individual good was approximately 80 months.[58] Such constancy of prices for individual items is consistent with our theory that the consumers had a notion of the price that they *ought* to pay at stores where they are continued and knowing customers. Kackmeister suggests that the decline in long-term customer relationships is one factor responsible for greater frequency of price change today.

Nakamura and Steinsson (2005) suggest a reason why customers think that firms *should not* change prices. The view consumer purchases as habit-forming. Thus, by buying a particular brand, or patronizing a particular store, consumers are putting themselves in a position where they can be exploited. It places the firm in a position where it can take advantage of the consumer by raising prices. Firms then make an implicit contract with their customers: that they will not change their prices unjustifiably. Since such an implicit contract is easier to make (and enforce) regarding *nominal* prices than *real* prices, the implicit guarantee is in nominal terms. Nakamura and Steinsson also supply some data which suggests strikingly that firms do behave this way. The prices of goods in store 126 (chosen for its completeness of data) of Dominicks Finer Foods chain indicate that many goods go on sale; but, remarkably, when they go off-sale, they usually tend to return to the exact same nominal price. Such behavior is consistent with the

[58]I derive this result from Kackmeister's data in the following way. He finds that in the 19th century that only 5 percent of items changed their prices per month. This means that the average spell of constant prices would have been 20 months (the inverse). But that is a biased statistic for the average length of time between price changes for an item on the shelf. The difference between the average spell of employment or unemployment and the average spell being experienced by an individual suggests a rule of thumb ratio for four to one. Using this ratio as a rule of thumb suggests that the spell between price changes averaged over the individual items on the shelf would be 80 months.

view that consumers think that the price of the item should not change (for whatever reason) and are likely to retaliate (change brands) if it does.

Summary

In sum there is a significant body of evidence that suggests violation of both the assumptions and the predicted outcomes of natural rate theory. Relative to natural rate theory, this evidence suggests excess sensitivity to nominal concerns. Employee and customer views regarding what wages and prices *should be* will explain these anomalies. In turn this yields a theory that is remarkably close to the old-style Keynesian story: even though wage setters and price setters do take account of inflationary expectations, there will still be long-run trade-offs between inflation and unemployment. Once again notions regarding what should or should not be, and their inclusion in utility functions, negates an important neutrality result—that there is no unique sustainable level of unemployment without steadily increasing or steadily decreasing inflation.

VIII. Rational Expectations Theory

Our discussion of rational expectations will piggy-back on our previous discussion of the natural rate.

According to rational expectations theory, insofar as the Central Bank changes the money supply systematically in response to employment conditions, the public will foresee that response and change prices and wages exactly to compensate. The public's anticipation will

then exactly offset the response. Monetary policy is neutral.[59]

There are two key assumptions underlying this neutrality. The obvious one is rational expectations. To some rational expectations regarding the effects of the money supply on prices and wages would seem to be beyond the scope of most wage and price takers, as well perhaps as beyond the economic knowledge of most wage and price setters.

But, even in the case where all those involved in buying and selling goods and labor services have rational expectations, the neutrality results of rational expectations theory require also that nominal considerations do not enter into the setting of either wages or prices. The previous descriptions of the ways in which nominal wages and prices enter into preference functions *via* employees' views of the wages that ought to be received and consumers' views of the prices that *ought* to be paid, give further reason why the neutrality results of rational expectations will be violated. If prices and wages are affected by people's notions of what their nominal values should be, changes in the money supply will have an effect on real output and employment. Monetary policy can be effective in stabilizing output, and perhaps even in raising its long run level even in the presence of rational expectations.

IX. Economic Methodology

We have seen that the absence of norms plays a key role in each of the five neutralities. Their omission from macroeconomics, and also economics more generally, can be explained by

[59]Empirically there is a theoretical puzzle of excess sensitivity to monetary shocks (Christiano, Eichenbaum, and Evans (1998)). Christina and David Romer (1989) have shown that such a response occurs with lags that would be surprisingly long if expected monetary shocks were always neutralized.

the nature of standard positive-economics methodology.[60] Following Friedman's (1953) essay, "The Methodology of Positive Economics," economic theorists should strive for parsimonious modeling. Indeed, according to Friedman, they should even forsake realistic assumptions in pursuit of such parsimony. Maximization models with only *objective* arguments of utility are more parsimonious than models where people, additionally, lose utility insofar as they, or others, fail to live up to their standards. As a result, whatever the empirical validity or relevance of such norms, positive economics has a methodological bias against their consideration.

The prescriptions of positive economics regarding the conduct of empirical investigation compound the bias against norms. Friedman says that economists should *not* pay heed to the stated *intentions* of decision makers, which would especially include their norms as to how they should behave. Instead, empirical work should only test hypotheses suggested by economists' parsimonious models of behavior. In contrast, a more naturalistic approach would prescribe a very different methodology. In this case economists would observe decision makers as closely as possible, with the express intent of characterizing their motivation, and would use such characterization as the basis for modeling of economic structure. Indeed sociological and anthropological ethnographers do precisely that: they depict their subjects' motivation from close observation.

If economic tests had great power, then it would be easy, of course, to follow Friedman's dictum of making more and more refined tests of hypotheses with decreasing parsimony. With such power, in due course, this method would get to models where people's views regarding how they should behave affect decision-making, if that is how people really do operate. But even the

[60]Some of the thoughts and wording in this section have been presented in Akerlof (2005).

most parsimonious economic models are very imprecise in their specification of the independent variable, the nature of the dependent variables, the nature of leads and lags, and the nature of residuals. Yet worse, almost any economic problem usually involves simultaneity (as in supply and demand), making establishment of causality usually extremely difficult. In almost any instance a very large number of parsimonious models can be fitted statistically, making it hard—if not all but impossible—to statistically reject all the variants of models without norms. As a result the program of positive economics—with its initial nulls of models based only on utility with objective variables verified only by statistical hypothesis testing—has severe bias against explanations of economic phenomena where norms play a role.

Summers (1986) has given an example of how low the power of such statistical tests can be. The conventional test of the efficient markets hypothesis, that stock prices are the expected value of future returns, looks for autocorrelations of the excess returns on stocks relative to bonds. Summers has shown that it would take approximately 5000 years of data with such a test to obtain as much as 50 % rejection of an alternative model where stock prices were more than 30 % away from their fundamentals 35 % of the time. With such lack of power nulls are important. When they are not rejected, alternative theories, such as those with norms, are not even considered.

In contrast to reliance on statistical testing, disciplines other than economics typically put much greater weight on a naturalistic approach. This approach involves detailed case studies. Such observation of the small often has been the key to the understanding of the large. To me, the most dramatic example of such a relation between the small and the large occurs in the

structure of life itself. Crick and Watson[61] conjectured correctly that if they could describe the crystalline structure of a single DNA molecule they would have unlocked the secret of life. The duality between the structure of the DNA molecule and the way in which organisms are generated and reproduced is one of most beautiful findings of human knowledge. It indicates the sense in which Crick and Watson were, indeed, profoundly correct.

But what are the implications for social science? Positive economics, with its emphasis on statistical analysis of *populations*, would suggest that the intensive study of a single molecule would be an all-but-worthless anecdote. In the case of DNA, we know that the exact opposite is true: because DNA is a template that determines all of the cells of the organism, and also its reproduction, one molecule may not tell all, but it does tell a great deal.

Is there some reason to believe that economic behavior and economic units are any different? Economic decisions may not be as duplicable as biological processes, but the basic reason why science intensively studies the microscopic applies to economics as well. The individual economic unit, be it a firm, a consumer, or an employee, behaves the way it does *for a reason.* And if these actors behave as they do for a reason, we can expect to find those reasons from the structures that we see in close observation; and because of those structures their behavior will also tend to be duplicated. This duality between duplicability and structure explains why much of science concerns very close observation, as it also explains why the study of even a single part of a single DNA molecule may be revealing.

Standard economic methodology says that it is impossible to infer motivation of individual actors from intensive case studies. But shouldn't this question be decided empirically,

[61] As dramatically described by Watson (1969).

rather than *a priori*? Anthropologists and sociologists listen carefully to individuals in case studies. When people follow the norms, they use them to explain their actions; when, on the other hand, they violate the norms, they become the subject of the local gossip. Those case studies are revealing because—like a language, which dictates how one should speak—the norms are known to all.

X. Conclusion

This lecture has shown that the early Keynesians got a great deal of the working of the economic system right in ways that are denied by the five neutralities. As quoted from Keynes earlier, they based their models on *"our knowledge of human nature and from the detailed facts of experience*." They used their intuitions regarding the norms of how consumers, investors, and wage and price setters thought they should behave. There is a systematic reason why such knowledge and experience is likely to be accurate: by their nature norms are generated and known by a whole community. They are known to those who abide by them, and those who observe them as well.

We have shown ways in which macroeconomic variables will be affected by norms. The five neutralities, which deny a role for norms systematically suggest that the Keynesians got it wrong. Consumption should have no special dependence on current income; investment should be independent of current cash flow; wages and prices should not depend on nominal considerations. But the Keynesians' initial intuitions got it right because they included norms whose implications are widely understood. This understanding yielded insights into behavior that must be absent from the five neutralities, whose very construction denies the possibility that

people's decisions might be influenced by their views regarding how they, and others, should behave. In this broader view it is then no theoretical surprise that in consumption, investment, and wage and price determination, macroeconomists have found excess sensitivity to variables that the five neutralities say should play no role at all.

It is time to restore the missing motivation to macroeconomics.

References

Abel, Andrew B., *Investment and the Value of Capital.* New York: Garland Publishing, 1979.

Ackley, Gardner, *Macroeconomic theory*. New York: Macmillan, 1961.

Agell, Jonas and Per Lundborg, "Survey Evidence on Wage Rigidity and Unemployment: Sweden in the 1990s," *Scandinavian Journal of Economics*, 105:1 (March, 2003) pp. 15-29.

Akerlof, George A., William T. Dickens, and George L. Perry, "The Macroeconomics of Low Inflation," *Brookings Papers on Economic Activit*y, 1996:1, pp. 1-59.

_____, _____, and _____, "Near-Rational Wage and Price Setting and the Long-Run Phillips Curve," *Brookings Papers on Economic Activity*, 2000:1, pp. 1-44.

_____and Rachel E. Kranton, "Economics and Identity," *The Quarterly Journal of Economics,* Vol. 115, No. 3. (Aug., 2000), pp. 715-753.

_____, and Rachel E. Kranton, "Identity and the Economics of Organizations," *Journal of Economic Perspectives,* 19:1 (Winter, 2005), pp. 9-32.

_____, and _____, "Identity and Schooling: Some Lessons for the Economics of Education," *Journal of Economic Literature* 40:4, December 2002, pp. 1167-1201.

_____ , and Janet L. Yellen, "A Near-Rational Model of the Business Cycle, with Wage and Price Inertia," *The Quarterly Journal of Economics*, Vol. 100, Supplement. (1985), pp. 823-838.

_____, *Explorations in Pragmatic Economics: Selected Papers of George A. Akerlof (and Co-authors).* Oxford: Oxford University Press, 2005.

Altonji, Joseph G., and Paul J. Devereux, "The Extent and Consequences of Downward Nominal Wage Rigidity," NBER Working Paper No. 7236, Cambridge, MA, July 1999.

Ball, Laurence and David Romer, "Are Prices too Sticky?" *Quarterly Journal of Economics*, 104:3, (Aug., 1989), pp. 507-524.

Banks, James, Richard Blundell, and Sarah Tanner, "Is There a Retirement-Savings Puzzle?" *American Economic Review,* 88:4 (September 1998) pp. 769-788 .

Barro, Robert J., "Are Government Bonds Net Wealth?" *Journal of Political Economy*, 82:6, (November, 1974), pp. 1095-1117.

_____, "The Ricardian Approach to Budget Deficits," *Journal of Economic Perspectives*, 3: 2. (Spring, 1989), pp. 37-54.

_____ , and David B. Gordon, "A Positive Theory of Monetary Policy in a Natural Rate Model," *Journal of Political Economy*, 91:4, (August 1983), pp. 589-610.

Bauer, Thomas, Holger Bonin, and Uwe Sunde, "Real and Nominal Wage Rigidities and the Rate of Inflation: Evidence from German Micro Data," Institute for the Study of Labor, Discussion Paper No. 959, December 2003.

Benedict, Ruth, *Patterns of Culture*. Boston: Houghton-Mifflin, 1934.

Bernheim, B. Douglas, and Kyle Bagwell, "Is Everything Neutral?" *Journal of Political Economy,* 96: 2, (Apr., 1988), pp. 308-338.

Bernheim, B. Douglas; Skinner, Jonathan and Weinberg, Steven. "What Accounts for the Variation in Retirement Wealth Among U.S. Households?" *American Economic Review,* September 2001, *91*(4)*,* pp. 832-55.

Bourdieu, Pierre, *Distinction: A Social Critique of the Judgement of Taste.* Cambridge, MA: Harvard University Press, 1984.

Bewley, Truman, *Why Wages Don't Fall During a Recession*. Cambridge, MA: Harvard University Press, 1999.

Blanchard, Olivier J., and Kiyotaki, Nobihiro. "Monopolistic Competition and the Effects of Aggregate Demand." *American Economic Review* September, 1987, *77*(4)*,* pp. 647-66.

_____, Florencio Lopez-de-Silanes, and Andrei Shleifer, "What Do Firms Do with Cash Windfalls," *Journal of Financial Economics,* 36:3, (December1994), pp. 337-360.

Blinder, Alan S., and Don Choi, "A Shred of Evidence on Theories of Wage Stickiness," *Quarterly Journal of Economics,* 105:4, (November 1990), pp. 1003-15.

_____, Elie R. D. Canetti, David E. Lebow, and Jeremy B. Rudd, *Asking About Prices: A new Approach to Understanding Wage Stickiness.* New York: Russell Sage Foundation, 1998.

Brainard, William C., and George L. Perry, "Making Policy in a Changing World," in *Economic Events, Ideas, and Politics: The 1960s and After*, George L. Perry and James Tobin, eds., pp. 43-82. Washington: The Brookings Institution, 200.

Brown, Roger, *Social Psychology: The Second Edition.* New York: Free Press, 1986.

Browning, Christopher R., *Ordinary Men : Reserve Police Battalion 101 and the Final Solution in Poland*. New York: HarperCollins, 1992.

Bruner, Robert F., "Does M & A Pay? A Survey of Evidence for the Decision-Maker," mimeo, Darden Business School, 2001.

Campbell, John Y. and N. Gregory Mankiw, "Consumption, Income and Interest Rates: Reinterpreting the Times Series Evidence," *NBER Macroeconomics Annual* 4, 1989, pp. 185-216.

Caplin, Andrew S., and John Leahy, "State-Dependent Pricing and the Dynamics of Money and Output," *The Quarterly Journal of Economics*, Vol. 106, No. 3. (Aug., 1991), pp. 683-708.

Card, David, "An Empirical Model of Wage Indexation Provisions in Union Contracts," *Journal of Political Economy,* 94:3 (June 1986), pp. S144-S175.

Card, David, and Dean Hyslop, "Does Inflation Grease the Wheels of the Labor Market?" pp. 71-114 in *Reducing Inflation: Motivation and Strateg*y, Christina D. Romer and David H. Romer, eds. Chicago: University of Chicago Press, 1997.

Carlton, Dennis W., "The Rigidity of Prices," *American Economic Review*, 76: 4 (Sep., 1986), pp. 637-658.

Castellanos, Sara G., Rodrigo García-Verdú and David Kaplan, "Wage Rigidities in Mexico: Evidence from Social Security Records," NBER Working Paper 10383, Cambridge, MA, March 2004.

Cassino, Vincenzo, "The Distribution of Wage and Price Changes in New Zealand," Reserve Bank of New Zealand Discussion Paper No G95/6, 1995.

Chapple, Simon, "Money Wage Rigidity in New Zealand," *Labour Market Bulletin*, 1996:2, pp. 23–50.

Chetty, Raj, "Labor Supply and Risk Aversion: A Calibration Theorem," Department of Economics, University of California at Berkeley, 2005.

Christiano, Lawrence J., Martin Eichenbaum and Charles L. Evans, "Monetary Policy Shocks:

What Have We Learned and to What End?" National Bureau of Economic Research Working Paper 6400. Cambridge, MA: NBER, 1998.

Christofides, Louis N. and Amy Chen Peng, "The Determinants of Major Provisions in Union Contracts: Duration, Indexation, and Non-Contingent Wage Adjustment," mimeo, University of Cyprus, September 2004.

Dernburg, Thomas F. and Duncan M. McDougall, *Macroeconomics: The Measurement, Analysis, and Control of Aggregate Economic Activity*, 2nd Edition. New York: McGraw-Hill, 1963.

Dornbusch, Rudiger and Stanley Fischer, *Macroeconomics,* Fourth Edition. New York, McGraw-Hill, 1987.

Dwyer, Jacqueline and Kenneth Leong, "Nominal Wage Rigidity in Australia," Research Discussion Paper 2000-08, Reserve Bank of Australia, November, 2000.

Ehrenberg, Ronald I., Leif Danziger and Gee San, "Cost-of-Living Adjustment Clauses in Union Contracts: Summary of Results," *Journal of Labor Economics,* 1:3 (July 1983) pp. 215-245,

Elster, Jon, "Social Norms and Economic Theory, *Journal of Economic Perspectives,* 3:4 (Autumn 1989), pp. 99-117.

Fazzari, Steven M., R. Glenn Hubbard, and Bruce C. Petersen, "Financing Constraints and Corporate Investment," *Brookings Papers on Economic Activity*, 1988: 1, pp. 141-206.

Fehr, Ernst, and Lorenz Goette, "Robustness and Real Consequences of Nominal Wage Rigidity," Working Paper No. 44, Institute for Empirical Research in Economics, University of Zurich, March 2003, (*Journal of Monetary Economics,* forthcoming).

_____, and Jean-Robert Tyran, "Does Money Illusion Matter?" *American Economic Review*, 91:5, (December 2001), pp. 1239-1262.

Feldstein, Martin S., "Social Security, Induced Retirement, and Aggregate Capital Accumulation," *Journal of Political Economy*, 82: 5, (Sep. - Oct., 1974), pp. 905-926.

_____, and Anthony Pellechio, *Review of Economics and Statistics*, "Social Security and Household Wealth Accumulation: New Microeconometric Evidence," 61:3. (Aug., 1979), pp. 361-368.

Fligstein, Neil, *The Transformation of Corporate Control*. Cambridge, MA: Harvard University Press, 1990.

Friedman, Milton, "The Methodology of Positive Economics," pp. 3-43 in Milton Friedman, *Essays in Positive Economics.* Chicago: University of Chicago Press, 1953.

_____, *A Theory of the Consumption Function.* Princeton, NJ: Princeton University Press, 1957.

_____, "The Role of Monetary Policy." *American Economic Review*, March 1968, *58*(1), pp. 1-17.

Goffman, Erving, *Encounters.* Indianapolis: Bobbs-Merrill, 1961.

Gordon, Robert J., "Can the Inflation of the 1970s Be Explained?" *Brookings Papers on Economic Activity,* 1977:1, pp. 253-279.

Gray, Jo Anna, "On Indexation and Contract Length," *Journal of Political Economy,* 86:1 (Feb., 1978), pp. 1-18.

Groshen, Erica L., and Mark E. Schweitzer, "Identifying Inflation's Grease and Sand Effects in the Labor Market," pp. 273-308 in *The Costs and Benefits of Price Stability,* Martin Feldstein, ed. Chicago: University of Chicago Press, 1997.

Hayashi, Fumio, "Tobin's Marginal *q* and Average *q*: A Neoclassical Interpretation," *Econometrica*, 50:1 (January 1982), pp. 213-224.

Hodson, Randy, *Dignity at Work.* Cambridge, England: Cambridge University Press, 2001.

Homans, George C. and Charles P. Curtis, Jr., *Introduction to Pareto: His Sociology.* New York: Alfred Knopf, 1934.

Huffman, David and Matias Barenstein, "Beer, Steak and Whiskey: Evidence of a Pay-Day Spending Spree," Chapter in UC Berkeley Dissertation, 2003.

Iwai, Katsuhito, *Disequilibrium Dynamics: A Theoretical Analysis of Inflation and Unemployment*. New Haven: Yale University Press, 1981.

Jensen, Michael C., and William H. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics,* 3:4 (October 1976), pp.305-360.

Kackmesiter, Alan K., "Has Retail Price Behavior Changed Since 1889? Evidence from Micro Data," Ph.D. Thesis, University of California, Berkeley, 2002.

Kahn, Shulamit, "Evidence of Nominal Wage Stickiness from Micro-data," *American Economic Revie*w, 87:5, (December 1997), pp. 993-1008.

Kahneman, Daniel and Tversky, Amos. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica*, March 1979, *47*(2), pp. 263-92.

Kaplan, Steven N. and Luigi Zingales, "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?" *Quarterly Journal of Economics,* 112:1 (February 1997) pp. 169-215.

Katz-Gerro, Tally, "Cultural Consumption and Social Stratification: Leisure Activities, Musical Tastes and Social Locations, *Sociological Perspectives,* 42:4 (Winter, 1999), pp. 627-646.

Keynes, John Maynard. *The General Theory of Employment, Interest and Money.* New York: Macmillan, 1936.

Kimura, Takeshi, and Kazuo Ueda, "Downward Nominal Wage Rigidity in Japan," *Journal of the Japanese and International Economies,* 15, 2001, pp. 50-67.

Klein, Lawrence R. and Arthur S. Goldberger, *An Econometric Model of the United States 1929-1952.* Amsterdam: North-Holland, 1955.

Knoppik, Christoph, and Thomas Beissinger, "How Rigid Are Nominal Wages? Evidence and Implications for Germany," *Scandinavian Journal of Economics*, 105:4, (December 2003), pp. 619-41.

Kuroda, Sachiko and Isamu Yamamoto, "Are Japanese Nominal Wages Downwardly Rigid? (Part I): Examinations of Nominal Wage Change Distributions," Institute for Monetary and Economic Studies, Bank of Japan, *Monetary and Economic Studies*, 21:2, (August 2003a), pp. 1-29.

Kuroda, Sachiko and Isamu Yamamoto, "Are Japanese Nominal Wages Downwardly Rigid? (Part II): Examinations using a Friction Model,"), Institute for Monetary and Economic Studies, Bank of Japan, *Monetary and Economic Studies*, 21:2, (August 2003b), pp. 31-68.

Kuroda, Sachiko and Isamu Yamamoto, "The Impact of Downward Nominal Wage Rigidity on the Unemployment Rate: Quantitative Evidence from Japan," Institute for Monetary and Economic Studies, Bank of Japan, *Monetary and Economic Studies*, 21:4, (December 2003c), pp. 57-86.

Laibson, David I., "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics,*112:2 (may 1997), pp. 443-477.

Laitner, John, "Wealth Inequality and Altruistic Bequests," *American Economic Review, Papers and Proceedings,* 92:2 (May, 2002), pp. 270-273.

Lamont, Owen, "Cash Flow and Investment: Evidence from Internal Capital Markets," *Journal of Finance*, 52:1, (Mar., 1997), pp. 83-109.

Lebow, David E., Raven E. Saks, and Beth Anne Wilson, "Downward Nominal Wage Rigidity: Evidence from the Employment Cost Index." Board of Governors of the Federal Reserve System, Finance and Economics Discussion Paper no. 99-31, July, 1999.

List, John A., "Does Market Experience Eliminate Market Anomalies?" *Quarterly Journal of Economics*, 118(1) (February 2003), pp. 41-71.

Loewenstein, George, "Because It Is There: The Challenge of Mountaineering....for Utility Theory," *Kyklos* 52:3 (September, 1999), pp. 315-343.

Lucas, Robert E., Jr., "Expectations and the Neutrality of Money," *Journal of Economic Theory,* 4:2 (April, 1972), pp. 103-124.

Lucas, Robert E., Jr. and Thomas J. Sargent, "After Keynesian Macroeconomics," in *After the Phillips Curve: Persistence of High Inflation and Unemployment*. Federal Reserve Bank of Boston Conference No. 19, 1979.

Lundborg, Per and Hans Sacklén, "Is There a Long-Run Unemployment-Inflation Trade-off in Sweden?" FIEF Working Paper 173, Stockholm, May, 2003.

Manicka, Rani, *The Rice Mother*. New York: Penguin, 2002.

Mankiw, N. Gregory, *Macroeconomics.* New York: Worth Publishers, 1997.

Milgram, Stanley, "Behavioral Study of Obedience." *Journal of Abnormal and Social Psychology.* 67 (1963), pp. 371-378.

Milgram, Stanley, "Some Conditions on Obedience and Disobedience to Authority," in I. D. Steiner and M. Fishbein, eds., *Current Studies in Social Psychology.* New York: Holt, Rinehart, and Winston, 1965.

Meyer, John R. and Edwin Kuh, *The Investment Decision: An Empirical Study.* Cambridge, MA: Harvard University Press, 1957.

Modigliani, Franco, and Richard Brumberg, "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data." In Kenneth K. Kurihara, ed., *Post-Keynesian Economics*, pp. 388-436. New Brunswick, NJ: Rutgers University Press, 1954.

Modigliani, Franco, and Merton H. Miller, "The Cost of Capital, Corporation Finance and the Theory of Investment," *American Economic Review,* 48: 3, (Jun., 1958), pp. 261-297.

Myers, Stewart C. and Nicholas S. Majluf, "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have," *Journal of Financial Economics,* 13:2 (June 1984), pp. 187-221.

Nakamura, Emi and Jón Steinsson, "Price-Setting in Forward Looking Customer Markets," Harvard University, 2005.

Nickell, Stephen and Glenda Quintini, "Nominal Wage Rigidity and the Rate of Inflation," Center for Economic Performance, London School of Economics, March 2001.

O'Brien, Anthony P., "A Behavioral Explanation for Nominal Wage Rigidity During the Great Depression," *Quarterly Journal of Economics,* 104:4 (November, 1989), pp. 719-735.

O'Driscoll, Gerald P., Jr., "The Ricardian Nonequivalence Theorem," *Journal of Political Economy,* 85:1 (January, 1977), pp. 207-210.

Pareto, Vilfredo, *Compendium of General Sociology,* Abridged in Italian by Giulio Farina,1920 from *Trattato di Sociologia Generale.* Translated by Elisabeth Abbott. Minneapolis, MN: University of Minnesota Press, 1980.

Parker, Jonathan, "The Response of Household Consumption to Predictable Changes in Social Security Taxes," *American Economic Review* 89:4 (September 1999), pp. 959-973.

Pepper, John, *What Really Matters: My Reflections on My Career at Proctor & Gamble with Guiding Principles for Success in the Marketplace and in Life.* Cincinnati, OH: Proctor & Gamble, 2005.

Phelps, Edmund S.*,* "Money-Wage Dynamics and Labor-Market Equilibrium," *Journal of Political Economy*, August, 1968, *76*(4), Part 2, pp. 678-711.

Phillips, Alban W., ""The Relation Between Unemployment and the Rateof Change of Money Wage Rates in the United Kingdom, 1861-1957,"" *Economica,* 25:100, (November 1958), pp. 283-99.

Rabin, Matthew, *"*Risk Aversion and Expected-Utility Theory: A Calibration Theorem*,"* *Econometrica*, 68,:5, (Sep., 2000), pp. 1281-1292.

Rogoff, Kenneth, "The Optimal Degree of Commitment to an Intermediate Monetary Target," *Quarterly Journal of Economics,* 100:4, (Nov., 1985), pp. 1169-1189.

Romer, Christina D. and David H. Romer, "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz," *NBER Macroeconomic Annual 1989,* pp. 121-170. Cambridge, MA: MIT Press, 1989.

Rotemberg, Julio J., "Monopolistic Price Adjustment and Aggregate Output," *Review of Economic Studies,* 49:4 (October, 1982), pp. 517-531.

Samuelson, Paul A., *Economics: An Introductory Analysis*, 6th Edition. New York: McGraw-Hill, 1964.

Sargent, Thomas J., A Note on the 'Accelerationist' Controversy," *Journal of Money, Credit and Banking*, 3:3 (August 1971), pp. 721-725.

Sargent, Thomas J, "Rational Expectations, the Real Rate of Interest, and the Natural Rate of Unemployment," *Brookings Papers on Economic Activity*, 1973: 2, pp. 429-480.

Schultze, Charles L., "Recent Inflation in the United States," Study Paper 1. Joint Economic Committee, 86th Congress, 1st Session, September, 1959.

Seater John J., "Ricardian Equivalence," *Journal of Economic Literature*, 31: 1, (Mar., 1993), pp. 142-190.

Shafir, Eldar, Peter Diamond, and Amos Tversky, "Money Illusion," *Quarterly Journal of Economics,* 112:2, (May, 1997), pp. 341-74.

Shea, John, "Union Contracts and the Life-Cycle/Permanent Income Hypothesis," *American Economic Review* 85 (March, 1995), pp. 186-200.

Shiller, Robert J., "Why Do People Dislike Inflation?" pp. 13-65 in Christina Romer and David Romer, eds., *Reducing Inflation: Motivation and Strategy*. Chicago: University of Chicago Press, 1997.

Souleles, Nicholas S., "The Response of Household Consumption to Income Tax Refunds," *American Economic Review* 89:4 (September, 1999), pp. 947-958.

Staiger, Douglas, James Stock and Mark Watson, "How Precise Are Estimates of the Natural Rate of Unemployment?" in Christina D. Romer and David H. Romer (eds.) *Reducing Inflation: Motivation and Strategy* (Chicago, IL: University of Chicago Press), 1997, pp. 195-242.

Stein, Jeremy C., "Agency, Information and Corporate Investment," in *Handbook of the Economics of Finance,* George M. Constantinides, Milton Harris, and Rene M. Stulz, eds., pp. 111-163. Amsterdam: Elsevier/North-Holland, 2003.

Stock, James H. and Mark W. Watson, "Has the Business Cycle Changed? Evidence and Explanations," *Proceedings of a Symposium on Monetary Policy and Uncertainty: Adapting to a Changing Economy*, Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, September 2003.

Summers, Lawrence H., "Taxation and Corporate Investment: A *q*-Theory Approach," *Brrokings Papers on Economic Activity*, 1981:1, pp. 67-127.

Summers, Lawrence H., "Does the Stock Market Really Reflect Fundamental Values?" *Journal of Finance Papers and Proceedings*, 41:3 (July 1986), pp. 591-601.

Terkel, Studs, *Working: People Talk About What They Do All Day and How They Feel About What They Do.* New York: Pantheon, 1972.

Tobin, James, "A General Equilibrium Approach to Monetary Theory," *Journal of Money, Credit and Banking* 1:1 (February 1969), pp. 15-29.

Tobin, James, "Inflation and Unemployment," *American Economic Review,* 62:1 (March 1972), pp. 1-18.

Watson, James D., *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*. New York: New American Library, 1969.

Weinrib, Ernest J., "The Fiduciary Obligation," *The University of Toronto Law Journal,* 25:1 (Winter, 1975), pp. 1-22.

Welch, Jack. *Straight from the Gut.* New York: Warner Business Books, 2001.

Wilcox, David W., "Social Security Benefits, Consumption Expenditure, and the Life Cycle Hypothesis," *Journal of Political Economy*, 97:2 (April, 1989), pp. 288-304.

Woodward, Ian, "Divergent Narratives in the Imagining of the Home Amongst Middle-Class Consumers: Aesthetics, Comfort, and the Symbolic Boundaries of self and Home," *Journal of Sociology,* 39:4 (2003), pp. 391-412.

Yellen, Janet L. and George A. Akerlof, "Stabilization Policy: A Reconsideration," Presidential Address of Western Economic Association. Mimeo, Berkeley, CA, July 1, 2004.

Zorn, Dirk M., "Here a Chief, There a Chief: The Rise of the CFO," *American Sociological Review,* 69:3 (June 2004), pp. 345-64.