

# The Economic Logic of a Fresh Start

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debtor's right to have his or her debts dismissed or discharged via a bankruptcy proceeding is referred to as the law's "fresh start" provision. Fresh start has been — and continues to be — a controversial feature of the U.S. bankruptcy law. Lately, the law has come under scrutiny because of the dramatic rise in personal bankruptcy filings over the past 25 years. In this article, Satyajit Chatterjee explains the economic logic underlying the fresh start concept. He also argues that this logic can explain why opposition to a discharge policy has waxed and waned over time.

U.S. law gives debtors the right to petition a bankruptcy court and ask to be released from their financial obligations to creditors. For reasons explained in this article, a debtor's right to have his or her debts dismissed or discharged via a bankruptcy proceeding is referred to as the law's "fresh start" provision. Fresh start has been — and continues to be — a controver-

sial feature of U.S. bankruptcy law. Of late, the law has come under scrutiny because of the dramatic rise in personal bankruptcy filings in the last 25 years. In 2005, roughly one out of every 75 U.S. households took advantage of the fresh start provision; in 1980, only one out of 375 households did.

The need to deal in some fashion with people who cannot (or will not) repay their debts was felt from the earliest days of European settlement in New England. By and large, the colonists dealt harshly with defaulters and were quite hostile to the idea of the discharge of personal debts. But this hostility appears to have waned by the late 19<sup>th</sup> century, when Congress enacted a federal bankruptcy law with a fresh start provision. Unlike earlier attempts at legalizing discharge, the 1898 law proved to be more perma-

nent, although later laws modified many of its provisions. The latest turn in this gradual evolution is the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005, a law that significantly curtails a debtor's right to a fresh start.

The objective of this article is twofold. The first is to explain the economic logic underlying the fresh start concept. For there is an economic logic — one that gets ignored when advocates portray fresh start as a form of protection against rapacious creditors or when opponents portray it as a refuge for the morally bankrupt. The economic logic puts debtors and creditors on an equal footing but argues that, under certain circumstances, society as a whole is better off when discharge is permitted. The second objective is to argue that this logic can explain why opposition to a discharge policy has waxed and waned over time. Why did the colonists view discharge with hostility? Why did this opposition wane by the turn of the previous century? Why has opposition to a fresh start reappeared now? The economic logic of a fresh start suggests that these shifts in attitude reflect an evolving tradeoff between the economic costs and benefits of a fresh start.

## WHAT IS A FRESH START?

U.S. bankruptcy law permits an individual debtor to be released from his or her financial obligations to current creditors. The main requirement for obtaining this release, or discharge, of debt is that the debtor must surrender to creditors whatever property he or she has at the time the discharge is sought. By surrendering all existing



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property to creditors, a debtor who is unable or unwilling to repay all of his or her debt can obtain permanent protection from collection efforts by current creditors.

There are some exceptions to this general provision of the law. On the liability side, not all financial obligations are eligible for discharge. Examples of nondischargeable obligations include student loans and judgments incurred in judicial court cases. On the asset side, debtors are not required to surrender certain assets to creditors. For instance, in Florida and Texas, home equity is exempt from seizure by creditors. In addition, any property essential to a person's livelihood or dignity (such as tools used by a carpenter to do his job, ordinary clothes, and so forth) is generally exempt from seizure by creditors as well.<sup>1</sup>

The term fresh start is used to describe this provision of bankruptcy law because it neatly encapsulates the spirit of an oft-cited justification for discharge given in a 1934 ruling by the U.S. Supreme Court. According to the court, discharge of debt "gives to the honest but unfortunate debtor who surrenders for distribution the property which he owns at the time of bankruptcy a new opportunity in life and a clear field for future effort, unhampered by the pressure and discouragement of preexisting debt."<sup>2</sup>

To understand the economic logic of the fresh start provision, we should view the need for this provision from two closely related, but distinct, per-

spectives. The first is the situation as it relates to a debtor and creditor *after* debt has been incurred (what economists call the *ex-post* perspective). The second perspective is the situation as it relates to potential debtors and creditors *before* any debt is incurred (what economists call the *ex-ante* perspective). The desirability of a fresh start

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can be argued from either perspective, but the nature of the argument is different in the two cases and therefore best discussed separately. As we will see, both perspectives are implicit in the famous Supreme Court justification for a fresh start quoted earlier.<sup>3</sup>

### FRESH START FROM THE POST-DEBT PERSPECTIVE

To understand the post-debt logic for having a fresh start provision, we

<sup>3</sup> The language of the Supreme Court ruling points to a set of core issues that any discussion of fresh start should cover. A complete and thorough discussion of all aspects of fresh start would be well beyond the scope of this article. The last two chapters of Thomas Jackson's book and the article by Michelle White provide more details about the costs and benefits of fresh start. The article by Michel Robe, Eva-Maria Steiger, and Pierre-Armand Michel provides further background on the nature of fresh start. Also, I do not discuss a second form of bankruptcy — called Chapter 13 — in this article. In a Chapter 13 bankruptcy, the debtor is allowed to keep his or her assets in return for agreeing to a new repayment schedule that involves a partial discharge of debt. Historically, only a third of bankruptcy filings in the U.S. have been Chapter 13 filings; the rest are of the fresh start variety. For a nice discussion of Chapter 13 bankruptcy, see the article by Wenli Li.

need to be clear about what transpires in its absence. In most modern societies, contract law gives creditors the right to seize the property of a debtor who does not repay his or her debts. If the debtor lacks sufficient property, the law permits creditors to garnish the debtor's earnings in excess of what is needed by the debtor to meet non-discretionary expenses. Importantly, these creditors' rights continue to be in force as long as there is some unmet financial obligation. It is against these creditors' rights that the fresh start provision extends protection.

Since this article is about the economic *logic* of a fresh start, and the logic can be somewhat subtle, it helps to talk about the issues by using an example. I will introduce the example in this section and progressively extend it in the following two sections. In this section, I use the example to make clear one reason why unrestricted creditors' rights can be bad for society.

Consider the case of a debtor, whom we shall call D, who has borrowed from a creditor, C, and her payment on the debt is now due. Assume also that D has no assets and her obligation to C amounts to \$5000. Further assume that D's monthly take-home pay from her regular full-time job totals \$2000 and her monthly nondiscretionary expenses are \$1800. Since D does not have the funds to pay off her obligation, she is in default. According to the law, C has the right to seize \$200 from D each month for the next 25 months in order to recover what is owed to him.<sup>4</sup>

However, matters may unfold differently. Imagine that D has the option to reduce her hours at her job so as

<sup>1</sup> Other exceptions exist to prevent abuse of the provision. For instance, shifting one's wealth into nonexempt assets shortly before filing for bankruptcy is viewed as an abuse and will make the debtor ineligible for a fresh start. Similarly, the right to a discharge is not available to a debtor who has used this provision in the previous six years — so "serial" discharge is viewed as an abuse and is not permitted.

<sup>2</sup> *Local Loan Co. vs. Hunt* U.S. 234, 244 (1934).

<sup>4</sup> Actually, the law would permit C to recover *more than* \$5000 because recovery takes time and C loses interest on the part of the debt yet to be repaid. Taking compensation for lost interest into account would require D to pay \$200 each month for more than 25 months.

to make her monthly take-home pay exactly \$1800. If D chooses to do this, C can no longer seize any income from D because D does not have any discretionary income. D may prefer this “less work” option to the option of working full-time and having her additional \$200 a month “taxed” away by C for the next two years. Of course, this less work option will keep D under the threat of garnishment indefinitely, but the benefits of working full-time and eventually becoming debt-free come too far in the future for D to make the extra effort.

This outcome is inefficient because D clearly values the extra \$200 a month more than the effort required to earn it — which is why she was working full-time in the first place. But now C’s right as a creditor stops D from doing so. Society’s loss is the \$200 D could earn, net of her efforts to earn it. One might wonder why the loss to society does not include the \$5000 loss to C, but from a societal point of view, C’s loss is exactly offset by D’s gain.<sup>5</sup>

In this example C’s rights as a creditor force D to obtain her discretionary income in a form that C cannot seize, that is, in the form of leisure. One can also imagine D’s being induced to engage in activities that allow her to hide her earnings from C, for instance, doing informal work for friends and relatives or engaging in illegal activities. If these alternatives are inferior (from society’s point of view) to D’s working full-time at her regular job, the inefficiency remains and is perhaps compounded. In general, whenever a debtor has the option to substitute nonseizable forms of income

for regular earnings, unbridled creditors’ rights can cause a costly distortion of work effort. In such situations, an efficiency case can be made for constraining a creditor’s rights. Indeed, if D is given the right of discharge, she will avail herself of it and continue working full-time at her regular job and the loss to society will be avoided.<sup>6</sup> This is the economic justification for discharge implicit in the Supreme Court’s statement that discharge gives a debtor “new opportunity in life and a clear field for future effort, unhampered by the pressure and discouragement of preexisting debt.”

But this *post-debt* justification ignores the fact that when discharge is permitted, a creditor’s incentive to lend is seriously blunted. Is not the reduction in lending that is sure to result an important loss from a societal point of view? This is an important objection, and it brings us to the issue of whether discharge can be justified from a *pre-debt* perspective. As we will see, discharge can be justified from a *pre-debt* perspective, but the argument in favor of it must be amended in an important way.

### RETHINKING THE (POST-DEBT) LOGIC OF A FRESH START FROM A PRE-DEBT PERSPECTIVE

We will continue with our example of creditor C and debtor D, but

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<sup>6</sup> It could be argued that the inefficiency could be avoided without permitting discharge if C and D negotiated a better outcome. After all, C must understand that if he insists on getting all of his \$5000 back, he will get nothing. Given this, he might offer to partially forgive D’s debt, and D might well accept such an offer and go back to working full-time. However, it’s likely that C is dealing not only with D but with many other debtors, and C must be cognizant of the fact that forgiving D’s debt might embolden other debtors to demand a similar consideration. These external effects might prevent an efficiency-restoring renegotiation between C and D.

we will now focus on their situation as they contemplate entering into a lender-borrower relationship. To do so requires extending the example. The extended example explains that if the lender understands the circumstance under which his creditor will default, and he can act to avoid that circumstance, then fresh start serves no useful purpose. In fact, instituting a policy of fresh start in such a situation could make matters worse!

We will assume that both C and D are forward-looking: Each person fully understands how the other will act in the future if a loan is made. We will continue to assume that D’s circumstances are exactly as before: She has a full-time job earning \$2000 a month with the option of working fewer hours; she has no assets; and her monthly nondiscretionary expenses are \$1800. To keep matters simple, we will also assume that D does not plan to save any portion of her resources for the foreseeable future. This means that she will spend any loan granted to her and she will not have any property a creditor can grab in the future. Finally, we will assume that the best alternative use of C’s funds is a risk-free investment that will earn him 5 percent per year.

Consider first the case where discharge is not permitted. From our previous discussion, we know that if D borrowed a lot of money, she will not pay it back. Being forward-looking, C understands this fact and will not lend a lot of money to D. Indeed, the *most* C would be willing to lend is the present value of the longest stream of \$200 monthly payments D can handle. Let’s assume that the longest stream is 12 months; that is, if D is faced with the prospect of making 13 or more monthly payments of \$200 each, she will stop making payments and take the less work option. But if she needs to make fewer than 13 monthly pay-

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<sup>5</sup> This is the sense in which economic logic puts lenders and borrowers on an equal footing: Any gain or loss to the lender that comes at the expense of an equivalent loss or gain to the borrower is viewed as being neutral with regard to gains or losses to society as a whole.

ments, she will continue making them. In this case C can lend, at most, \$2238 (rounded) to D without losing money on the deal. This amount of \$2238 is simply the present discounted value of 12 monthly receipts of \$200 each when the annual interest rate is 5 percent. This is the key difference when matters are viewed from the *pre-debt* perspective: If C is aware of the level of debt beyond which D will default, he will rationally lend less than that amount and default will not occur. If foresight can prevent default, the *post-debt* rationale for discharge does not apply.

In fact, having a discharge policy in place can actually make matters worse. Consider the above contract that requires D to pay \$200 a month to C for 12 months. Would D have the incentive to adhere to this contract if she has the option to invoke discharge? The answer depends on the pecuniary and psychological costs of invoking discharge. The pecuniary costs of discharge include the out-of-pocket expenses of going to court, the cost of not being able to borrow again for an extended period of time, and the cost of being barred from certain types of employment following default.<sup>7</sup> The psychological cost might stem from a feeling of shame in having failed to meet one's obligations. If these costs are high enough, D will adhere to the contract.

But it is also possible that these costs are too low to prevent D from invoking discharge. If this is the case — and C is aware that D's costs of discharge are low — the amount C would be willing to lend to D will be

less than \$2238. How much less? For concreteness, suppose that the costs of discharge are such that D would adhere to the contract if she had six or fewer monthly payments of \$200 to make. Then, the most that C would be willing to lend would be \$1183 (rounded). This amount is the present discounted value of six monthly pay-

extend our example one more time. The point of the extended example is that the risk of not being able to repay gives a fresh start a benefit that may counter its costs. The benefit is that in the event that the debtor is unable to repay, she can invoke discharge and be relieved of the burden of her debt. But the debtor may choose to invoke dis-

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ments of \$200 each when the annual interest rate is 5 percent.

Thus, a discharge policy may have the effect of reducing D's credit limit from \$2238 to \$1183. However, it is entirely possible that D would actually prefer to borrow more than \$1183 and pay it back but the existence of a discharge policy makes it impossible for her to do so. The bottom line is that a discharge policy can have adverse effects on borrowers by making it too easy for them to default and consequently make creditors less willing to lend.

This objection to a discharge policy is implicitly recognized and countered in the Supreme Court ruling quoted earlier. Recall that the ruling made reference to the "honest but unfortunate debtor" in making the case for discharge. Evidently, the court was drawing attention to the fact that misfortune plays a role when people don't pay back their debts. And indeed, as argued in the next section, the risk of bad outcomes can provide a justification for a discharge policy.

### THE ROLE OF RISK IN RESTORING THE (PRE-DEBT) LOGIC OF A FRESH START

To explain the role of risk, we will

charge even when she has the capacity to repay. To avoid this outcome, the creditor must reduce the amount lent, which is the cost.

Imagine that in the month immediately after D takes out her loan there is a small chance that her discretionary income will fall permanently to \$100. We will assume that D is contemplating entering into a contract wherein she promises to pay \$200 each month for some (to be determined) set of months. The question we want to answer is: How much would C be willing to lend to D, recognizing that D's discretionary income may fall to \$100?

Let's answer the question first for the case where discharge is not permitted. If D's discretionary income remains \$200 in the first month of the loan, she will be in a position to make 12 monthly payments of \$200 (which is the maximum number of months she can promise, given that she can choose the less work option and not pay anything). But if her discretionary income falls to \$100 in the first month, she will be in default. At that point, C will have the right to "tax" away all of D's discretionary income until all obligations are met. Faced with this "tax," D will choose the less work option (that is, reduce her discretionary income to

<sup>7</sup>Failure to meet debt obligations is recorded in a person's credit history. This history is available to potential creditors and employers. A tarnished credit history typically leads to difficulties in obtaining new loans and could lead to difficulty in obtaining certain types of employment.



zero by working fewer hours) and never repay anything.<sup>8</sup> Knowing this, C will be willing to lend somewhat less than \$2238 against D's promise to pay \$200 each month for the next 12 months. By offering to lend somewhat less than \$2238, C will get more than a 5 percent rate of return on his investment in the event D actually pays back. This return above the opportunity cost of his funds (which by assumption is 5 percent) is C's compensation for taking on the risk that D will default on the loan.

Now let's answer the question assuming that discharge is permitted. In this case, D will adhere to her loan contract as long as she has six or fewer monthly payments of \$200 to make (which is the maximum number of months she can promise to pay, given that she has the option to invoke discharge and walk away from her debt) and her discretionary income is \$200. If her discretionary income falls to \$100 in the first month of the loan, she will invoke her right to discharge and walk away from her debt. Again, anticipating this, C will be willing to lend somewhat less than \$1183 against D's promise to pay \$200 each month for the next six months because there is the small chance that D will not make any payments at all.

The bottom line is that without the possibility of discharge, the "honest but unfortunate" debtor runs the risk of being condemned indefinitely to life under the threat of seizure, a situation that is both unpleasant and bad for work effort. Permitting discharge

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<sup>8</sup> D's options are to hand over all of her discretionary income for the next 24 months or reduce her work effort. Since the less work option is preferable to the prospect of handing over all her discretionary income for the next 13 (or more) months, she will surely choose the less work option when faced with the option of handing over all of her discretionary income for the next 24 months.

eliminates this possibility but reduces the maximum amount a debtor can borrow. The amount the debtor can borrow is less because the lender must

then, the case for a discharge policy rests ultimately on the risk of bad outcomes and the fact that discharge provides a form of insurance against

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make certain that the debtor has the incentive to repay even when there is no financial hardship. If debtors' aversion to the risk of bad outcomes is sufficiently strong, or if their need to borrow is sufficiently weak, then from the debtors' perspective permitting discharge will be preferable to prohibiting it.

This risk-based logic for discharge is further strengthened if we recognize that lenders need not bear any losses from having a discharge policy in place. This is so because in the (likely) event that D does make all six of her monthly payments of \$200 each, C earns more than a 5 percent rate of return (annualized).<sup>9</sup> Therefore, by lending on similar terms to many people, C can use the additional returns from the above-5-percent interest rate paid by nondefaulting debtors to offset the losses inflicted by defaulting debtors and still obtain an average return of 5 percent on his investments.

From the *pre-debt* perspective,

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<sup>9</sup> This is so because C lent an amount less than \$1183 but insisted that D pay back \$200 for six months. For instance, if C lent only \$1500, the implicit interest rate in the event D paid back the loan would be about 15 percent.

this risk. The economic logic of a fresh start then comes down to a comparison between the benefits of insurance and the costs of a reduced borrowing capacity. If enough people in the economy value the insurance benefit of a discharge policy more than the cost of a reduced borrowing capacity, a policy of discharge, or fresh start, will be socially desirable.

### FRESH START AND THE EVOLUTION OF U.S. BANKRUPTCY LAW

The economic logic of a fresh start provides insights into the history of the evolution of personal bankruptcy law in the U.S., in particular, into Americans' divergent attitudes, over time and space, toward the efficacy of a discharge policy. An obvious but nevertheless important point about the economic logic is that it states *conditions* under which having a discharge policy is socially desirable. Thus, if we observe an economy that looks upon a discharge policy with disfavor — or *vice versa* — the economic logic of a fresh start suggests reasons this might be so.

The colonial history of the United States affords a unique opportunity to observe the economic logic of a fresh

start at work.<sup>10</sup> Each of the 13 original colonies started out with debtor and creditor rights based on English laws. These laws gave creditors the right to seize the property of insolvent debtors and, if there was any suspicion that the debtor was hiding property, to imprison him or her. There are ample records of impoverished insolvent debtors spending years in jail petitioning colonial legislatures for relief. A discharge of debt was possible at the behest of the creditor only.

But as time progressed, the colonies altered these laws to suit their own needs.<sup>11</sup> As one would expect from the post-debt logic of a fresh start, the law that came under pressure first was the law permitting the imprisonment of debtors. It was clear to everyone that keeping insolvent debtors in jail for years served no useful purpose. It was unlikely that someone who had been imprisoned for several years had any hidden wealth, so creditors were not being served by this imprisonment and society lost the labor of the imprisoned debtors. Bowing to public pressure, Massachusetts enacted a debtor relief

law in 1698, which permitted insolvent debtors who owed less than £500 to obtain their release from jail upon swearing an oath of poverty. But the law did not discharge debts: Debtors were responsible for paying back everything they owed, and creditors retained the right to attach future property accumulated by insolvent debtors toward satisfaction of any unmet obligations.

As the discussion of the post-debt logic of discharge would lead us to expect, this law had an adverse effect on the work effort and savings of insolvent debtors released from jail. Why would an insolvent debtor exert effort and accumulate wealth if his creditors could “tax” it all away? The Massachusetts legislature acknowledged this problem when, in 1725, it noted that the law had been a “...great encouragement to idleness and ill-husbandry, and too much a temptation to perjury...” and repealed it. Nevertheless, similar laws were passed periodically until 1787, when relief of debtors who owed moderate amounts of money was made a permanent part of Massachusetts law. The experience of Massachusetts in this regard is similar to that of the other colonies that enacted debtor-relief laws. But even though the post-debt logic of discharge was quite apparent to the Massachusetts legislature, neither it nor most other colonial legislatures permitted discharge of debt until much later.

This reluctance to permit discharge can be explained from the perspective of the economic logic of a fresh start. Recall that permitting discharge leads lenders to lend less. Hence, whenever the capacity to borrow is really important to people, we can expect society to be hostile to the idea of discharge. There is ample historical evidence that in the early years of colonization, ordinary people acutely felt the need to borrow. To quote historian Bruce Mann: “Debt was an

inescapable fact of life in early America. One measure of how thoroughly this was so is in the pervasiveness of debts owed and owing in probate inventories....Debt cut across regional, class, and occupational lines. Whether one was an Atlantic merchant or a rural shopkeeper, a tidewater planter or a backwoods farmer, debt was an integral part of daily life.” This one single fact probably goes a long way toward accounting for the general reluctance of colonists to enact a discharge policy. When a person’s ability to earn a living depends on his or her capacity to borrow, it is not in the interests of a people to erect barriers to the flow of credit by making it difficult for creditors to collect on their loans.<sup>12</sup>

Nevertheless, a few colonies did enact discharge laws fairly early in their histories: Rhode Island, New York, Maryland, and South Carolina.<sup>13</sup> These exceptions may also be consistent with the logic of a fresh start. As historian Peter Coleman notes, these

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<sup>10</sup> The discussion in this section draws from three sources. Most heavily, it draws from Peter Coleman’s highly regarded history of insolvency, imprisonment, and bankruptcy in colonial America. It also draws from historian Bruce Mann’s recent book on colonial America’s attitude toward debt and debtors, and it draws from David Skeel’s fascinating account of the century-long legislative struggle to establish a federal bankruptcy law.

<sup>11</sup> Thus, with regard to bankruptcy laws, the colonies acted like small, largely independent democratic countries with legislatures attuned to the needs of their respective citizenry, a fact that imperial authorities in Britain did not always care for but put up with nevertheless. Interestingly, this situation continued after independence because even though the Constitution gave the federal government the right to devise “uniform laws regarding bankruptcy,” no long-lasting federal bankruptcy law was devised until 1898. Thus, the states (and territories) continued to enact local bankruptcy laws to meet their own individual needs until the dawn of the 20<sup>th</sup> century.

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<sup>12</sup> The colonies tempered the adverse consequences of not having a discharge policy by modifying creditors’ rights. Many colonies passed laws that prevented creditors from immediately seizing the assets of borrowers in default. These “stay laws” gave insolvent debtors breathing room to meet their obligations. That way, if the reason for their inability to meet debt payments was temporary, they were not deprived of their assets. Also, during times of general colony-wide financial distress, many colonies passed laws that discharged the debts of people who were insolvent on a particular date. In this fashion, many colonies provided relief to debtors on an ad hoc basis without having an official discharge policy in place. See the article by Ian Domowitz and Elie Tamer for a description of how business conditions influenced bankruptcy legislation.

<sup>13</sup> Pennsylvania did not enact a discharge policy, but a discharge policy for the residents of the county of Philadelphia was enacted and allowed to stand for a brief period. New Jersey had a discharge policy in place during 1771-1787 but abolished it thereafter. Delaware did not permit discharge until 1900. Massachusetts, the place where America’s industrial revolution took root, enacted a discharge policy in the mid-19<sup>th</sup> century.

colonies stood out for being heavily commercialized. In these colonies we would expect a discharge policy to reflect the needs of entrepreneurs, a class of people for whom risk-sharing is more critical.<sup>14</sup>

After independence, the U.S. Constitution granted the federal government the right to enact a uniform bankruptcy law. But attempts to do so failed miserably for almost a century. Historians have puzzled over why it took so long for a bankruptcy bill to pass and what led to its passage and success in 1898. As with any other piece of legislation, special interest groups had a lot of influence in shaping the character of various bankruptcy bills. But because of the ubiquity of debt in early America, the fairness and practicality (or lack thereof) of any bankruptcy law became quickly apparent to people, and if the law performed poorly, it did not last.

Put differently, the economic logic of a fresh start was a constant reality check on the interest-group logic of relief laws passed by lawmakers.<sup>15</sup> It is significant that the 1898 bankruptcy bill – the one that eventually lasted long enough to become permanent – allowed U.S. states to have a say in local discharge policy. Thus, a discharge policy suited to local needs became possible, and the law itself found acceptance. It is perhaps also significant that by the end of the 19<sup>th</sup> century, America was no longer a nation of “rural shopkeepers, tidewater planters

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<sup>14</sup> It is important for entrepreneurs to be able to borrow in order to get a venture going. If the initial venture is successful, further expansion can be financed by borrowing against accumulated assets.

<sup>15</sup> Interest-group politics explains regulatory capture: how interest groups can use the law to their own benefit. It explains why regulation might end up serving the interests of the industry it regulates rather than the interests of society as a whole.

or backwoods farmers.” It was a nation where three-quarters of industrial output was generated in business corporations. The rise of corporations meant that ordinary people were much more likely to be wage earners and thus less reliant on credit to earn a living.

Now, at the start of the 21<sup>st</sup> century, the situation has changed. Once again, debt has assumed greater importance in the lives of ordinary people. People and businesses expect to buy and sell all manner of consumer goods and services on credit, a development

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that began with the proliferation of consumer durables in the 1920s, most notably automobiles. Thus, credit for ordinary people (consumer credit) has again become an integral part of our economic system, and, predictably, this development has led to dissatisfaction with the policy of discharging debts.<sup>16</sup>

The latest bankruptcy bill puts significant restrictions on who can avail themselves of the right to discharge.<sup>17</sup>

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<sup>16</sup> There are more subtle changes at work as well. Because fresh start is a form of insurance, the need for it is not as great if there are other forms of insurance available. Since the early 1940s, unemployment insurance has become widely available in the U.S., and this development makes people more willing to accept limits on discharge policy in return for an increased capacity to borrow. See the article by Kartik Athreya for more discussion of the interaction between unemployment insurance and fresh start.

<sup>17</sup> The Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 did more than just restrict access to discharge for above median-income households. See Loretta Mester's article for a comprehensive discussion of the reform (when the act was still in the proposal stage) and the empirical research on bankruptcy and credit that bears on it.

Recall that although a discharge policy is primarily meant to give the borrower an escape route if his or her capacity to repay is impaired, a lender must contend with the fact that a borrower might invoke discharge even when he or she has the capacity to repay. Indeed, the reason the creditor (in our example) had to restrict his lending to the debtor was to ensure that the debtor invoked discharge only when her capacity to repay was impaired. The latest bankruptcy bill is an attempt to relax this limitation on lending by

insisting that the debtor cannot invoke discharge if she has the capacity to repay. In this spirit, the law does not allow households with above-median income to invoke discharge. The result of the law will be to make more credit available at cheaper terms – something the average consumer presumably wants and will benefit from.<sup>18</sup>

## CONCLUSION


U.S. law gives individual debtors the right to petition a bankruptcy court and ask to be released from their financial obligations to creditors. This right is referred to as the law's fresh start provision – after a famous Supreme Court ruling that succinctly captured the basic reasons for having such a policy. As discussed at length in this article, the reasons fall into

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<sup>18</sup> My article with Dean Corbae, Makoto Nakajima, and Victor Rios-Rull examines this issue in a numerically specified model of the U.S. economy and concludes that restricting above-median-income households' access to fresh start will benefit the average U.S. household.

two categories. One justification for a discharge policy is that it eliminates the adverse effects that unrestricted creditor rights can have on an insolvent debtor's work incentives. A deeper justification is that a discharge policy provides a form of insurance benefit: The policy permits a debtor to not

repay his or her debts when doing so would be very costly. Of course, these benefits come at the cost of a reduced capacity to borrow. Perhaps the most important lesson to be gleaned from an understanding of the economic logic of a fresh start is that there are both costs and benefits of adopting a discharge

policy. Furthermore, there is nothing in the economic logic to suggest that the benefits necessarily exceed the costs. Indeed, the evolving calculus of costs and benefits may well account for Americans' changing attitudes toward the efficacy of a fresh start. 

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# The Industrial Revolution and the Demographic Transition

BY AUBHIK KHAN

I

n the 19<sup>th</sup> century, the United Kingdom began a period of economic transformation known as the Industrial Revolution. It's commonly believed that this era opened

as new inventions improved the technologies used to produce goods and provide services. However, we now know that such improvements affected only a relatively small part of the economy. Nonetheless, output rose during the first stage of the Industrial Revolution because of capital accumulation. One explanation for this increase in capital may be that another revolution occurred in Britain around the same time: the demographic transition. In this article, Aubhik Khan outlines some evidence on the Industrial Revolution and the demographic transition, then presents two economic theories that link the two phenomena.

In the 19th century, the United Kingdom began a period of economic transformation known as the Industrial Revolution. While the typical reader may think of Dickensian mills when hearing of the Industrial Revolu-



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charge at [www.philadelphiafed.org/econ/br/](http://www.philadelphiafed.org/econ/br/).

tion and of the end of a pastoral society, for most economists, the Industrial Revolution is associated with a change in the long-run or average rate of growth of per capita income. Also, in the 19th century, a steady rise in living standards began that has, in some sense, never ceased. As a result, people are now accustomed to economic growth. They expect it alongside the sometimes gradual, sometimes abrupt changes to the organization of industry and society associated with technological change.

Prior to the Industrial Revolution, the notion that there would be

an improvement in people's standards of living almost every year would be unfamiliar not only to laypersons, whether common people or the nobility, but also to economists working in that period.

It is commonly believed that the Industrial Revolution began as new inventions improved the technologies used to produce goods and provide services. However, there is a difficulty with this account: We now know that such improvements affected only a few sectors that represented a small part of the economy. In the absence of widespread improvements in technology, output rose during the first stage of the Industrial Revolution because of capital accumulation — that is, because there was an increase in the quantity of machines and tools available to each worker.

Why did society suddenly choose to increase capital at an increasing rate? One answer may be that another revolution occurred in Britain around the same time: the demographic transition. This demographic transition saw the rate of population growth in the United Kingdom first rise, and then later fall. During this period, adult mortality fell, then child and infant mortality, then finally fertility.

After presenting some evidence on the Industrial Revolution and the demographic transition, I present two economic theories that link the two phenomena. The first explains the slowdown in population growth as a result of technological progress. It represents the conventional view that the Industrial Revolution drove the demographic transition. An influential summary of this theory is contained in

the 2002 book written by Nobel laureate Robert E. Lucas. The second economic theory — which is part of my ongoing research with Michele Boldrin and Larry Jones — suggests that causality runs in the opposite direction. These different theories have different implications for how modern developing economies may improve their rate of growth. For example, to the extent that demographic transitions affect economic development, policy that reduces mortality and fertility may raise the level of economic development.

## THE INDUSTRIAL REVOLUTION

**Real Wages and Population Stagnated Until 1800.** Between 1250 and 1800 there was little sustained improvement in the British economy. The economic history of Great Britain over this period is reasonably well captured by a model originally developed by Robert Malthus.

Malthus's theory suggested an inverse relation between the real wage (the wage paid to laborers measured in terms of the goods it can provide) and population. This inverse relation stems from the value of labor. For example, when population was lower than its average level, labor would be relatively scarce. This would drive up real wages as landowners bid for scarce laborers. Increases in real wages would allow laborers to purchase more goods and services, including better food and shelter. Their standard of living would rise. This rise in living standards would also increase the number of children born that would survive into adulthood. This would move population back to its average level and reduce the scarcity of labor. As a consequence, landowners, no longer having difficulty operating their farms, would reduce the real wage back to its average level. The resultant decline in the living standards of workers would

end the growth in population.

Malthus's theory could explain the persistent rise in the real wage in England during the 15th and 16th centuries. Over this time the Black Death sharply reduced the number of laborers.<sup>1</sup> However, the theory also implied that society would always remain poor and that the “perfectibility” of society

conditions there was over the 500-year period. As stated above, the level of the real wage in 1390 is very close to that observed in 1740. Equally striking to someone living today is that there is little discernible difference in the population of England between 1350 and 1740. For comparison, the population of the United States was 248

**Malthus's theory suggested an inverse relation between the real wage (the wage paid to laborers measured in terms of the goods it can provide) and population.**

was infeasible. Whenever living conditions temporarily improved, population growth would bring them back down. This somewhat bleak outlook on life was consistent with the observation that the real wage was about the same in 1740 as it had been 350 years before.

Figure 1 is taken from the influential paper by Gary Hansen and Edward Prescott. It shows the population of England and the average real wage paid on farms from the end of the 13th to the middle of the 19th century. Over this period farm laborers had little to no assets, and they worked as many hours as their employers demanded, subject to their health. As a result, their real wage can be taken as a very good indicator of their real income.

What is striking from the figure, when viewed through the eyes of someone who lives in the 21st century, is how little net change in living

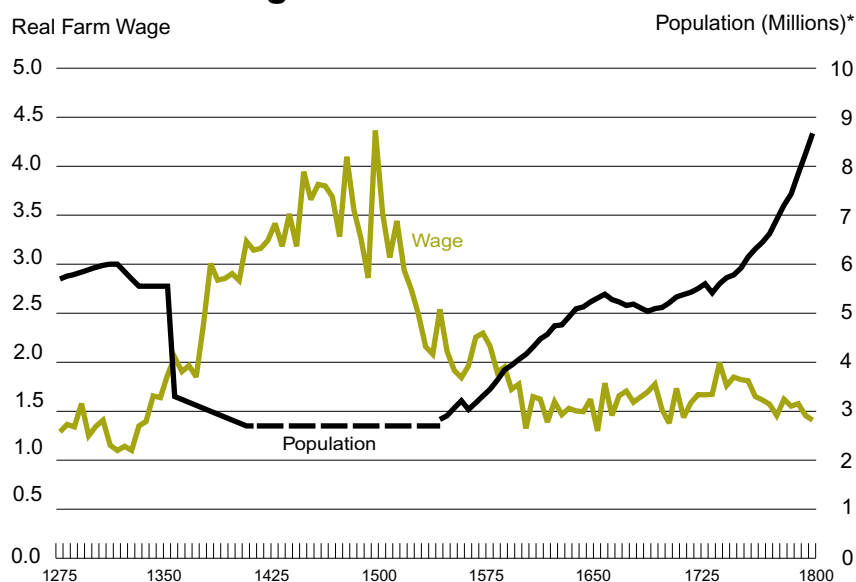
million in 1990, having almost doubled in the 50 years since 1940, when it was 132 million.<sup>2</sup>

The small overall changes in real wages and population provide support for Malthus's theory of a natural long-run level of population associated with a particular real wage. Furthermore, the rise in real wages in the 15th and 16th centuries, which occurred at the same time that periodic outbreaks of plague led to an extraordinary rise in mortality and reduction in population, is also consistent with the Malthusian view.

**After 1800 Both Real Wages and Population Grew.** This inverse relationship between real wages and population began to change around the beginning of the 19th century. Between 1780 and 1989, the real wage rose 22-fold. The English Industrial Revolution had arrived, bringing with it a sustained improvement in living conditions.

<sup>1</sup> Catastrophic outbreaks of plague afflicted the English periodically between the mid-14th century and the 17th century. One of these outbreaks, known as the Great Plague (1665-1666), is estimated to have cost between 75,000 and 100,000 lives in London, about one-fifth of the city's population.

<sup>2</sup> The population data, which include immigration, are taken from the U.S. census and are available at <http://www.census.gov/population/censusdata/table-2.pdf>.

**FIGURE 1****The English Economy: Population and Real Farm Wage**

\* Dashed line indicates missing data.

Source: Figure 1 in Hansen and Prescott (2002)

As we know, before the Industrial Revolution, there was little change in living standards. If we set the real GDP per person in Great Britain to 100 in 1566, it had risen to only 130 by 1806. This implies an annual rate of economic growth in income per person of 0.11 percent over a 240-year period. In other words, there was no discernible improvement, at least on average, in the quality of life for most people.

However, beginning in the early 19th century, growth rates began to rise. Between 1806 and 1906, income per person grew at an average of 0.9 percent a year, that is, more than eight times faster. From 1906 to 1990, income per person in the United Kingdom has grown at an annual rate of 1.5 percent a year. This is more than 13 times faster than the average growth rate between 1566 and 1806.

**Problems with the Technological Explanation.** In the traditional view, new inventions brought about

this new era of persistent growth. Examples include James Watt's improved steam engine, John Kay's fly shuttle, and James Hargreaves' spinning jenny. However, as famously argued by N.F.R. Crafts and C. Knick Harley, while these and several other well-known discoveries were applied to production in the 19th century, their impact was limited to just a few sectors in the economy in the early part of the Industrial Revolution.

Gregory Clark's quantitative assessment of the role of technological progress in the 18th century supports Crafts and Harley's view. To assess the impact of technological progress on the economy, we must break overall production per person into components that are attributable to capital, labor, and total factor productivity. This is the famous growth decomposition first used by Nobel laureate Robert Solow in his 1957 paper. Solow assumes that the output of goods and

services requires two inputs. The first is labor. The total quantity of labor used by a business is measured as the number of workers times the average hours worked by each. A rise in the quantity of labor, either because there are more workers or because they work longer hours, increases the total quantity of goods or services produced by the business. The second input is capital, the quantity of machines and buildings used to produce goods and services. An increase in capital means that more machines and buildings are used for a given method of production. The third component is a change in the method of production — that is, in the overall level of technology — and is called a change in total factor productivity. Inventions that allow more output to be produced without increasing the quantity of inputs lead to a rise in total factor productivity.

Gregory Clark extends the Solow method to include land as a factor of production. Separating out changes in output per worker between 1700 and 1861, he finds that total factor productivity growth shows little rise until the middle of the 19th century. This means that the role of discovery and innovation — that is, technological progress — in spurring the Industrial Revolution was relatively minor. Instead, for some reason, society as a whole began to invest more heavily in capital, that is, in machines. Since capital is accumulated by using current production to increase machines and buildings instead of consuming it, an increase in capital implies a rise in the savings rate.<sup>3</sup> I will discuss a possible reason for this change in the rate at which society saved output below.

<sup>3</sup>This is strictly true only for a country that can't borrow from abroad to finance investment. While there was international borrowing and lending in 18th century England, access to such funds was limited.

## THE DEMOGRAPHIC TRANSITION

Over the same two centuries associated with the English Industrial Revolution, there were dramatic changes in population growth and life expectancy driven by changes in the underlying factors that explain them: fertility and mortality. Population growth rose in England around 1700 and continued to rise until reaching a peak of 1.36 percent a year during the period 1791 to 1831. Looking across centuries, we find that between 1680 and 1820 the population of England increased 133 percent. Next, between 1820 and 1900 it rose another 166 percent. When compared with other large European nations, this represents a dramatic increase in population. For example, the corresponding increases in France were 29 percent and 26 percent (Figure 2).

Two economic historians, E.A. Wrigley and Robert Schofield, describe a famous finding in their 1981 book: Most of the increase in population was the result of a rise in fertility. We see little change in life expectancy between 1700 and 1870 largely because infant and child mortality did not fall until late in the 18th century. For example, the expected life span was 36.8 years between 1701 and 1711; 160 years later, between 1861 and 1871, it had risen to only 40.7 years. Notably, the mortality rates of people between the ages of five and 20 fell markedly over this period. For the years between 1735 and 1970, Figure 3 plots the fraction of children that survived to their fifth and 20th year of life.

Aside from the fall in child mortality, a dramatic rise in fertility occurred during this period. Over the 250 years before 1800, the crude birth rate (a measure of fertility) first fell, then rose. However, in 1796, at 35.51 births per 1000 people, it was no different from its level in 1551. Thereafter,

there is a notable increase in fertility until it peaks in 1821 at 40.22 births per 1000. Fertility remained high until the beginning of the 20th century when it began to decline, as mortality had done earlier.

These changes in fertility, mortality, and population growth are known as a demographic transition (Figure 4). A demographic transition involves four stages, broad patterns that social scientists have observed across countries. In the first stage, both fertility and mortality are high, and population growth is low. In the second stage, mortality begins to fall first, without a change in fertility. Population growth rises over this second stage. Over the third stage, fertility falls. In the fourth stage, both mortality and fertility settle at low levels, and population growth is once again low (although the level of population has now risen). The transition in England is exceptional in that the high initial level of fertility, rather than simply falling sometime after

the second stage, first rose only to fall much later on.

## THE LINK BETWEEN FERTILITY AND ECONOMIC GROWTH: TWO ECONOMIC THEORIES

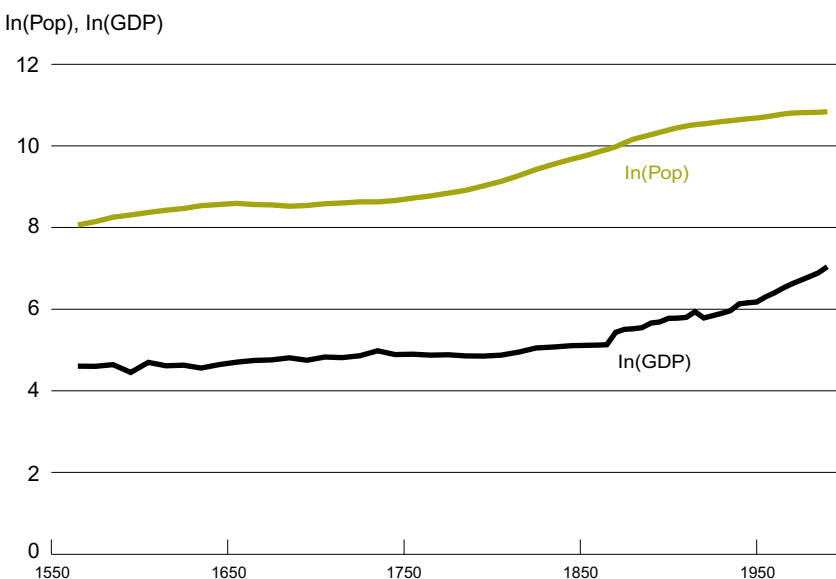
Economists and other social scientists have produced a huge literature about the Industrial Revolution. There is also a large body of work that studies the demographic transition. Here I discuss only economic theories that link the two events, and even then I discuss only one example of each of the two theories.

The first theory is by far the most commonly accepted, and I will call it the technology-led theory. This theory suggests that improvements in technology led to the Industrial Revolution and that the associated rise in the standard of living reduced mortality. Fertility fell as people began to invest in the quality of their children.

The second theory is relatively new and undeveloped and, therefore, is

FIGURE 2

### UK Population and GDP Per Capita, 1565 to 1990



Source: Boldrin, Jones, and Khan (2005)



far less widely accepted. It argues that the demographic transition preceded economic development and, moreover, was responsible for some of the improvement in living standards. I will call it the demography-led theory.

#### Economic Models of Fertility.

Both theories rely on an economic model of household fertility choice, a theory of how parents decide how many children to have. When studying fertility choices of households, economists assume that parents care about their children's happiness or welfare, as well as their own. With this assumption, economists have gained powerful insights about fertility choices by a household that wishes to maximize its welfare. The most famous proponents of this view are Robert Barro and Gary Becker, and I will describe a very simple version of the approach taken in their 1989 paper.

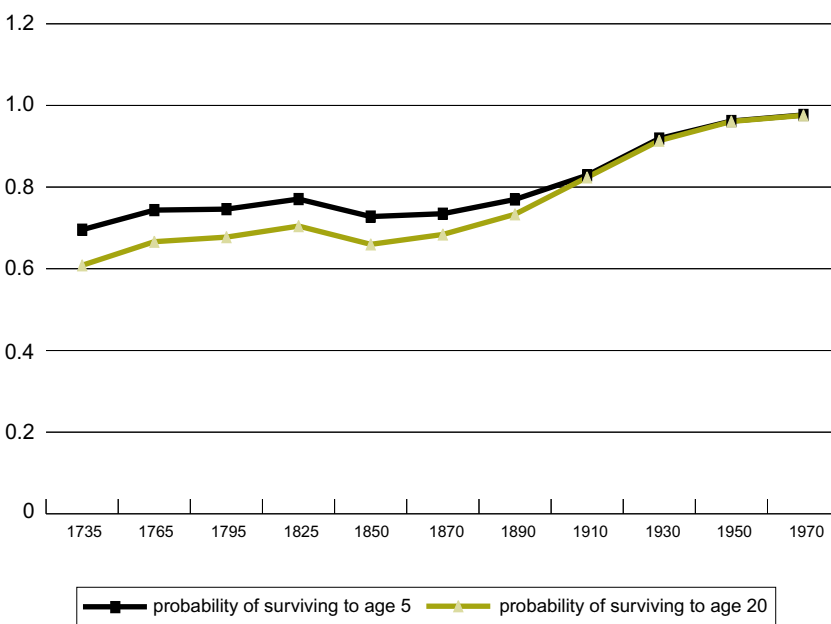
Barro and Becker developed a model in which parents care about both the number of children they have and the welfare of those children. At the same time, parents also value their own direct consumption of goods and services. Given their income and their time, they must trade off their own welfare from consuming goods against their welfare from having children, as well as their children's welfare.<sup>4</sup>

In applications of the Barro and Becker model to economic development, parents are able to affect the welfare of their children by investing in their education. Specifically, parents

<sup>4</sup> An alternative view of population growth is discussed by Stephen Parente and Edward Prescott in their chapter in the *Handbook of Economic Growth*. They argue that fertility choices are not made at the household level but at the societal level and that they are implemented through a range of policies that either promote or hinder families' choices about how many children to have. Parente and Prescott suggest that these policies arose because pre-industrial societies had to defend land.

## FIGURE 3

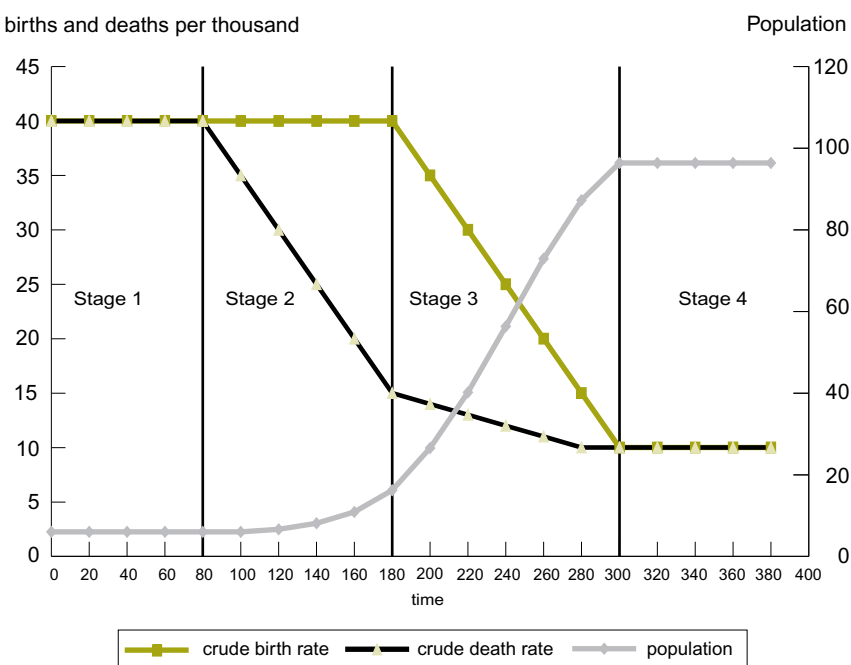
### English Survival Rates



Source: Boldrin, Jones, and Khan (2005)

## FIGURE 4

### A Stylized Demographic Transition



choose how much costly human capital to give to each child.<sup>5</sup> Higher levels of human capital, by increasing children's skills, allow them to earn more real income. This, in turn, enables them to raise their own consumption and thus their welfare. Thus, parents face two choices involving their children: They must decide how many children to bear, and they must determine the human capital investment in each child.

#### **Technology Leads Demography.**

The technology-led theory finds that improvements in technology increase the return to investment in human capital. Prominent examples of this theory are contained in the works of Gary Becker, Kevin Murphy, and Robert Tamura, and in the work of Lucas. Before the technological improvements that led to the Industrial Revolution were implemented, the return to investing in the human capital of each child was relatively low, at least given the costs, because the difference in the earnings of skilled and unskilled workers was small. However, the introduction of new technologies brought with it more complex methods of production, and total factor productivity increased. In such environments skilled workers became more valuable than they had previously been, and the wage premium paid to skilled workers rose.

The rise in the skill premium led those parents who could afford it to invest more heavily in the human capital of their children. Over time, improvements in income led to more and more parents being able to afford to educate their children. Both the rise in total factor productivity and the increase in human capital led to increases in the

real earnings of workers. Living standards improved. Moreover, the move to increased investment in human capital increased the cost of having children for parents. As a result, the number of children per family fell over time.

**Before the technological improvements that led to the Industrial Revolution were implemented, the return to investing in the human capital of each child was relatively low.**

It is convenient shorthand to describe children with a higher level of human capital as children with a higher skill quality.<sup>6</sup> According to economic theories of fertility, there is a tradeoff between the quality and the quantity of children a family has. The technology-led theory argues that new inventions moved families to increase quality at the expense of quantity and that this reduced fertility.

This conventional view can explain the fall in fertility that occurred at the end of the Industrial Revolution. However, a weakness is that it relies, to some extent, on the thesis that the Industrial Revolution was spurred by technological improvements. As I discussed above, there is some evidence to suggest that this was not initially true. It also suffers from another problem: Economic growth rose long before fertility fell.

#### **Demography Leads Technology.**

The demography-led theory centers on the effects of the fall in mortality, for children age five and above, that

began in the 18th century. Investing in a child's human capital will turn out to be a waste if he or she does not survive long enough to benefit from it. Thus, investment in human capital is very risky when childhood mortality is high. However, if children of school

age are likely to live on to adulthood, costly expenditures on their schooling become less risky.

The demography-led theory suggests that reductions in mortality for children age five and older increased the return to human capital investments for children, since, once they are old enough to receive formal education and specialized training in skills, they would also be more likely to live on to earn the higher wages of skilled workers. As before, this drives an increase in parents' investments in children and a reduction in fertility.

As more skilled workers are able to make better use of machines, increases in human capital raise the returns to investing in physical capital. At the same time, the higher earnings by households with skilled workers raise average household income. This allows for a rise in savings, which, in turn, funds physical capital investment in the economy. Driven by the rise in human capital and the resultant increase in income, the stock of physical capital grows. This availability of better equipment for skilled workers compounds the effects of the initial rise in human capital, and there is further accumulation of both human and physical capital.

<sup>5</sup>Economists use the term human capital to describe a worker's skills and ability. Investment in human capital is usually believed to be time-intensive and includes years spent in formal education as well as on-the-job training.

<sup>6</sup>Obviously, a person's quality can't be reduced to his or her skill level. Using the terminology of a quality/quantity tradeoff, however, places the family's problem in a familiar economic framework that allows for clarity of exposition.

The demography-led theory's appeal is that it doesn't rely on total factor productivity growth to explain the fall in fertility. However, it does not explain the reductions in mortality that occurred during the Industrial Revolution. These are explained implicitly by the technology-driven theory as the natural consequence of improvements in medical technology. Explaining them explicitly is more important for the demography-driven theory, since it relies heavily on changes in mortality. Another difficulty with the demography-led theory is that it is, as of yet, insufficiently developed to evaluate it against data.

Both the technology-led theory and the demography-led theory explain changes in growth and fertility through parents' decisions on how many children to have and how much to invest in their education, skills, and general well-being. Both emphasize the quality/quantity tradeoff. What distinguishes the two theories is why this tradeoff


changes. In the technology-led theory, improvements in technology raise the return to investment in the human capital of children. In the demography-led theory, this return rises because older children, who are the recipients of such investments, live longer. This increases the benefit they may expect from human capital investment.

## CONCLUSION

In the 17th and 18th centuries, Great Britain experienced an economic transformation, the Industrial Revolution, which began a period of economic growth and prosperity that defines the modern era. Standards of living that had fluctuated for hundreds of years now began to improve steadily.

Roughly over the same period, a demographic transition occurred. First, adult mortality fell; sometime later there was a decline in child and infant mortality. Fertility initially rose and then fell alongside mortality. These changes led to a sharp rise in popula-

tion growth rates, which subsided only after many decades.

Economic theory offers explanations that uncover the links between the Industrial Revolution and the demographic transformation. I have discussed two theories. The first, the technology-led theory, is widely understood and supported. The second, the demography-led theory, is relatively new. It has been developed partly in response to several difficulties with the technology-led theory. Most notably, the timing of events suggests some difficulty, though perhaps not an insurmountable one, in explaining the proposition that an increase in income led to a fall in fertility. The Industrial Revolution began at the end of the 18th century, but fertility did not fall until 100 years later. This timing is consistent with the demography-led theory, but a full evaluation of the relative merits of the two theories will require a more careful empirical examination. 

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# Human Capital and Higher Education: How Does Our Region Fare?

BY TIMOTHY SCHILLER

**T**he number of people with a college education in a given state or region varies across the nation. States in the Third Federal Reserve District (Pennsylvania, New Jersey, and Delaware) compare favorably with the nation on measures of college education, and the three states as a whole are close to the national average. Despite its average ranking in educational attainment, the area is a premier location for colleges and universities. In this article, Tim Schiller evaluates the region's standing with respect to college education by reviewing data on individual and social returns to education, looking at college education as a stimulant to local economic growth, and comparing the tri-state area with the nation as a source of and a destination for college graduates.

Human capital refers to the technical skills and knowledge acquired by workers. Education is an investment in human capital, that is, in the skills and knowledge that produce a return to the individual in the form of higher earnings. Education also has social returns or spillovers. The presence of educated workers in a region enhances the earnings of those who, regardless

of their own educational level, work with or near educated workers. This is especially true for spillovers from college-educated workers. Research shows that having large numbers of college graduates in a region increases that region's economic growth and that spillovers (also called externalities) are an important factor in generating more rapid growth. Aware of this connection, educators, state and local governments, and businesses around the country are making efforts to increase the educational attainment of their local work forces, especially the number of college graduates.

The number of people in a region who have a college education varies significantly across the nation. Parts of the three-state region (Pennsylvania,

New Jersey, and Delaware) compare favorably with the nation on measures of college education, and the three states as a whole are close to the national average. In spite of its average ranking in the nation, the region is one of the premier locations for college education. The area's colleges and universities are important sources of college-educated workers for the nation and the world. In evaluating the region's standing with respect to college education, we must consider its important role as a producer of college graduates as well as its role as a user of college-educated workers.

To help with this evaluation, I will review what we know about individual and social returns to education, look at college education as a stimulant to local economic growth, and compare our region to the nation as a source of, as well as a destination for, college graduates.

## EDUCATION: AN INVESTMENT IN HUMAN CAPITAL

Education represents an investment in the knowledge and skills that increase people's ability to earn. The cost consists of the direct outlays for education as well as the opportunity cost of forgone income during the time spent acquiring the education. The return is the increase in earnings that results. Economists have measured the return to education over many years and found that it increases steadily for each level of education attained.<sup>1</sup> Data from the U.S. Bureau of Labor



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charge at [www.philadelphiafed.org/econ/br/](http://www.philadelphiafed.org/econ/br/).

<sup>1</sup> See the articles by Jacob Mincer; Gary Becker; and James Heckman, Lance Lochner, and Petra Todd.



**TABLE 1****Unemployment and Earnings of Workers 25 Years and Older (2006)**

Education	Unemployment Rate Percent	Median Weekly Earnings Dollars
Doctoral Degree	1.4	1,441
Professional Degree	1.1	1,474
Master's Degree	1.7	1,140
Bachelor's Degree	2.3	962
Associate's Degree	3.0	721
Some College, No Degree	3.9	674
High School Graduate	4.3	595
Less Than High School Diploma	6.8	419

Source: Bureau of Labor Statistics

Statistics show that earnings rise and unemployment declines for each higher level of education (Table 1).

The economic importance of education has been growing. Even as the number of college graduates in the labor force has increased, the wage gap between these workers and those with less education has widened. The increased wage reflects an increase in demand that has been greater than the increase in supply. Firms have been investing in new technologies that require more workers with the education and skills to use them, and more and more of the nation's economic growth has been originating in sectors with high demand for skilled workers.<sup>2</sup> The investment in new technology could reflect firms' desire to take advantage of the increase in the supply of college-educated workers. Or it could be a result of the development of new

<sup>2</sup> See the article by Keith Sill.

general-purpose technologies, such as advances in computers and telecommunications, that either require or are most productively used by educated workers. In either case, the increasing premium for college-educated workers in the face of rising supply indicates that the growth in demand for college-educated workers has exceeded the growth in supply.

#### **EDUCATION SPILLOVERS AND REGIONAL ECONOMIC PERFORMANCE**

In addition to providing a return to the individual, investment in education results in spillovers that benefit others who work with or near individuals who have made the investment. Spillovers provide the economic justification for public subsidies for education and motivate community interest in improving the educational attainment of the population.<sup>3</sup> Since

<sup>3</sup> See the article by Robert Topel.

spillovers appear more likely to stem from college-educated workers than from those with less education, much of the economic research on spillovers has focused on the extent of college education among the population under study.<sup>4</sup>

Social interaction is the primary way in which spillovers occur, whether by chance or by plan. This interaction is most likely to lead to productive spillovers if it occurs in a work context. This context can be provided in a metropolitan area with a high concentration of firms in the same industry, and it can also be provided in an area with a diversity of industries.<sup>5</sup> In the first case, employees from different firms in the same industry can exchange ideas about new products and production methods more readily because of

<sup>4</sup> See the article by Susana Iranzo and Giovanni Peri.

<sup>5</sup> See the article by Gerald Carlino.

the dense concentration of employees who work in the same industry. In the second case, the diversity of industries allows ideas developed in one industry to be more widely disseminated to other industries, where the new ideas, perhaps with some modifications, can also be productively applied. In both cases, exchanges of information about productivity-enhancing possibilities are more likely in areas with greater population size, density, and industrial variety.

Innovation, spillovers, and improved productivity are more likely in metropolitan areas with large concentrations of workers with higher education. Empirical research supports this insight, demonstrating that earnings, which are based on productivity, are greater in metropolitan areas that have greater concentrations of college graduates. Research by Enrico Moretti estimates that a one-percentage-point increase in the supply of college graduates in a metropolitan area raises wages for workers in that area: 1.9 percent for high school dropouts, 1.6 percent for high school graduates, and 0.4 percent for college graduates.<sup>6</sup> Furthermore, research by Edward Glaeser and David Maré finds that growth in earnings appears to be more rapid in urban areas; an initial wage increase of about 7 percent when workers first move from rural to urban areas rises to an urban-rural difference of about 10 percent in three to five years.

By making workers more productive, education enables faster earnings growth for the educated individual. Additionally, various research studies

have revealed that areas with concentrations of educated residents are more likely to have faster growth in population, employment, and productivity than areas where college-educated residents are less concentrated.<sup>7</sup> Of course, college graduates are likely to relocate to obtain employment early in their careers; therefore, rapidly growing areas

number of college graduates would have a greater percentage of population with bachelor's degrees or higher.

The production of college graduates is notably evident in the Pennsylvania-New Jersey-Delaware region. A large number of colleges and universities produce large numbers of college graduates, although there is variation

## Pennsylvania ranks high among all states in the U.S. in the number of colleges and universities and in the number of degrees awarded, both absolutely and when adjusted for total state population.

are likely to attract them. Thus, there is a certain counterbalance between influences: Concentrations of college graduates influence growth, and growth influences the concentration of college graduates. I discuss this in more detail later when I talk about local area efforts to increase the college-educated shares of their populations.

### RAISING THE LEVEL OF EDUCATIONAL ATTAINMENT IN A REGION

As we have seen, college education is beneficial to the individual who possesses it. It also has spillover benefits for co-workers and residents of a region where large numbers of college graduates work and live. What are some of the factors that affect the educational attainment of an area's population? At first glance, it would seem that an area that produces a large

among the three states. Pennsylvania ranks high among all states in the U.S. in the number of colleges and universities and in the number of degrees awarded, both absolutely and when adjusted for total state population. New Jersey ranks somewhat above average on both measures absolutely, but below average when adjusted for total state population. Delaware ranks below average on both measures absolutely; however, when the measures are adjusted for total state population, the percentage moves above average in the number of degrees awarded but not in the number of institutions. (See Tables 2 and 3 for state data and rankings.)

Pennsylvania and Delaware "produce" more college graduates than they "consume," and New Jersey "produces" fewer graduates. That is, the total number of freshmen enrolled in Pennsylvania and Delaware is greater than the number of college freshmen among those states' population. (Pennsylvania and Delaware bring in some students from out of state.) The total number of freshmen enrolled in New Jersey is lower than the number of col-

<sup>6</sup> The increase in wages for college graduates is the net effect of two offsetting factors: spillovers, which raise wages, and the increase in supply of college graduates, which tends to reduce wages. The small positive net result indicates that the spillover effect slightly overcomes the supply effect.

<sup>7</sup> See the articles by Curtis Simon and Clark Nardinelli; Edward Glaeser, Jose Scheinkman, and Andrei Schleifer; James Rauch; and Christopher Wheeler.

**TABLE 2**
**Four-Year Colleges and Universities Relative to Total Population (2005)**

State	Institutions per 1,000 Population	State	Institutions per 1,000 Population
Vermont	0.0353	South Carolina	0.0092
District of Columbia	0.0272	Virginia	0.0091
South Dakota	0.0232	Alaska	0.0090
North Dakota	0.0188	Illinois	0.0088
Nebraska	0.0154	<b>Total</b>	<b>0.0087</b>
New Hampshire	0.0153	Wisconsin	0.0087
Iowa	0.0152	Arkansas	0.0086
Massachusetts	0.0152	Connecticut	0.0083
Maine	0.0151	Alabama	0.0081
Missouri	0.0145	North Carolina	0.0076
Minnesota	0.0131	Georgia	0.0074
West Virginia	0.0127	<i>Delaware</i>	0.0071
<i>Pennsylvania</i>	0.0120	Idaho	0.0070
Kansas	0.0117	Utah	0.0069
New York	0.0115	Mississippi	0.0068
Rhode Island	0.0112	Michigan	0.0068
Tennessee	0.0111	Maryland	0.0068
New Mexico	0.0109	Arizona	0.0067
Oregon	0.0107	Louisiana	0.0066
Oklahoma	0.0107	Washington	0.0065
Montana	0.0107	California	0.0064
Hawaii	0.0102	Florida	0.0062
Indiana	0.0099	Nevada	0.0054
Kentucky	0.0096	Texas	0.0048
Colorado	0.0094	<i>New Jersey</i>	0.0044
Ohio	0.0093	Wyoming	0.0039

Source: National Center for Education Statistics and Census Bureau

lege freshmen in the state's population. (On net, New Jersey residents go out of state for their college education.) The percentage breakdown is: Delaware enrolls about 20 percent more freshmen in total; Pennsylvania enrolls 10 percent more; and New Jersey enrolls

about 30 percent less.<sup>8</sup>

The region's production of college graduates is concentrated in certain metropolitan areas, such as Philadel-

<sup>8</sup> See the reference to the U.S. National Center for Education Statistics.

phia, State College, and Princeton, which is in the Trenton metropolitan area. These centers of education export their output to the rest of the world and, in this respect, are similar to some other well-known educational centers in the nation, such as Raleigh-

**TABLE 3**
**Bachelor's and Higher Degrees Awarded Relative to Total Population (2005)**

State	Degrees per 1,000 Population	State	Degrees per 1,000 Population
District of Columbia	38.69	Ohio	7.22
Massachusetts	12.56	Oklahoma	7.19
Rhode Island	11.39	West Virginia	7.14
Vermont	11.07	Virginia	7.10
Utah	10.45	Montana	6.99
North Dakota	10.42	Oregon	6.77
Nebraska	9.83	Louisiana	6.76
Missouri	9.57	Idaho	6.45
New York	9.53	Maine	6.36
<i>Delaware</i>	9.30	Kentucky	6.24
Iowa	9.26	Washington	6.23
<i>Pennsylvania</i>	9.02	North Carolina	6.23
Minnesota	8.64	Tennessee	6.18
New Hampshire	8.56	Hawaii	6.00
Arizona	8.54	California	5.99
Kansas	8.40	South Carolina	5.90
Illinois	8.40	New Mexico	5.77
Colorado	8.20	Georgia	5.72
South Dakota	8.10	Texas	5.67
Indiana	8.10	Mississippi	5.66
Michigan	7.77	Florida	5.43
Connecticut	7.74	<i>New Jersey</i>	5.43
Wisconsin	7.57	Arkansas	5.32
Alabama	7.30	Wyoming	4.57
<b>Total</b>	<b>7.25</b>	Nevada	3.29
Maryland	7.23	Alaska	3.17

Source: National Center for Education Statistics and Census Bureau

Durham and Boston. Like these other areas, the centers of higher education in the region do not obtain all of their “raw material” locally, nor do they “consume” all of their “finished products” locally. For example, Pennsylvania imports a significant portion of

the raw material for producing college graduates — it has the second highest number of enrolled college freshmen from out of state — and the college graduates, the “finished products,” are re-exported. Delaware also re-exports college graduates, but a much smaller

number than Pennsylvania.

As the data described earlier demonstrate, Pennsylvania produces a large number of college graduates. Because Pennsylvania supplies workers with undergraduate and advanced degrees for the nation and many foreign



countries, it is not surprising that it does not retain a large share of them. Indeed, only four of the top 10 states ranked by degrees awarded (adjusted for total population) also rank among the top 10 states in the percentage of population with a bachelor's degree or higher. This fact suggests that there is not a strong relationship between the number of degrees awarded in a state and the proportion of the state's population holding degrees. Empirical research supports this impression. One statistical estimate indicates that the percentage increase in a state's college-educated population will be only about one-third of the percentage increase in its production of college graduates in the long run.<sup>9</sup> Obviously, merely producing college graduates in a state does not guarantee that they will remain there.

#### ATTRACTING GRADUATES: AMENITIES AND JOBS

If producing college graduates in a state does not result in a commensurate increase in college graduates among that state's population, we need to look beyond the supply side to find ways to increase the number of college graduates in a state or a metropolitan area's population and labor force.

If we look beyond the supply side, what do we observe on the demand side? The importance of the demand side can be clearly seen within our region in the contrast between New Jersey and Pennsylvania. New Jersey is the leading state in providing college freshmen to other states, but the high percentage of college graduates among its population indicates that New Jersey attracts college graduates even if many of them have been educated outside the state.

<sup>9</sup> See the article by John Bound, Jeffrey Groen, Gabor Kezdi, and Sarah Turner.

States and metropolitan areas seeking to increase their college-educated populations need to consider two major aspects of the demand side: the amenity aspect, which relates to which features of an area are attractive to college graduates, and the economic aspect, which relates to which areas have high demand for college-educated workers. The amenities most promi-

### Large metropolitan areas are more likely than small ones to possess the amenities and economic prospects that attract college graduates.

nently highlighted by survey research and analyses of population movements are those associated with cultural and recreational opportunities and warm, dry climates.<sup>10</sup> The economic aspect is related to job opportunities and salaries.

Various studies around the country have identified specific examples of these two aspects that are important to college graduates. A survey of Philadelphia-area college graduates discovered that the availability and affordability of housing are features of the area that are important to graduates who remain here; geographic location, job opportunities, recreation, and climate are features that are important to graduates who leave the area.<sup>11</sup> These results match those of surveys conducted in other states and metropolitan areas.<sup>12</sup> They are also consistent with research on college graduates' interstate

<sup>10</sup> See the article by Richard Florida.

<sup>11</sup> See the reference to the Knowledge Industry Partnership.

<sup>12</sup> See the publication by Carnegie Mellon University.

moves, which reveals that they tend to leave states that have low employment growth, high unemployment, or low pay and move to states that score higher on one or more of these measures, with net migration to the South Atlantic and Mountain states.<sup>13</sup>

Large metropolitan areas are more likely than small ones to possess the amenities and economic prospects

that attract college graduates. Data for metropolitan areas indicate that the percentage of the population with a bachelor's degree or higher is greater in large metropolitan areas throughout the nation than it is in small areas. This is true for the three-state region. Four of the 21 metropolitan areas that are wholly or partially in the region have above-average percentages of population with a bachelor's degree or higher. Two of these are among the largest: the New York metropolitan area, which includes northern New Jersey, and the Philadelphia metropolitan area (Table 4). These two metropolitan areas are economically diverse, and many firms that need college-educated workers are located there. The other two areas, which are the highest ranked by this measure among areas in the three-state region, are State College, PA, and Trenton, NJ. In both of these areas, colleges and universities make up a large portion of the employment base, and the large share of faculty and students among the areas' populations boosts

<sup>13</sup> See the article by Yolanda Kodrzycki.

**TABLE 4****Percent of Population 25 Years and Older with a Bachelor's Degree or Higher (2005)**

Metropolitan Area	Percent
State College, PA	40.2
Trenton-Ewing, NJ	37.7
New York-Northern New Jersey-Long Island, NY-NJ-PA	34.8
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	31.7
<b>Total U.S. Metropolitan Area Population</b>	<b>30.1</b>
Harrisburg-Carlisle, PA	28.1
Pittsburgh, PA	27.1
Ocean City, NJ	26.3
Allentown-Bethlehem-Easton, PA-NJ	25.0
Erie, PA	24.2
Atlantic City, NJ	23.9
Lancaster, PA	23.0
Reading, PA	21.4
Scranton-Wilkes-Barre, PA	20.9
York-Hanover, PA	19.2
Lebanon, PA	18.9
Johnstown, PA	17.9
Dover, DE	17.6
Youngstown-Warren-Boardman, OH-PA	17.3
Williamsport, PA	16.9
Altoona, PA	15.8
Vineland-Millville-Bridgeton, NJ	15.7

Source: Census Bureau

their percentage of college-educated residents. "College town" metropolitan areas rank high among all areas in the region by percentage of the population with a bachelor's degree, as such towns do throughout the nation.

The high proportion of college graduates in the New York-Northern New Jersey metropolitan area clearly drives up the statewide proportion,

demonstrating the influence of both the amenity and economic aspects of demand. (The availability of some amenities, especially cultural ones, not only results from the concentration of college graduates but fosters such concentrations as well, because concentrations of college graduates constitute a large market for cultural amenities, which, in turn, attracts providers of

such amenities.) The area provides cultural and recreational amenities, and its concentrations of industries with large and growing needs for college-educated workers provide the economic aspect, serving as sources of demand for college graduates.

The Philadelphia metropolitan area serves a similar role at the other end of New Jersey and for southeastern Pennsylvania. In fact, the Philadelphia area has the high percentage of college graduates that is typical of large metropolitan areas (Table 5). But it does not figure as prominently in the statewide picture in Pennsylvania as the New Jersey portions of the New York-Northern New Jersey and the Philadelphia metropolitan areas do in New Jersey. Consequently, the statewide percentage in Pennsylvania is near the national average, while the New Jersey statewide percentage is above it.

If we examine the demand for college graduates as indicated by employment growth, the data indicate that job growth for occupations that typically require a college education has been slower in Pennsylvania than in the nation for several years, while it has been faster in New Jersey.<sup>14</sup> These occupations are those in management, business and finance operations, computers and mathematics, architecture and engineering, sciences, community and social service, legal, education, arts and media, and health care. Obviously, many of these occupations are more in demand in urban areas than in rural areas. New Jersey, being more densely urbanized than Pennsylvania, will therefore have a greater base of demand for these occupations, but the difference in growth rates is striking. From 1999 (when current occupational definitions were established) until

<sup>14</sup> See the 2007b reference to the U.S. Bureau of Labor Statistics.

**TABLE 5**

### Percent of Population 25 Years and Older with a Bachelor's Degree or Higher (2005) Ten Largest Metropolitan Areas

Metropolitan Area	Percent
Washington-Arlington-Alexandria, DC-VA-MD-WV	45.9
New York-Northern New Jersey-Long Island, NY-NJ-PA	34.8
Atlanta-Sandy Springs-Marietta, GA	34.3
Chicago-Naperville-Joliet, IL-IN-WI	32.1
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	31.7
<b>Total U.S. Metropolitan Area Population</b>	<b>30.1</b>
Dallas-Ft. Worth-Arlington, TX	30.0
Los Angeles-Long Beach-Santa Ana, CA	29.4
Houston-Sugar Land-Baytown, TX	27.8
Miami-Ft. Lauderdale-Miami Beach, FL	27.5
Detroit-Warren-Livonia, MI	26.4

Source: Census Bureau

2006, employment in these occupations increased 13 percent in New Jersey compared with 4 percent in Pennsylvania (the national increase was 6 percent).<sup>15</sup> Although Pennsylvania produces large numbers of college graduates, slow job growth for college graduates in the state reflects, at least in part, a relatively weaker demand for them. New Jersey's demand for college graduates brings them into the state (for the first time or as returning residents) even if they did not receive their college education there.

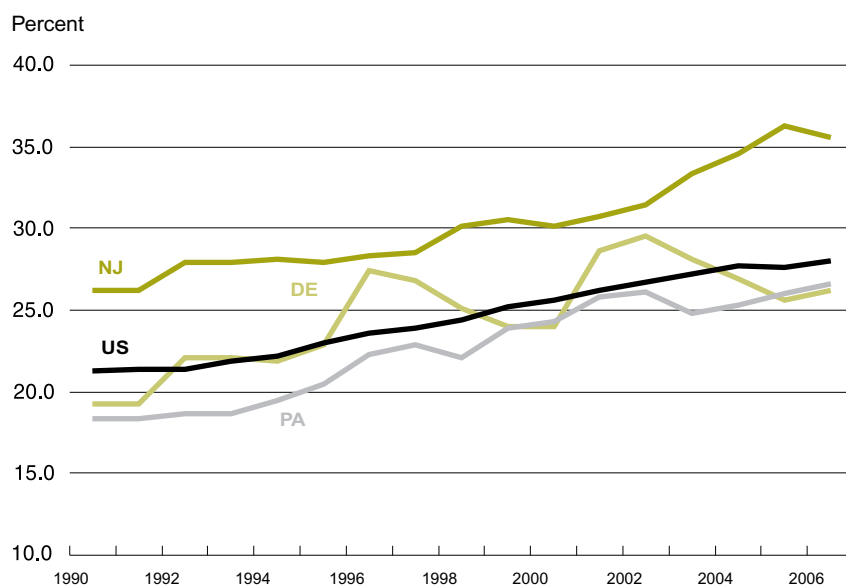
### REGIONAL EFFORTS TO BOOST THE COLLEGE-EDUCATED POPULATION

The gap between a college graduate's income and the income of someone who hasn't completed college has been increasing, and the percentage of the population with a bachelor's degree or higher has been rising for many years throughout the country. In the past decade and a half, educational attainment, by this measure, has increased somewhat more in Pennsylvania and New Jersey than in the nation, but it has slipped slightly in Delaware (see the Figure). Despite the general increase in the proportion of the population with a college education, there is still a great deal of variation in this measure around the nation (Table 6). Consequently, regional variations in educational attainment are increasingly influencing regional variations in income.

The positive impact of an educated population on regional income and economic growth is well known to governments, businesses, and civic groups around the country, and they are making efforts to attract and retain college students and graduates. This is not an easy task, since recent college

**FIGURE**

### Percent of Population 25 Years and Older with Bachelor's Degree or Higher



Source: Census Bureau

<sup>15</sup> Data on occupational employment for Delaware are not complete for these years.

**TABLE 6****Percent of Population 25 years and Older with a Bachelor's Degree or Higher (Ranked in 2006)**

State	2006	2000	1990	State	2006	2000	1990
District of Columbia	49.1	38.3	33.3	New Mexico	26.7	23.6	20.4
Massachusetts	40.4	32.7	27.2	<i>Pennsylvania</i>	26.6	24.3	17.9
Colorado	36.4	34.6	27.0	<i>Delaware</i>	26.2	24.0	21.4
Connecticut	36.0	31.6	27.2	Michigan	26.1	23.0	17.3
Maryland	35.7	32.3	26.5	North Carolina	25.6	23.2	17.4
<i>New Jersey</i>	35.6	30.1	24.8	Texas	25.5	23.9	20.4
Vermont	34.0	28.8	24.3	South Dakota	25.3	25.7	17.2
Minnesota	33.5	31.2	21.9	Idaho	25.1	20.0	17.7
Hawaii	32.3	26.3	22.9	Montana	25.1	23.8	19.8
New York	32.2	28.7	23.1	Iowa	24.7	25.5	16.9
New Hampshire	32.1	30.1	24.3	Wisconsin	24.6	23.8	17.7
Virginia	32.1	31.9	24.5	Arizona	24.5	24.6	20.3
Kansas	31.6	27.3	21.1	Missouri	24.3	26.2	17.8
Washington	31.4	28.6	22.9	Ohio	23.3	24.6	17.0
Illinois	31.2	27.1	21.1	Oklahoma	22.9	22.5	17.8
Rhode Island	30.9	26.4	21.3	South Carolina	22.6	19.0	16.6
California	29.8	27.5	23.4	Tennessee	22.0	22.0	15.9
North Dakota	28.7	22.6	18.0	Indiana	21.9	17.1	15.6
Oregon	28.3	27.2	20.6	Louisiana	21.2	22.5	16.1
Georgia	28.1	23.1	19.3	Mississippi	21.1	18.7	14.8
<b>U.S.</b>	<b>28.0</b>	<b>25.6</b>	<b>20.3</b>	Alabama	20.8	20.4	15.6
Alaska	27.7	28.1	23.0	Nevada	20.8	19.3	15.3
Florida	27.2	22.8	18.3	Wyoming	20.8	20.6	18.8
Nebraska	27.2	24.6	19.0	Kentucky	20.2	20.5	13.6
Utah	27.0	26.4	22.2	Arkansas	19.0	18.4	13.4
Maine	26.9	24.1	18.8	West Virginia	15.9	15.3	12.3

Source: Census Bureau



graduates are among the most mobile sectors of the population. States and cities are using a variety of methods to increase enrollment at colleges and universities in their areas and to retain graduates.<sup>16</sup> These methods include scholarships, marketing efforts, and internships, among others. Programs at the state and local levels around the nation as well as in the region foster internships, collaboration between colleges and industry, and new business formation focused on college graduates.<sup>17</sup> The Philadelphia Knowledge Industry Partnership is spearheading efforts in the Philadelphia region, and there are programs in other large cities in the District.

It is important for regional efforts aimed at increasing the number of college-educated workers to concentrate on the economic aspect of the demand side by encouraging job growth focused on industries and occupations that use college graduates. This is clearly evident in our region: New Jersey ranks high in college graduates, attracting them from out-of-state colleges as its highly educated labor force grows. Demographic studies and surveys both


show that job opportunities are powerful determinants of college graduates' location decisions, especially for those more inclined to move from one area to another; so it makes sense to focus efforts to attract college graduates on this factor.

Programs that succeed in attracting and retaining college graduates can benefit the regions that undertake them. But promoters of such programs must keep in mind that some areas, such as those in the regions mentioned earlier, are — and are likely to remain — exporters of college graduates, with the associated relatively low retention rate. Nevertheless, colleges and universities that send a relatively large share of their graduates elsewhere still provide several important benefits to the local economy.<sup>18</sup> The college itself is a source of employment. Both students and faculty raise the educational attainment level of the local population (demonstrated in our region by the high percentage of college-educated residents in the State College, PA, and Trenton, NJ areas). The area can also serve as a source of supply of college-educated workers for local employers, even if most graduates go elsewhere.

But it is perhaps more appropriate to view these areas as export centers,

rather than local sources of supply and, in turn, to view the region in which they are located as an import destination. If we view the situation in this way, raising the percentage of the college-educated population in the region would best be accomplished by raising demand for college graduates — primarily by stimulating growth of jobs requiring a college education (or higher), not by raising supply through efforts narrowly aimed at retaining or attracting college graduates.

## CONCLUSION

Education is an investment in human capital that pays individual and social dividends. The percentage of an area's population that has a bachelor's degree or higher is positively associated with the area's total income and growth. Recognizing this, civic leaders in many areas of the country, including our region, are making efforts to attract and retain college graduates. Research shows that employment opportunities are a key element for successful attraction and retention efforts. Thus, programs to boost the college-educated population should not be narrowly focused on the education sector but should include broader efforts to boost employment growth, especially for occupations and industries that require workers with bachelor's degrees and higher. 

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<sup>16</sup> See the article by George Smith.

<sup>17</sup> See the references to the Pennsylvania Economy League and the Knowledge Industry Partnership.

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<sup>18</sup> See the reference to the Federal Reserve Bank of Atlanta.

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# Recent Developments in Consumer Credit and Payments

BY MITCHELL BERLIN

**O**n September 20-21, 2007, the Research Department and the Payment Cards Center of the Federal Reserve Bank of Philadelphia held their fourth joint conference to present and discuss the latest research on consumer credit payments. Approximately 75 participants attended the conference, which included six research papers on topics such as liquidity constraints, the rise in bankruptcy, and the financial mistakes made by credit card holders. In this article, Mitchell Berlin summarizes the papers presented at the conference.

In his opening remarks at the conference, Charles Plosser, president of the Federal Reserve Bank of Philadelphia, noted that innovation in electronic payments has led to major changes in the financial industry. The process of innovation has allowed new entrants into the industry, expanding the availability of consumer credit and permitting more opportunities for smoothing consumption over time. Plosser reminded conference participants that rapid growth in in-

novation often leads to excesses and mistakes and that progress is necessarily uneven. He stressed that the Fed's mandate is to evaluate innovations in the context of economic efficiency, effective monetary policy, and an efficient payments system. This mandate provides the rationale for this conference, which brought together researchers whose papers address fundamental issues about consumer credit.

## LIQUIDITY CONSTRAINTS

In the first paper, **Jonathan Levin** of Stanford University reported the results of a study (with **William Adams** and **Liran Einav**) that provided evidence for the economic significance of liquidity constraints in the market for subprime auto loans. The authors also sought to uncover the underlying sources of these constraints. Broadly, liquidity constraints refer to limits on an individual's ability to

borrow because of various frictions in credit markets, especially those due to incentive problems that arise when borrowers are better informed than lenders about their risk of default. When such borrowing limits are significant, an individual's ability to make purchases depends heavily on his or her cash on hand.

Levin and his co-authors examined a sample of applications for loans at a large subprime auto lender between June 2001 and December 2004. In addition, they examined the details of the loan contracts for the applications that were accepted and the repayment history on all loans through April 2006.

First, they examined general borrowing patterns for evidence of liquidity constraints. They found that 44 percent of car buyers made the minimum down payment; that is, a large share of buyers borrowed no more than the absolute minimum, even though a higher down payment would have reduced their loan rate significantly. Strikingly, the authors found that both applications and sales revealed a marked spike in February. Levin explained that February is the time of year when consumers receive tax rebates and have more cash on hand to make a purchase.<sup>1</sup> When the authors split their sample into customers who were eligible for the earned income tax credit and those who weren't, the February spike remained only for those who were eligible. This provided fur-



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available free of charge at [www.philadelphiafed.org/econ/br/](http://www.philadelphiafed.org/econ/br/).

<sup>1</sup>He noted that this explanation for the time-of-year effect was actually provided by the subprime lender.

ther support for the tax rebate explanation for the spike in the data.

Levin and co-authors then turned to formal econometric tests for evidence of liquidity constraints. They estimated the distinct effects of higher loan payments (measured by a higher car price) and of higher minimum down payments on customers' probability of purchasing. Levin and co-authors argued that a customer who is not liquidity constrained would care only about the present value of total loan payments: A dollar spent today to cover the down payment should have the same effect on the borrower's purchasing decision as an appropriately discounted dollar spent tomorrow to repay the loan. On the contrary, they found that a \$100 increase in the minimum down payment had the same effect on the probability of purchase as a \$900 increase in the car price, evidence that purchase decisions were strongly affected by customers' ability to come up with the initial cash. Levin and co-authors argued that the alternative explanation — that customers discount future car payments at an annual rate of 427 percent — was implausible.

Next, the authors tried to uncover the underlying sources of liquidity constraints, in particular, the relative effects of *adverse selection* and *moral hazard*. The authors defined adverse selection as the tendency for borrowers who have a higher risk of default to take out larger loans, while they defined moral hazard as the tendency for borrowers with larger loans to default more often.<sup>2</sup> In either case, contracting is made more difficult when the borrower is better informed than the lender about his or her risk of default.

<sup>2</sup> Note that, in this context, both adverse selection and moral hazard operate through the size of the borrower's loan.

To disentangle the effects of adverse selection and moral hazard, the authors first estimated a Tobit model of customers' desired down payment and found that observably riskier customers — for example, customers with low credit scores or lower incomes — had a

## Levin and co-authors suggested that improvements in credit rating technologies probably played an important role in the strong growth of subprime markets in the 1990s.

lower desired down payment, a finding consistent with adverse selection.

The authors then estimated the effect of larger loan size on the probability of default. They argued that this effect includes both moral hazard — the higher probability of default due to larger loan size — and adverse selection — the tendency for riskier borrowers to take out larger loans. The authors proposed the following procedure to disentangle these effects.

Since the explanatory variables used to estimate customers' desired minimum down payment included most of the observable factors that a lender would use to estimate a borrower's risk, the authors argued that the residual from the Tobit regression was a measure of the borrower's private information, including the borrower's private information about his or her probability of default.<sup>3</sup> This residual could then be included along with the loan size (and other control variables) in a regression that explained the probability of default; the authors interpreted the coefficient on loan size as the

<sup>3</sup> In this context, the residual refers to the portion of the customer's down payment decision that can't be explained by factors that the researcher can observe and include in the regression, such as the customer's FICO score.

moral hazard effect and the coefficient on the residual as the adverse selection effect. Regression results provided evidence for both adverse selection and moral hazard but showed that moral hazard was twice as important quantitatively.

Their regressions also showed that the customer's FICO score had a very strong relationship to the probability of default; that is, observing the borrower's credit rating provided lenders with a lot of information about borrower risk. Levin and co-authors suggested that improvements in credit rating technologies probably played an important role in the strong growth of subprime markets in the 1990s.

## THE RISE OF HOUSEHOLD BANKRUPTCY

The next speaker, **Borghana Narajabad** of Rice University, discussed the results of his work on the underlying causes of the increase in consumer bankruptcies in the mid-1990s. He argued that prior research had failed to adequately explain why the rise in bankruptcies coincided with other developments in credit markets. In particular, the 1990s had also witnessed a significant rise in credit card debt and usage and increased variation in credit terms offered to customers. His theoretical model was designed to yield these empirical predictions in addition to the rise in bankruptcies. According to Narajabad's explanation, an improvement in lenders' screening technology permitted them to better differentiate high-risk from low-risk

borrowers. In turn, lenders could profitably offer more credit to all borrowers, but it was profitable to provide the largest increases in credit limits to lower risk borrowers. Also, the general increase in the availability of credit increased both credit card usage and the number of bankruptcies.

The main elements of Narajabad's stylized theoretical model were: (i) individuals have the need for credit to cover their consumption needs for an uncertain amount of time; (ii) they are differentiated according to the risk that their income would remain low for a long time; (iii) individuals know more about their underlying risk than lenders; (iv) borrowers have an incentive to default on loans when the debt burden is large compared with their costs of defaulting; and (iv) at some cost, lenders can screen borrowers and become better informed about the borrower's risk type.

Outlining the underlying logic of his model, Narajabad first analyzed the borrowing decision. He explained that the amount borrowed in each period prior to the (uncertain) time when the borrower could repay was determined by the following marginal condition. The marginal utility of higher consumption financed by borrowing must equal the marginal cost of borrowing. This marginal cost has two elements: first, the loss of future borrowing capacity as the borrower moved nearer to his or her credit limit and, second, the higher debt payments once the borrower has the capacity to repay.

From this marginal condition, Narajabad showed that the model generated two of the patterns observed in the data. The model predicted that an increase in the credit limit would lead to an increase in borrowing, mainly because the constraint on future borrowing capacity is relaxed when the credit limit is increased. The model also predicted a rise in bankruptcies

with an increase in borrowing limits. Since a borrower can reach the credit limit before having enough income to repay existing loans, he or she may choose to default if the debt load is sufficiently high.

Turning to the lender's decision, Narajabad explained that his model predicted that an improvement in the lender's screening technology induced lenders to increase borrowers' credit limits, with a disproportionate increase in the credit limits for lower risk borrowers. Thus, the model explained the increased variation in credit terms observed in the data.

Narajabad then turned to a quantitative exercise to see how well the model actually matched the data. The estimation technique seeks to match selected statistics describing consumer use of credit cards in the 1990s, as measured by the Survey of Consumer Finances from 1992 and 1998. These statistics included the ratio of credit limits to income in both years, the ratio of credit card debt to income in both years, default rates for 1992, and the variance of credit limits in the two years. Narajabad explained that he explicitly chose not to match default rates in 1998 when he estimated the model. The model's ability to match the actual rise in defaults would be an important test of its success.

Narajabad concluded that the model was broadly successful in matching the data. He found that the model could generate approximately one-third of the increase in defaults from 1992 to 1998. Narajabad also explained that his model rejected alternative explanations for the increase in bankruptcies. A reduction in the stigma attached to filing for bankruptcy predicts a counterfactual decline in credit to higher risk borrowers, while a reduction in the transaction costs of lending does not predict the greater variation in credit limits across different customers.

## WHO MAKES MISTAKES?

**Barry Scholnick** of the University of Alberta discussed the results of his study (with **Nadia Massoud** and **Anthony Saunders**) of financial mistakes made by credit card holders. They examined the prevalence of certain types of mistakes, as well as the types of customers who made these mistakes. The main question motivating their study was whether mistakes were made predominantly by wealthy customers, who might make mistakes because the impact on their total wealth is trivial, or by poor and less educated customers, who might make mistakes because of a lack of financial sophistication.

Scholnick and his co-authors constructed a database extending from December 2004 to June 2006 that combined: (i) confidential data (from a Canadian bank) about individual cardholders that included customers' credit card accounts, deposit accounts, and credit scores; (ii) demographic information about the individuals in a customer's postal code, which the authors used as a proxy for the individual customer's demographic traits;<sup>4</sup> and (iii) information about residential property transactions in the postal code. Scholnick emphasized the unique features of this data set. The small number of households in the Canadian postal zones (approximately 200) minimizes the measurement error created by using an aggregate in place of the individual's actual wealth.<sup>5</sup> Furthermore, monthly data on customer balances provided a detailed picture of the evolution of customers' liquid wealth holdings over time. The authors viewed the comprehensiveness and

<sup>4</sup> To protect customers' privacy, the bank identified customers' postal zones but not their addresses.

<sup>5</sup> By comparison, U.S. ZIP codes have 10,000 households.



detail of this data set as one of the paper's main contributions.

The authors considered four types of mistakes: a cash advance, a delinquent payment, a transaction that exceeds the credit limit, and a simultaneous delinquency and overlimit in a single month. These mistakes range from frictional to moderately consequential. The cash advance triggers only a moderate fee, while the other mistakes may affect a consumer's credit report in addition to triggering a fee. In each case, the authors considered the transaction a mistake only if the customer had adequate bank balances to avoid the penalty, for example, if the customer could have avoided a delinquency by making a payment from a deposit account.<sup>6</sup>

The authors showed that a significant fraction of total transactions were mistakes. For example, while delinquencies occurred in 10.3 percent of observations, mistakes accounted for 4 percent of the observations (adjusting for precautionary balances). In addition, they found that consumers make consequential mistakes more often than frictional mistakes. The authors argued that this provides evidence that the mistakes were not caused by rational inattention. If customers were simply not paying attention because it was not worth their time, the authors expected frictional mistakes to be made more often than more costly mistakes.

The authors then turned to the question: Who makes credit card mistakes? The authors estimated panel logit regressions for 75,000 customers, a separate one for each

type of mistake and for each definition of precautionary cash balances. In general, the authors found that less wealthy cardholders were more likely to make mistakes. More specifically, renters were significantly more likely to make mistakes than homeowners, and individuals with more business and investment income were, for the most part, significantly less likely to make mistakes. Those individuals with

## Consumers make consequential mistakes more often than frictional mistakes.

a larger share of total income derived from government payments — another indicator of lower wealth — were more likely to make mistakes. Scholnick argued that these results were not consistent with the view that mistakes were mainly committed by wealthier customers, rationally allocating their attention.

Although individuals with higher assessed risk were more likely to make mistakes, the authors found no evidence that mistakes were associated with subsequent defaults. Since mistakes typically trigger fees, the authors argued that this result is inconsistent with bankers' claims that fees are assessed to compensate the bank for defaults.

### THE AGE OF REASON

John Driscoll of the Federal Reserve Board reported on recent research (with Sumit Agarwal, Xavier Gabaix, and David Laibson) that explored the pattern of financial decision-making over an individual's lifetime. He and his co-authors found that across a wide range of financial

transactions, the quality of financial decisions followed a U-shaped pattern; that is, financial decision-making improved until an individual reached his or her 50s and then declined as he or she aged. Driscoll and his co-authors argued that this age of reason effect could be explained by a model in which an individual's analytic capabilities decline roughly linearly from age 20 onward, while experience with financial matters increases throughout the individual's life, but at a decreasing rate over time. The net effect yields improvements in financial performance until (roughly) age 53; beyond this age, the decline in cognitive ability dominates.

Using proprietary data sets from a national financial institution, the authors considered financial decision-making in 10 separate contexts, including a number of decisions involving home equity loans, auto loans, and credit cards. In addition to providing information about the terms of the financial transaction, for example, fees and rates, the data sets include substantial demographic information about the individuals.

Driscoll provided a detailed discussion of the empirical results for home equity loans and home equity lines of credit. The authors examined the average annual percentage rate paid by borrowers in each of six age buckets, controlling for various demographic characteristics and various measures related to a borrower's risk of default, including FICO score. The authors found that the rate paid by borrowers followed a U-shaped pattern, declining continuously until age 50 to 60 and rising subsequently. This is precisely the same pattern the authors discovered for many other products, but for home equity loans and lines of credit, the authors had additional evidence supporting their hypothesis that this U-shaped pattern was related to

<sup>6</sup>Of course, a customer might be delinquent or go over the limit on credit card payments to maintain his or her bank balance above some level, so-called precautionary balances. Accordingly, the authors used various definitions of mistakes, each corresponding to a different measure of precautionary balances.

the quality of the borrower's financial decision-making.

Specifically, the loan rate depended on the borrower's loan-to-value ratio (LTV); the lender charged a higher rate for higher LTVs, although it increased in discrete jumps. As part of the application, the lender required borrowers to estimate the value of their homes, and the lender subsequently performed its own appraisal. If the lender's estimated LTV was significantly higher than the borrower's estimated LTV, the loan officer would direct the borrower to a higher-priced loan. But if the lender's estimated LTV was significantly lower than the borrower's estimated LTV, the loan officer would not direct the borrower to a lower-priced loan. The authors defined a rate-changing mistake as one in which the borrower's estimate was significantly different from the lender's estimate, and they found that such mistakes led to an average increase of 125 basis points for loans and 150 basis points for lines of credit (holding constant the borrower's risk and other demographic characteristics). The authors found that the U-shaped pattern existed only for customers who made rate-changing mistakes. This supported the authors' claim that the quality of the customer's financial decision-making — in this case, the ability to accurately value one's house — underpins the higher loan rates paid by the young and the old.

The authors also studied balance transfer offers in which customers received low teaser rates for balances transferred to a new card. However, this rate applied only to the balances transferred; all new purchases were charged a high rate, and all payments on the new card were applied first to the transferred balances. For the customer, the optimal strategy during the teaser rate period is to make all purchases and payments on the old

card. The authors found that one-third of the customers who transferred balances identified the optimal strategy within the first month, one-third figured out the strategy before the sixth month, and one-third never learned during the teaser rate period. They also found that the percent of borrowers who discovered the optimal policy at some point was first increasing in age and then decreasing in age — an inverse U-shape — with the highest percentage for borrowers between ages 35 and 44. On the other hand, the

**For the customer, the optimal strategy during the teaser rate period is to make all purchases and payments on the old card.**

fraction that never learned the optimal strategy displayed a U-shape, again with the lowest percentage for borrowers between ages 35 and 44. Driscoll and co-authors' interpretation of these results was that middle-aged people were both most likely to act optimally and least likely to remain permanently confused. They also argued that the somewhat younger peak of financial performance may reflect the greater analytic skill required to determine the optimal strategy.

Driscoll said that he and his co-authors had explored and rejected a number of alternative explanations for the U-shaped pattern. In particular, the pattern could not be explained by age-related variation in default risk or by borrowing to meet medical expenses. Driscoll argued that they could not rule out cohort effects but that for credit card and auto loans the data indicated the same U-shaped pattern for 1992 data, 10 years earlier than the sample considered in the paper. He argued that replicating the U-shape for

an earlier period is inconsistent with the argument that cohort effects were driving results.

## IS IT OPTIMAL TO FORGET DEFAULTS?

Ronel Elul of the Federal Reserve Bank of Philadelphia presented his research (with **Piero Gottardi**) that examined the rationale for laws requiring bankruptcies to be erased from an individual's credit files. Elul explained that the Fair Credit Reporting Act (FCRA) requires bankruptcies to be

expunged after 10 years and that laws restricting the use of old information are common outside the U.S. Elul and Gottardi's research showed that forgetting is optimal under some conditions and also that it must be imposed by government mandate; that is, it would never arise through private contractual arrangements.

Elul and his co-author examined a model with both adverse selection and moral hazard.<sup>7</sup> In particular, there were two types of borrowers: a safe borrower who never defaulted and a risky borrower who could lower his or her probability of default by expending costly effort. The authors assumed that all loan contracts were single-period contracts, and they focused their attention on Markov perfect equilibria, those in which lenders can observe only

<sup>7</sup> In this context, adverse selection refers to borrowers' being better informed about their intrinsic risk than lenders when loan contracts are signed and moral hazard refers to borrowers' knowing more about risk-taking behavior subsequent to receiving the loan.

whether a borrower has defaulted or repaid a loan in the previous period.<sup>8</sup>

In their model, reputational concerns lead risky borrowers to exert high effort. By assumption, a risky borrower would always choose low effort without reputational concerns, and no lender would make a loan to a risky borrower who chooses low effort. Although lenders are unable to directly observe a borrower's type, they can observe whether the borrower has defaulted in the previous period. A default by a borrower indicates to all lenders that the borrower is a risky type, and once a borrower has defaulted he would automatically be excluded from the loan market. After a number of initial periods of low effort, a risky borrower who has not yet defaulted may choose to exert high effort to maintain his or her reputation.<sup>9</sup> As long as the borrower doesn't default, he or she is indistinguishable from a safe borrower and receives the same loan rate.<sup>10</sup>

Into this setting Elul and Gottardi introduced a stylized representation of the FCRA. Once a borrower has defaulted, the default is stricken from the record with some probability. The authors asked: Under what conditions would introducing a positive probability of forgetting increase consumer welfare?

Elul explained that the possibility of forgetting introduces a tradeoff. On

the one hand, forgetting reduces the risky borrower's incentive to exert high effort because it reduces the penalty for default (exclusion from the loan market forever). This negative effect on incentives is manifested as a larger initial number of periods in which the risky borrower exerts low effort, before reputation-building incentives kick in. However, permitting borrowers to re-enter (which requires forgetting)

## Consumers are quite sensitive to the price differential between fixed- and adjustable-rate mortgages.

also has a beneficial effect, because aggregate output is reduced when risky borrowers who would have exerted high effort are excluded from the loan market.

Elul presented his and Gottardi's general result that forgetting will be efficient under certain conditions. In particular, they showed that some amount of forgetting will be efficient when agents don't discount the future too heavily; when gains from exerting high effort are sufficiently high; when low effort is not too inefficient; and when the fraction of low-risk borrowers is high enough. Under these conditions, the additional output when borrowers re-enter the market outweighs the negative effect on incentives in initial periods.

The authors also explained that forgetting requires a government mandate; that is, it could not be implemented through private contracts. The reason is that any lender who unilaterally chose a policy of forgetting would attract only risky borrowers and would suffer losses.

## SUBSTITUTION BETWEEN FIXED- AND ADJUSTABLE-RATE MORTGAGES

In the final presentation of the conference, **James Vickery** of the Federal Reserve Bank of New York presented the results of his research into the elasticity of substitution between fixed-rate mortgages (FRMs) and adjustable-rate mortgages (ARMs). He argued that consumers are quite sensitive to the price differential between fixed- and adjustable-rate mortgages; specifically, he found that a 20-basis-point increase in the rate on FRMs (relative to ARMs) would cause a 17-percentage-point decline in the market share for FRMs.

Vickery explained that the regulatory cutoff for conforming mortgages — the maximum size for loans that can be purchased and insured by the government sponsored enterprises (GSEs) — creates a discontinuity at the conforming loan limit. He argued that the supply of fixed-rate mortgages falls discontinuously at the conforming loan limit because loans can't be as easily securitized without a guarantee from the GSEs. The greater difficulty of securitizing loans affects the supply of FRMs more than the supply of ARMs because FRMs subject the lender to interest rate risk if they are kept on the lender's balance sheet. As long as the relative demand for FRMs and ARMs is affected by their rates, but not by the conforming loan limit per se, the discontinuity permitted Vickery to identify the demand curve for FRMs.

Vickery estimated the coefficient of substitution between fixed- and adjustable-rate mortgages in two steps: First, he estimated the change in the market share of fixed-rate loans at the conforming loan limit; second, he estimated the size of the difference in the rates on conforming and non-conforming loans. The coefficient of

<sup>8</sup> Elul and Gottardi argued that such equilibria are more realistic than those that can arise when contracts might be conditioned on past behavior in complicated ways.

<sup>9</sup> The risky borrower doesn't begin to exert high effort until enough risky borrowers have defaulted. At this point, lenders assess a high probability that someone who has not yet defaulted is a safe borrower. Said differently, the value of establishing a reputation rises as the fraction of high-risk borrowers in the population decreases.

<sup>10</sup> That is, the model always yields a pooling equilibrium.

substitution is simply the ratio of the change in market share of FRMs to a given difference in the rates.

To carry out the first step, he estimated an empirical model in which the probability of a loan's having a fixed rate depends on the relative rates on FRMs and ARMs — permitting the relationship to differ before and after the conforming loan limit — as well as a number of control variables. Vickery used two different techniques to deal with the likelihood that households with a greater preference for fixed-rate loans might adjust their behavior to keep their loan below the conforming limit. The first approach was an instrumental variable approach in which Vickery constructed a dummy variable indicating whether 80 percent of the house value exceeded the loan limit. Vickery argued that the house price was plausibly exogenous with respect to consumers' relative preference over types of mortgage loans. His second approach was to simply drop observations near the conforming limit.

Vickery presented his main results using the Monthly Interest Rate Survey (MIRS), a sample collected monthly from depository institutions (sample period 1992-2005), which includes important contractual characteristics but which


has no information about borrower characteristics. Using the MIRS data, Vickery found that the FRM share fell discontinuously by 14.3 percent using the instrumental variable specification and by 20.4 percent using the specification dropping observations near the conforming loan limit. Vickery reported similar, but somewhat smaller, effects using a different data set, the Survey of Consumer Finances, in which respondents provide extensive information about household characteristics. He argued that data about mortgage rates and sizes are likely to be more accurate when reported by financial institutions rather than households and that the MIRS estimates were more likely to be correct.

Vickery then estimated the difference between the rates on conforming and nonconforming loan limits. His preferred estimates used data from Bankrate.<sup>11</sup> This data set contains a detailed description of the loan contract associated with a particular rate, especially information about any pre-existing customer relationship between the lender and borrower and information about the borrower's FICO score.

<sup>11</sup> Bankrate, Inc. is a company that provides information on financial rates.

Using this data set, Vickery estimated that the difference in the rates on a conforming and nonconforming loan ranged from 27 basis points for a 30-year FRM to nine basis points for an ARM that reprices after the first year. Using pricing information from the MIRS data set, Vickery found similar, but somewhat smaller, estimates. Vickery argued that the Bankrate estimates were more likely to be correct because of the greater contractual detail.

The coefficient of substitution is the ratio of the change in the market share of FRMs to the difference in the rates between FRMs and ARMs at the conforming loan limit. Using his preferred estimates, Vickery calculated that (holding constant macroeconomic factors such as the yield curve) a 20-basis-point increase in the rate on a fixed-rate loan would lead to a 17 percent decline in the market share of fixed-rate mortgages.

Vickery then explained the results of a thought experiment in which he asked how much the share of fixed-rate loans would decline in the U.S. if mortgage rates were the same as in England, where adjustable-rate mortgages are much more common. He estimated that the average share of FRMs would decline from 76 to 37 percent using UK rates. 

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# Financing Community Development: Learning from the Past, Looking to the Future

Summary of the 2007 Federal Reserve System Community Affairs Research Conference

BY LORETTA J. MESTER

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he Federal Reserve System's 2007 Community Development Research Conference, "Financing Community Development: Learning from the Past, Looking to the

Future," was held in Washington, D.C., on March 29-30, 2007. This conference was the fifth in a biennial series that the Federal Reserve System established in 1999.

The responsibility for organizing the conference program rotates among the Federal Reserve Banks. The staffs of the Federal Reserve Bank of Philadelphia's Community Affairs Department and Research Department took the lead in organizing the 2007 program. The intention of the conference series is to encourage the application of rigorous economic analysis to issues related to community development because without such state-of-the-art research, policymakers cannot hope to devise effective economic development policies and programs. In this article, Loretta Mester provides a summary of the conference.

The conference was organized around six key questions: (1) Is subprime loan pricing fair or predatory?



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[www.philadelphiafed.org/econ/br/](http://www.philadelphiafed.org/econ/br/).

(2) Are legislative remedies to limit predatory lending really remedies? (3) What determines who defaults or goes bankrupt, and how do they fare? (4) What should and can be done to enhance borrowers' knowledge of their credit risk? (5) Does the financing of small businesses differ for minority-owned businesses and for businesses in low-income areas? and (6) Can alternative financial services products help the underbanked? Although the research did not provide definitive answers to these questions, the presen-

tations and discussions did advance our knowledge and provided several interesting avenues for further research.\*

**Jeffrey Lacker**, president of the Federal Reserve Bank of Richmond and chair of the Conference of Presidents' Committee on Research, Public Information, and Community Affairs, opened the conference. He pointed out the value of careful, objective research on consumer financial markets, which have experienced much innovation in recent years. Financial innovation creates opportunities but also entails risk. Lacker would like researchers to study borrowing and other household financial decisions from an ex ante viewpoint, that is, to look at the full distribution of possible outcomes and their relative probabilities. Otherwise, it is difficult to know whether any particular credit market product is beneficial on net or whether the benefits of any proposed method for curtailing adverse outcomes outweigh the costs from restricting credit that the method may entail. He also pointed out one of the limitations of the data collected under the Home Mortgage Disclosure Act. Even with recent enhancements, these data include information from lenders only and do not contain much information about borrowers, so Lacker

\*Revisions of some of the papers presented at this conference have been published in a special issue of the *Journal of Economics and Business*, 60, Nos. 1-2, 2008. Part of this summary is taken from my introduction to this special issue. The conference papers are available on the Federal Reserve System's website at [www.federalreserve.gov/communityaffairs/national/2007researchconf/default.htm](http://www.federalreserve.gov/communityaffairs/national/2007researchconf/default.htm).



is pessimistic about their usefulness for understanding the effectiveness of credit markets. Lacker suggested that researchers try to partner with credit rating bureaus so that lender-supplied data can be combined with data on households to better illuminate borrowers' credit decisions and outcomes. In his view, further research will help us better understand the costs and benefits of market practices and government interventions.

Indeed, turmoil in the subprime mortgage market took center stage in mid-2007, underscoring the importance of further research on this market segment. Six papers at the conference studied various aspects of the subprime mortgage market, including pricing, possible predatory practices and policy responses, foreclosures, and delinquencies.

## SESSION 1: IS SUBPRIME LOAN PRICING FAIR OR PREDATORY?

**"Predatory Lending Practices and Subprime Foreclosures: Distinguishing Impacts by Loan Category,"** by **Morgan Rose**, examines the foreclosure behavior of subprime mortgages. While the rise in subprime mortgage lending has increased access to credit for some borrowers, it has also raised concerns about possible predatory pricing practices within this market segment. The recent increase in subprime mortgage foreclosures has prompted calls for more regulation to curb predatory lending, and some municipalities and states have passed such legislation. But distinguishing predatory lending from legitimate lending is a difficult task. Rose's analysis indicates that the impact of prepayment penalty periods, balloon payments, and reduced documentation — characteristics often cited as consistent with predatory lending — on the foreclosure behavior of subprime refinance and home purchase mortgages is not at

all straightforward. To the extent that these factors are not associated with foreclosures resulting in loss of wealth and tax base, the empirical basis for some of the new regulations enacted at the municipal and state level is questionable. These laws might restrict legitimate access to credit for low-income borrowers without offering much benefit. The results also suggest that our understanding of these loans must advance before effective federal legislation to limit predatory lending can be

code on median household income, race, education, and adult population. Over 31,000 loans were used in the empirical analysis, with over 200,000 loan-quarters of observations.

Rose estimates multinomial logit models that explain for each of four loan types (fixed-rate purchase, fixed-rate refinance, adjustable-rate purchase, adjustable-rate refinance) the probability of a loan's entering foreclosure, prepayment, or remaining active in the quarter. Explanatory vari-

**The recent increase in subprime mortgage foreclosures has prompted calls for more regulation to curb predatory lending, and some municipalities and states have passed such legislation.**

designed, and that the recent regulatory guidelines emphasizing prudent loan terms and underwriting standards may be a better approach than placing restrictions on loan characteristics.

Rose uses quarterly data collected by LoanPerformance, Inc. on subprime refinance and home purchase mortgages originated in 1999Q1 through 2003Q2 on properties located in the Chicago metropolitan area and which have been securitized into private-label mortgage-backed securities. Chicago provides a good laboratory for study, having experienced a significant increase in foreclosures in recent years. Focusing on a single geographic region can help control for regional differences in housing markets. However, the limited time period means the loans studied are not seasoned and many of the new types of mortgage instruments, like "piggyback" mortgages, cannot be included. Rose combines these data with 2000 Census Bureau data, which include information by ZIP

ables include macroeconomic, demographic, and vintage control variables, and features of the loans, including whether the loan requires a balloon payment, whether it has a prepayment penalty period longer than 36 months from origination, whether it is a low- or no-documentation loan, the loan-to-value ratio, interest rate at origination, the borrower's FICO score at origination, and, for refinance loans, whether the borrower withdrew cash. The first three of these loan characteristics are often cited as features of predatory loans. Standard errors were adjusted to allow for clustering by loans, since loans can remain in the data set for multiple quarters.

The empirical findings indicate that the relationship between outcome (foreclosure, prepayment, active), loan characteristics, and demographic variables differs among the four loan types, making it difficult to reach a general conclusion about whether particular loan characteristics or combinations

of characteristics are associated with higher probability of foreclosure. For example, having a prepayment penalty period longer than 36 months is associated with a statistically significant higher probability of foreclosure for purchase fixed-rate mortgages and refinance adjustable-rate mortgages, but not for refinance fixed-rate mortgages or purchase adjustable-rate mortgages. Low- or no-documentation is associated with a statistically significant higher probability of foreclosure for refinance loans of either type and a statistically significant lower probability of foreclosure for purchase fixed-rate mortgages, and is not significantly associated with the probability of foreclosure for purchase adjustable-rate mortgages. Rose also examines the impact of combinations of the three loan characteristics often considered characteristics of predatory loans. In most, but not all cases, the results indicate that the effect of the combination on the predicted probability of foreclosure is greater than the sum of the individual impacts.

Based on the analysis, Rose concludes that the relationships between foreclosures and loan characteristics often cited as predatory are much more complex than previous analysis suggests, and that prohibitions on these loan characteristics may not have the desired effects intended by legislators. This suggests the need for a model of borrower and lender behavior to better understand the consequences of restricting various loan characteristics on the supply and demand for these types of credit.

The association between subprime lending and minorities is the focus of **“Race, Ethnicity, and Subprime Home Loan Pricing,”** by **Debbie Gruenstein Bocian, Keith Ernst, and Wei Li.** The paper examines whether African-American and Latino borrowers receive a disproportionately

larger share of higher-rate home loans, controlling for borrower riskiness. This paper uses the 2004 data collected under the Home Mortgage Disclosure Act (HMDA), which for the first time included information on the costs of subprime home loans. For first-lien loans, lenders were required to report the spread between the annual percentage rate (APR) of the loan and the yield on a U.S. Treasury security of comparable maturity if the spread was three percentage points or higher. By matching these data to a proprietary database on subprime lending, the authors are able to address a significant weakness of earlier studies of race and loan pricing, namely, the inability to control for the risk characteristics of the borrowers and loans at the time of origination. In particular, the proprietary data allow them to control for a borrower’s FICO score, loan-to-value ratio, and whether the loan was covered by private mortgage insurance. The resulting data set contains over 177,000 subprime loans originated in 2004.

The analysis covers subprime loans that have been securitized where the loans are secured by first liens on owner-occupied properties, and excluding loans secured by manufactured housing units, backed by private mortgage insurance, those with nonstandard amortization schedules, and those with origination amounts above the Fannie Mae and Freddie Mac limit (which was \$333,700 in 2004). Separate analyses are performed on six different subgroups of loans, defined by whether the loan is fixed or variable rate, included a prepayment penalty or not, and was for purchase or for refinancing. Following a method of Ambrose et al. (2004), the authors use three-stage least squares to estimate a logistic model relating the probability of receiving a loan designated as a higher-rate loan in the HMDA

data to borrower, loan, economic, and geographic characteristics, allowing for endogeneity between the loan-to-value, loan amount, and loan interest rate. (Unlike the Elliehausen et al. paper discussed below, this paper does not account for potential simultaneity between the presence of a prepayment penalty and other loan terms.)

Overall, the results of the analysis suggest that for many types of loans, African Americans and Latinos are more likely to receive a higher-priced loan compared to non-Latino white borrowers with similar characteristics. For example, the authors estimate that African Americans are 1.84 times and Latinos are 1.7 times more likely to receive a higher-rate fixed-rate purchase loan with prepayment penalties, all else equal, than a non-Latino white borrower. These estimates are statistically different from one at the 1 percent and 5 percent levels, respectively.

It is beyond the scope of the paper to identify the causes for such a disparity in pricing. It could be that even the better measures of borrower risk that are used in the analysis still do not completely control for differences in risk. However, the results suggest that other explanations must also be considered, for example, are minority borrowers steered to higher-priced loans? The authors suggest some enhancements to the HMDA reports that would aid in further research, for example, including information on loan-to-value and credit scores, and also on the type of originator.

**Alan White** of Community Legal Services, Philadelphia, discussed the Rose and the Bocian et al. papers. In his view, both papers provide further evidence on the harm to consumer welfare caused by deregulation of mortgage markets. He thinks there has been little empirical work documenting the welfare benefits of the

expansion of the subprime lending market. Although their existence appears to be the received wisdom, he is skeptical that on balance such benefits outweigh the costs. Indeed, he proposes two alternative hypotheses: that subprime loans have displaced other credit products, like FHA loans, and that subprime lending has expanded credit not by bringing in more borrowers, but by increasing the amount of funding available to individuals who had access to credit before the rise of the subprime market. Regarding discriminatory pricing, White suggested that researchers evaluate whether the loan-pricing matrices used by lenders to match risk factors with price are correctly calibrated. Do minority borrowers pay higher prices because their cost to the lender is higher? White also underscored one of the lessons from Rose: the subprime market is very heterogeneous — subprime loans that were made in 2000 are different from subprime loans that were made in 2006, and loans made for purchase and loans made for refinance are different, with the latter often better thought of as a consumer credit product rather than as a mortgage.

## SESSION 2: ARE LEGISLATIVE REMEDIES TO LIMIT PREDATORY LENDING REALLY REMEDIES?

**“The Effect of Prepayment Penalties on the Pricing of Subprime Mortgages,”** by Gregory Elliehausen, Michael Staten, and Jevgenijs Steinbuks, also investigates prepayment penalties on subprime loans. Similar to Rose’s research, the results of this paper suggest that restricting certain loan characteristics, in particular prepayment penalties, may have unintended consequences. Previous research has indicated that loans with prepayment penalties have higher value to lenders, and the

prepayment penalty mitigates some of the prepayment risk faced by the lender. However, studies have yielded conflicting results about whether the rates that borrowers pay are lower for loans that include prepayment penalties. Elliehausen et al. advance the existing literature by examining the relationship between prepayment penalties and loan rates using

**Previous research has indicated that loans with prepayment penalties have higher value to lenders, and the prepayment penalty mitigates some of the prepayment risk faced by the lender.**

simultaneous equation estimation techniques, which recognize that prepayment penalty, loan rate, and loan-to-value ratios are set simultaneously by the lender. Previous studies have failed to recognize this endogeneity and so have potentially produced biased estimates of the effect of a prepayment penalty on the loan rate.

This study uses the subprime mortgage database of the Financial Services Research Program, which contains data on all originations of the subprime subsidiaries of eight large financial institutions from 1995Q3 to 2004Q4. This database covers nearly one-quarter of loans reported as higher-priced mortgages made for purchase or refinancing of owner-occupied homes in the 2004 HMDA data. The analysis includes close-ended first mortgages with loan-to-value ratios of 90 percent or less. The average loan amount for these loans in 2004 was \$130,000.

Because pricing schedules differ by loan type, the authors estimate separate loan pricing models for fixed-rate,

variable-rate, and hybrid mortgages with a 30-year term to maturity. A three-equation simultaneous equation system is estimated, with loan rate premium (the difference between the loan rate and the rate on a Treasury security of comparable maturity), loan-to-value ratio, and presence of a prepayment penalty as dependent variables. Loan-to-value and prepayment penalty

are included as explanatory variables in the loan rate premium equation; loan rate premium is included as an explanatory variable in the loan-to-value and in the prepayment penalty equation. Loan characteristics included in the model as controls are loan amount, home value, loan-to-value, and whether the loan was a low-documentation loan. Borrower characteristics included are borrower income, FICO risk score, and whether the home is owner-occupied. The analysis also controls for whether the mortgage was originated by a mortgage broker and whether the loan was used for refinancing. Instruments are used to identify the system. The prepayment penalty equation is a probit equation used to predict the probability that the loan includes a prepayment penalty. This predicted value is included in the loan rate premium equation and then the interest equation and loan-to-value equations are estimated by two-stage least squares.

The empirical results show that controlling for potential endogeneity is important: The single equation

ordinary least squares results and the three-equation system results differ. Results for the three-equation system indicate that the presence of a prepayment penalty is associated with lower loan rates: 38 basis points lower for fixed-rate loans, 13 basis points lower for variable-rate loans, and 19 basis points lower for hybrid loans. The authors report that these interest rate reductions are similar to those found in lenders' wholesale loan pricing rate sheets. This result raises the possibility that a restriction on the use of prepayment penalties may have the unintended consequence of raising loan rates.

**"State and Local Anti-Predatory Lending Laws: The Effect of Legal Enforcement Mechanisms,"** by Raphael Bostic, Kathleen Engel, Patricia McCoy, Anthony Pennington-Cross, and Susan Wachter, takes another look at anti-predatory lending laws and their effect on subprime mortgage lending. On the one hand, such laws could restrict the availability of this credit and raise its price. On the other hand, they could allay consumer concerns about predatory lending by raising the cost to lenders that engage in abusive practices, thereby increasing the demand for this credit. The authors' analysis shows that in order to understand the effect of these laws, it is important to look at the individual provisions, including the types of mortgages covered, restrictions on pricing, and enforcement mechanisms. The study finds that these components have independent effects on the supply of and demand for subprime mortgages. In particular, broader coverage, which was a provision in the newer anti-predation laws, and enhanced enforcement are associated with a greater likelihood of subprime origination, while restrictions on pricing are associated with a lower likelihood of subprime origination.

The Home Ownership and Equity

Protection Act (HOEPA), passed in 1994, is a federal law that regulates loans considered to be "high-cost loans." The act defines these as first mortgages with an annual percentage rate at origination 8 percentage points or more above the yield on Treasury securities of comparable maturity; subordinate liens with a spread of 10 percentage points or more; or loans with total points and fees that exceed

**The Home Ownership and Equity Protection Act (HOEPA), passed in 1994, is a federal law that regulates loans considered to be "high-cost loans."**

the greater of 8 percent of the loan amount or \$400 (subject to annual indexing). While HOEPA imposes significant restrictions on the credit terms of these loans, it is estimated to cover only a small portion of subprime mortgages. Several states have passed their own laws; many of these lower the HOEPA pricing triggers, thereby expanding coverage. The laws differ in enforcement mechanisms: Some allow only government enforcement, and others allow borrowers to sue particular parties, with some restricting private lawsuits to compensatory damages only.

Bostic et al. examine the impact of anti-predatory lending laws on the three different outcomes: the probability of applying for a subprime loan relative to a prime loan, the probability of originating a subprime loan relative to a prime loan, and the probability of a subprime loan's being rejected. The analysis includes all types of anti-

predatory lending laws, both pre- and post-HOEPA, and finds an additional 16 state laws that previous studies in the literature have not identified. Building on previous research (Ho and Pennington-Cross, 2006), the authors create two variants of a legal index that measures the breadth of coverage, type and severity of restrictions on loan terms, and enforcement mechanisms. Higher values of the index correspond to laws with broader coverage, more stringent restrictions, and stronger enforcement mechanisms.

The authors use 2004 and 2005 HMDA data. They identify subprime loans in two different ways. For 2004 and 2005, they designate loans as subprime if they are reported on HMDA as having an annual percentage rate in excess of the rate on a Treasury security of comparable maturity of 3 percentage points or more. This information is available only on loan originations and not on applications for loans that were not originated. For 2004, they also had a list of subprime lenders that was generated by the U.S. Department of Housing and Urban Development (HUD) through industry trade publications, HMDA data analysis, and phone calls to determine the extent of the institutions' subprime lending. Thus, for 2004 they were able to repeat their analysis for this definition of subprime, which also allowed them to investigate applications for subprime loans, as well as originations.

To focus on the effect of anti-predatory lending laws on the market and to help control for other factors that might affect loan markets, the analysis includes only loans that were made in counties along a state border, where at least one of the states has an anti-predatory lending law. The authors then estimate three separate logit regressions to predict the three outcomes described above (the probabilities of applying for, originating,



or being rejected for a subprime loan relative to a prime loan), as a function of the legal index, a fixed effect designating the state border pair in which the loan is located, controls for borrower characteristics, such as borrower income (but not borrower FICO score, which is not available in the HMDA data), and location characteristics such as county unemployment rate. They also include a control for whether the institution is regulated by the Office of the Comptroller of the Currency (OCC), since the OCC has interpreted the National Banking Act as exempting national banks from state and local anti-predatory lending laws.

The empirical results indicate that the existence of a state anti-predatory lending law has little effect on credit flows in the subprime mortgage market: It has no effect on the odds of applying for or entering into a subprime loan, but it reduces the odds of being rejected for a subprime loan by 7 percent. However, the results also show that individual components of the laws can have significant and sometimes offsetting effects. Although the effects differ somewhat across year (2004 vs. 2005) and subprime loan definition (HUD list vs. HMDA price criteria), in general, the results suggest that tighter loan-term restrictions do not have a significant effect on the probability of a subprime loan application's being made but do increase the odds of a subprime loan application's being rejected, and they reduce the odds of subprime loans' being originated. These effects are somewhat offset by provisions resulting in broader coverage of the laws. Broader coverage is associated with lower odds of subprime loan applications but also with lower odds of rejection and higher odds of origination. This is consistent with the hypothesis that anti-predatory laws help reassure potential borrowers, thereby attracting them to this

market. There is weak evidence that stronger enforcement is associated with higher probability of subprime origination and lower probability of rejection of a subprime application. Similar to the Rose and Elliehausen et al. papers discussed above, one conclusion to be drawn from the paper is that the impact of laws intended to improve the functioning of the subprime mortgage market can be complex, resulting in unanticipated outcomes.

**Michael Calhoun** of the Center for Responsible Lending discussed the Elliehausen et al. and Bostic et al. papers. In Calhoun's view, the mortgage delivery system is an important component of the subprime mortgage market, and he focused several of his comments on the research results concerning mortgage brokers. One of the many findings in Elliehausen et al. is that loans from brokers are significantly more likely to carry a prepayment penalty, all else equal, than loans from retail lenders. Calhoun pointed out that this is consistent with a hypothesis discussed in Ernst (2005), namely, that brokers may be more likely to place borrowers in subprime loans with prepayment penalties in order to maximize their own compensation. Calhoun discussed three sources of compensation for brokers: They can be (but rarely are) paid in cash from the borrower, their fees can be financed into the loan amount, and they can receive a payment from the lender for placing a borrower with a higher interest rate than the lender requires to compensate it for the given borrower's risk profile. The lender will be more likely to make such a payment if the loan includes a prepayment penalty, which helps to ensure that the borrower remains in the loan long enough for the lender to recoup this payment. Calhoun calculates based on typical prepayment penalties that the interest rate reductions found for loans with

prepayment penalties in Elliehausen et al. are not large enough to offset the cost of the prepayment penalty for many subprime borrowers with hybrid adjustable rate mortgages. He also suggests that loans that are more profitable for the broker to deliver are not necessarily the best deal for the borrower. Calhoun also suggested that it is important to consider the mortgage delivery system when assessing anti-predatory lending laws as in Bostic et al. In Calhoun's view, the HOEPA triggers for high-cost loans may be too narrow, as they do not include prepayment penalties or payments to brokers for delivering loans with rates above the lender's minimal acceptable rate. Several states now include a broader definition of high-cost loans in their anti-predatory lending regulations.

The luncheon speaker on the first day of the conference was **Mary Lee Widener**, president and CEO of Neighborhood Housing Services of America, Inc. (NHSA). In her presentation, Widener said she expected the fallout from the current problems in the subprime market to be widespread but noted that credit markets have faced and handled large challenges in the past. There are likely lessons to be learned from the current experience to help borrowers, lenders, community development organizations, and policymakers handle future challenges. In Widener's view the most important factors for advancing community development financing are collaboration, affordability, and borrower support. Collaboration between community development organizations, regulators, policymakers, and lenders was essential for eliminating redlining, a common practice in the 1960s and 1970s. Development of fair lending practices followed, taking more collaboration. By the mid-1980s, the Community Reinvestment Act had resulted in hundreds of local partnerships between



lenders and nonprofits and local governments that delivered capital into many local communities. Collaboration with private-sector lenders was important for achieving affordability, and affordability included responsible underwriting so that borrowers could meet the long-term obligations of their mortgages. Borrower support was also needed — both pre-purchase and post-purchase counseling. In Widener's view lenders' commitment to forbear and not foreclose when temporary life events interrupted the borrower's ability to repay loans was also an important element in helping families in low-income communities remain homeowners. Further advancements in the low-income mortgage market were made by NHSA through its collaboration with the mortgage insurance industry, the secondary market through Freddie Mac and Fannie Mae, and the rating agencies. This allowed loans to low-income borrowers to be financed through the capital markets.

Widener explained that several challenges remain. One is trying to overcome the reluctance of many communities to allow development of affordable housing. Another challenge is making the borrower support and development systems sustainable. One aid to doing this is showing that loans to low-income borrowers with proper support systems perform better than is commonly thought, which is what NHSA has experienced. The subprime lending market poses another challenge. When the terms under which subprime lending is available become predatory, such lending has a negative impact on communities. Better consumer education and development of alternative loan products better suited to lower-income borrowers can help. Widener discussed several such products that have been developed via collaborations among NHSA, other nonprofits, and the private sector.

### SESSION 3: WHAT DETERMINES WHO DEFAULTS OR GOES BANKRUPT AND HOW DO THEY FARE?

**"The Delinquency of Subprime Mortgages,"** by Michelle Danis and Anthony Pennington-Cross, analyzes the dynamics of the payment behavior of subprime mortgage borrowers using more sophisticated econometric techniques than have heretofore been used to study this issue. Payment dynamics are an important determinant of loan pricing. For example, delinquencies will increase the price of these loans to borrowers by increasing the cost of servicing these loans and of guaranteeing timely payments. The paper's goal is to identify the key factors that drive delinquency.

At any point in time a mortgage can be current, delinquent, or terminated. Within each of these branches of possibilities, there are further alternatives (called nests). If delinquent, the mortgage can be 30, 60, 90, or more days late. Termination can be due to either prepayment or default (that is, foreclosure). Notice that the status of the mortgage is the result of actions of both the borrower and the lender. To capture the multiplicity of possible outcomes, the authors estimate (via full-information maximum likelihood) a nested logit model of loan outcomes as a function of explanatory variables, including loan characteristics (age of loan, loan-to-value, whether the loan is a low-documentation loan, whether the loan is a no-documentation loan, and whether the loan includes a prepayment penalty), borrower's FICO score at time of origination, and variables controlling for economic conditions in the state in which the property is located (change in house prices, volatility in house prices, unemployment rate, and mortgage rate change (which does not vary by state)). The nested logit model has an advan-

tage over multinomial logit, which is often used to investigate such multi-choice situations. The multinomial logit model requires that the ratio of the probabilities of any two alternative choices (that is, the odds ratio between the two alternatives) be independent of any other alternative. This makes estimation easier but is often not a good description of behavior. For example, the multinomial logit model would imply that if prepayment were taken away as an option, we'd see proportionate changes in the probabilities of all other alternatives. But the nested logit model would imply that any change in the probabilities of delinquency is evenly distributed over 30, 60, or 90+ days, but there would not need to be proportionate increases in the probabilities of the remaining alternatives in the other nests (that is, default and current). Thus, the nested logit model is less restrictive, and the authors present tests indicating that the more restrictive multinomial logit model is rejected for their data.

The authors' loan data are from LoanPerformance, which provides data on pools of nonagency, publicly placed securitized loans. They use monthly data on the payment status of single-family 30-year fixed-rate subprime mortgages on owner-occupied property originated between January 1996 and May 2003. Over 97,000 loans are included in the analysis. State-level data on house price level, house price volatility, and the unemployment rate, and national prime mortgage rates are matched to the loan data. However, the time period is too early to cover the recent period of sharp increases in subprime mortgage delinquencies. The authors present estimates of the change in the probability of the outcome associated with a one-standard-deviation increase and one-standard-deviation decrease in an explanatory variable, holding the other variables

constant at their means. (The changes are not symmetric for increases and decreases in explanatory variables.) They are unable to report standard errors for these elasticity estimates, which are highly nonlinear functions of the explanatory variables and coefficients. However, most of the coefficient estimates are significantly different from zero at the 5 percent or better level.

The empirical results show that some of the relationships between the explanatory variables and the probability of delinquency, default, and prepayment are as expected but others are not. A borrower's credit score appears to be a robust predictor of default and delinquency, with higher credit scores associated with lower likelihood of delinquency or default. The estimated probability of 90-day or more delinquency is 0.75 percent for a borrower with a FICO score at the mean 649; it is 1.89 percent for a borrower with a FICO score one standard deviation lower, at 579.

The empirical results also show that for borrowers with credit scores below 630, higher credit scores are associated with higher likelihood of prepayment. This might reflect the borrowers' ability to migrate to prime loans as their credit scores improve. However, for scores above 630, an increase in credit score is associated with a lower probability of prepayment. This seems counterintuitive. The authors suggest this might reflect something unique about these borrowers that is not controlled for in the estimation – these borrowers seem to have credit scores that would qualify them for prime mortgages, yet they have taken out subprime mortgages.

Prepayments on mortgages are known to be difficult to predict, and the paper's results do not contradict this. As expected, the probability of prepayment is very responsive to changes in interest rates, with the

probability of prepayment increasing as mortgage rates decline. But the probability of prepayment is fairly unresponsive to changes in house prices, which is an unexpected result.

An interesting finding is that factors that imply increased probability of delinquency do not necessarily imply increased probability of default. For example, higher loan-to-value at origination implies a higher probability of delinquency but not of default.

**An interesting finding is that factors that imply increased probability of delinquency do not necessarily imply increased probability of default.**

This is a reminder that movement from delinquency to default is partly determined by actions of the lender. Another surprise is that higher state unemployment rates do not seem to trigger higher probability of delinquency or default in the authors' data. The interaction between local economic conditions and loan performance presents an interesting avenue for future research and is one of the issues addressed in the Grover et al. paper discussed below.

**“The Anatomy of U.S. Personal Bankruptcy Under Chapter 13,”** by Hülya Eraslan, Wenli Li, and Pierre-Daniel Sarte, analyzes the performance of consumers who file for personal bankruptcy under Chapter 13, one of two chapters of the U.S. bankruptcy code under which households can file for bankruptcy. Under

Chapter 7, filers turn over all of their assets above an exemption level that varies by state in exchange for having their debts discharged. Under Chapter 13, filers need not turn over their assets but must complete a plan that indicates how they will repay their debts out of future income. The repayment plan under Chapter 13 must propose to pay at least as much as the value of the assets creditors would have received under Chapter 7.

The Bankruptcy Abuse Prevention and Consumer Protection Act, enacted in 2005, introduced a means tests on filers, whereby filers deemed to have sufficient income would be required to file under Chapter 13. The act presumes that higher-income filers will end up paying off more of their debt under Chapter 13, while at the same time receiving a fresh start. But there is little, if any, empirical evidence about how debtors and their creditors actually fare under Chapter 13. This paper provides such evidence using a data set that the authors painstakingly constructed from public court docket records of all Chapter 13 bankruptcy filings between 2001 and 2002 in Delaware. The analysis, based on data from over 900 filings, casts doubt on the success of Chapter 13 filings.

The authors approach their investigation by constructing a theoretical model of the bankruptcy decision. Debtors, when considering bankruptcy, decide first whether to file under Chapter 7 or Chapter 13. The authors do not model this decision and focus only on the decisions filers make after they have chosen Chapter 13. These Chapter 13 filers must decide on the length of the repayment plan to propose (typically three years or five years). Once the plan is proposed, the court-appointed trustee must decide whether to recommend that the court confirm the plan or dismiss it. If the plan is dismissed, the creditors can re-

sume debt collection measured against the filer. If the plan is confirmed, the filer begins making payments according to the plan. Over time, the debtor may experience unexpected changes in income and the plan can be modified. If the debtor completes the (perhaps modified) plan, any remaining debts are discharged. If for some reason the debtor cannot or will not complete the payments according to plan, the case is dismissed. The debtor might try to convert the case to Chapter 7 or go back to face his or her creditors without the protection of the bankruptcy provisions. The authors use maximum likelihood techniques to estimate their structural model relating several outcomes — the choice of plan length, whether the plan is confirmed or dismissed, the creditor recovery rate under the plan, and whether the plan is brought to conclusion — to exogenous debtor characteristics.

The Chapter 13 filers in the sample have significantly more debt but fewer assets than nonfilers — filers' median total debt is about \$121,000, about 6.6 times the national median, while the median value of their total assets is about \$103,000, less than half the national median. The filers are somewhat less likely to be unemployed than the average Delaware resident, but their average monthly income is about 30 percent less than Delaware's average adjusted gross income and they experienced a significant decline in income prior to filing. The median credit recovery rate under Chapter 13 is quite low, about 12 percent of total debt; the mean recovery rate is about 28 percent; and a relatively small fraction of Chapter 13 filers are actually successful in getting their cases discharged. Moreover, 20 percent of the debtors who want to file under Chapter 13 are never successful in getting their repayment plan approved by the bankruptcy court — and this was at

a time when these filers were voluntarily choosing to file under Chapter 13 instead of Chapter 7.

The authors' estimation results indicate that the amount that creditors ultimately recover from borrowers that file for Chapter 13 is significantly related to whether debtors are experiencing bankruptcy for the first time, the amount of their past-due secured debt at the time of filing, and the amount of income they have in excess of what

## Who should bear the responsibility for medical problems or job problems that might trigger bankruptcy?

is required for basic maintenance. Also, changes in the debtors' financial conditions while in bankruptcy affect their outcomes under Chapter 13. The authors perform some policy experiments using their estimated model. One of the provisions of the new law prohibits debtors with income above the state median to file a plan with less than five years' duration. Their model suggests that this provision will likely result in only a minimal increase in recovery rates for creditors but may lower the likelihood that filers emerge from the bankruptcy process with a fresh start and their cases discharged.

**Katherine Porter** of the University of Iowa College of Law discussed the Danis and Pennington-Cross and the Eraslan et al. papers. Two key questions important to these papers are: How do we define success in lending markets, and what enables this success? As Porter pointed out, the definition of success will likely differ for creditors and for debtors. From a policy

perspective, one must decide what a tolerable level of failure is and then determine how one might respond to failure, be it via bankruptcy relief, government or private aid, or restrictions on the availability of credit.

Porter suggested that it is not altogether obvious how policymakers should treat certain trigger events. For example, who should bear the responsibility for medical problems or job problems that might trigger bankruptcy? In most cases, family income plays a primary role in determining the success of any type of remedy. But both the level and the stability of income have been shown to be important to successful outcomes under Chapter 7 in previous research and under Chapter 13 in the Eraslan, et al. paper. Porter suggested that further investigation into the effect of income stability on outcomes might prove to be fruitful in furthering our understanding of the bankruptcy process.

## SESSION 4: WHAT SHOULD AND CAN BE DONE TO ENHANCE BORROWERS' KNOWLEDGE OF THEIR CREDIT RISK?

**"Targeting Foreclosure Interventions: An Analysis of Neighborhood Characteristics Associated with High Foreclosure Rates in Two Minnesota Counties,"** by Michael Grover, Laura Smith, and Richard Todd, examines the predictability of outcome — in this case, the probability that a mortgage moves into foreclosure — based on neighborhood characteristics. If one can predict which neighborhoods are likely to have a high rate of foreclosure, programs designed to help sustain homeownership could be targeted to neighborhoods with the greatest need.

The paper uses public data on foreclosures in two counties in Minnesota, Hennepin and Ramsey, in 2002.

(Minneapolis is located in Hennepin and St. Paul is located in Ramsey.) Data on 1,178 foreclosed properties were used in the analysis. Street addresses of the properties involved were matched to their census tract, so that Census Bureau data from 1990 and 2000 could be matched to the foreclosure data. Additional data on lender, interest rates, and mortgage riders and conditions were obtained from the property-records departments of the two counties. Census-tract level credit score data were obtained from PCI Corporation and CRA Whiz; HMDA data were also used. The authors found that it was very difficult to determine from the mortgage documents whether the loan was for home purchase or for refinancing, and it was sometimes difficult to determine the lender. The painstaking nature of the data collection limited the analysis to one year and two counties. In the authors' data set, foreclosed mortgages are disproportionately of recent origin, with a median duration from origination to foreclosure sale of 2.6 years. Compared to other mortgages originated in the same neighborhood during the same period, the foreclosed mortgages tended to have higher interest rates and smaller loan amounts and were more likely to have been originated by a nonbank or subprime lender and to have had another mortgage on the property. Reflecting strong house price appreciation in the time period studied, the data also show that the sheriff's sale typically brought in more than the outstanding mortgage balance. Thus, had borrowers chosen to sell their homes before defaulting, they could have paid off their mortgages and gotten some equity. It remains an interesting research question as to why borrowers did not do this.

The authors' analysis indicates that of seven variables available in advance of foreclosure, neighborhood

credit score is singly the most accurate in identifying census tracts with the highest foreclosure rates, which is consistent with the Danis and Pennington-Cross findings, discussed above. In particular, the 1999 neighborhood credit score correctly ranks 36 of the 50 tracts with the highest foreclosure rates and its correlation with the foreclosure rate is 0.64. The authors also perform a multivariate analysis of the association of foreclosure rate with variables available in advance of or concurrently with foreclosure. They estimate a logit model that predicts the probability of foreclosure with census-level variables measuring credit risk, minority homeownership transition, and other demographic factors. Because foreclosure is a relatively rare event, to accurately predict the probability of foreclosure, one needs a large number of mortgaged units. Since the number of mortgaged units varies considerably over the census tracts in the sample, the variance of prediction error might vary systematically with the number of mortgaged units in the census tract. To allow for this potential heteroscedasticity in the error term, the authors estimate the logit regression using the minimum chi-squared estimator.

This multivariate analysis indicates that the percentage of neighborhood adults with very low credit scores and the change in the share of minority homeowners between 1990 and 2000 (a measure of neighborhood transition) are the strongest predictors of foreclosure rate; both are positively associated with foreclosure rate. Based on their findings, the authors suggest that there may be social benefits from making mortgage and foreclosure records and credit scores by neighborhood more readily available to the public and foreclosure mitigation practitioners, but a cost-benefit analysis of this

suggestion is beyond the scope of the paper.

Several papers in this volume have found that a borrower's credit risk score at origination is associated with mortgage outcome, with lower scores associated with higher rates of delinquency and default. An interesting question is whether borrowers have an accurate assessment of their own credit score and whether the accuracy of their assessment varies with the level of their score. If higher risk borrowers have less accurate perceptions of their own credit risk, they may be more likely to enter into loan contracts for which they are not well suited (if such contracts are offered to them), and this could partly explain the higher rates of foreclosure and delinquencies seen for these borrowers.

**“Consumer Credit Literacy: What Price Perception?”** by **Marsha Courchane, Adam Gailey, and Peter Zorn**, tackles this interesting question. The authors use data provided to them by prime and subprime lenders on 1.2 million mortgage loans originated in 2004 and from a consumer survey conducted in 2000 by Freddie Mac. The loan data include variables collected under HMDA and loan-level variables used in underwriting and pricing the loans, such as FICO score, loan-to-value ratio, and debt-to-income ratio. The survey includes information about consumers' financial knowledge and credit outcomes such as whether they have been denied credit, been evicted, had utilities turned off, or property repossessed. The survey also asked respondents how they would rate their current credit record.

The empirical results suggest that inaccurate self-assessment is not always associated with bad financial outcomes (which might include higher likelihood of being denied credit, being evicted, or declaring bankruptcy) and that the direction of the inaccuracy



matters. The authors use locally weighted polynomial regressions to examine the relationship between the percent of respondents experiencing a bad financial outcome and credit-risk score as measured by FICO score, with separate analyses for respondents that correctly assessed their credit score and for those who did not. They also use probit regressions to investigate this relationship when controlling for other factors, including income and net worth. Both analyses indicate that consumers who assess their credit score to be lower than it actually is (that is, are pessimistic about their credit record) are more likely to experience a bad financial outcome than those who accurately assess their credit score, but consumers who assess their credit score to be higher than it actually is (that is, are optimistic) are less likely to have bad financial outcomes than those who correctly assess their score.

One possible explanation is that there is reverse causality in the survey data. That is, a bad financial outcome might have caused the accuracy of the self-assessment of credit score rather than the other way around. However, in a separate analysis that helps to address this potential reverse causality, the authors still find that optimism is associated with better financial outcomes. The authors next explore an alternative explanation — that consumers are actually more accurate in their assessments of their credit risk than their FICO scores reflect. Using their loan and survey data, the authors construct an alternative credit score and find some support for this alternative hypothesis: a regression of this alternative credit score on FICO score and accuracy of self-assessment (that is, optimism and pessimism) indicates that holding FICO score constant, optimism is associated with higher values of the alternative credit score (that is, lower risk) and pessimism is associated

with lower values of the alternative credit score (that is, higher risk).

The authors interpret the results of their research as supporting the value of financial literacy programs to the extent that these programs help educate consumers about not only their credit scores but also a broader set of factors that are important for assessing their credit risk. An alternative interpretation, which differs from the authors', is that consumers do not need (or no longer need) these programs, as they appear to be accurate in assessing their credit risk.

In his discussion, **Glenn Canner** of the Federal Reserve Board staff noted that concerns about foreclosures have increased over time as the credit-quality of the borrower pool has widened, new types of mortgages have emerged, short-term interest rates have risen, and house prices have flattened or begun to fall. He agreed that it was important to try to identify leading indicators of neighborhood foreclosure sales, given the adverse effects foreclosures can have on individuals and their neighborhoods.

Canner discussed two theories of default. The trigger-events theory suggests that borrowers may default when certain life-events — for example, medical problems, divorce, job loss — disrupt their ability or willingness to pay. The options theory suggests that when a borrower takes out a mortgage it is like having a put option on the value of the home — the borrower will choose to default when the mortgage balance exceeds the value of his or her home. These two theories can suggest alternative factors that Grover et al. may want to incorporate into their study of predicting foreclosures. The options theory suggests that areas with falling home prices or where borrowers have little or negative equity might show higher rates of foreclosure. The trigger-event theory suggests that fac-

tors that disrupt income flows or lead to unexpected expenses might lead to foreclosure. A trigger event might also be a factor that could affect the accuracy of a borrower's assessment of his or her own credit risk. Canner discussed other factors that could affect self-assessment accuracy, including expectations about one's job prospects and future income, financial literacy, experience in obtaining credit, the reason a payment was missed (a one-time event or a more habitual problem), and changes in one's credit score over time.

**Charles Plosser**, president of the Federal Reserve Bank of Philadelphia, opened the second day of the conference by discussing the theme that brought together the diverse group of individuals, including government policymakers, academic researchers, community leaders, consumer advocates, and financial service providers. The theme he discussed was that to ensure opportunity for the economically distressed and to promote economic development, we must be guided by accurate information, careful research, and sound policy analysis.

In Plosser's view, "public policy driven by headlines rarely turns out to be good policy" and research can now make a greater contribution to economic development efforts than it could in the past because development efforts have been more diverse and more local in nature. The efficacy of these various programs cannot be discerned without the proper research. Plosser discussed the importance of development strategies that work with the marketplace as it tries to be more responsive to the needs of lower-income households and cautions against the law of unintended consequences that might arise if policymakers try to manipulate economic outcomes. Policies are likely to always have some surprising effects, but careful analysis of proposed policies and careful monitor-



ing of implemented policies can help keep such surprises to a minimum.

#### **SESSION 5: DOES THE FINANCING OF SMALL BUSINESSES DIFFER FOR MINORITY-OWNED BUSINESSES AND FOR BUSINESSES IN LOW-INCOME AREAS?**

The last two sessions of the conference turned from mortgages to other aspects of community lending and development. “**Tracing Access to Financial Capital Among African-Americans from the Entrepreneurial Venture to the Established Business,**” by Alicia Robb and Robert Fairlie, empirically investigates the relationship between wealth, access to financial capital, and the outcomes from African American-owned businesses from the start-up stage through maturity. Business ownership rates for African Americans are considerably lower than those for whites. According to the 2000 census data, nearly 11 percent of white workers are self-employed business owners, while less than 5 percent of African-American workers are. In addition, African American-owned businesses appear to be less successful on average than those owned by whites or Asians, with lower profits and higher closure rates. Understanding the sources of such disparities is an important step toward determining whether entrepreneurship is an effective way out of poverty for minorities. The research can also help in determining whether government programs offering loans to minority-owned businesses can be made more effective or whether a new approach is needed. While previous studies have found that the poorer performance of African American-owned businesses relative to white-owned businesses stems from low levels of start-up capital, education, and business experience, these studies did not trace out

the relationship between wealth and access to financial capital over the life of the business.

The authors use data from several sources, including the Census Bureau’s Characteristics of Business Owners Survey, the 1998 Survey of Small Business Finances, the Survey of Minority-Owned Businesses, the Survey of Business Owners, and the Current Population Survey, with sample-size

the owners prior to self-employment – the authors find that lower levels of assets among African Americans account for 15.5 percent of the difference in the probability of becoming self-employed between whites and African Americans. However, a related question is whether African Americans are less able to raise external funds to start their businesses than are whites and are thereby hampered

**To ensure opportunity for the economically distressed and to promote economic development, we must be guided by accurate information, careful research, and sound policy analysis.**

varying over the surveys and years. For example, the 1998 Survey of Small Business Finances includes about 3500 businesses that were not equally owned by a minority and nonminority; the 1997 Survey of Minority-Owned Business Enterprises includes over 15 million white-owned firms and over 750,000 African American-owned firms. All the data sets confirm that African American-owned businesses underperform white-owned businesses and tend to be smaller in terms of sales and employment.

Research on entrepreneurship indicates that personal wealth is an important determinant of self-employment. The differences in net worth between whites and African Americans are large: The median net worth of whites, at \$67,000, is more than 10 times the median net worth of African Americans, at under \$6,200. Results using the Current Population Survey data from 1998 to 2003 indicate that the largest single factor explaining racial disparities in business creation rates are differences in asset levels of

by undercapitalized businesses to start with. The authors provide some evidence consistent with this: The Characteristics of Business Owner data indicate that African American-owned businesses have lower levels of start-up capital compared to white-owned businesses. Less than 2 percent of African American-owned businesses start with \$100,000 or more in capital, compared with nearly 5 percent of white-owned businesses, and 6.5 percent of African American-owned businesses start with \$25,000 to \$100,000 in capital, compared with about 11 percent of white-owned businesses. The empirical results also show that lower start-up capital accounts for 14.5 percent of the difference in profitability of white-owned and African American-owned businesses. However, as the authors discuss, the amount of start-up capital available for investment in new businesses may be related to the predicted performance of the business. That is, it could be that African American-owned businesses have lower start-up capital because investors perceive that

their probability of success is lower. Or they could have less access to capital because they have less personal wealth to borrow against.

The authors show that some differences in racial borrowing patterns persist even as the businesses mature. Data from the Survey of Small Business Finances indicate that African American-owned businesses are less likely to have an outstanding loan or credit line and more likely to have borrowed on a credit card than white-owned businesses, but the African American-owned firms also have worse credit histories than white-owned businesses, including higher rates of delinquency and bankruptcy. The authors estimated a multivariate logistic equation and found that once credit history is controlled for, the difference in the probability of having an outstanding loan is not statistically significant. However, African American owners are more likely to have been denied credit and to have borrowed on their credit card than white owners, even controlling for credit history. The causes of the differences in credit experiences of white and African American business owners, the effects these differences might have on business outcomes, and the direction of causality (does limited access to credit cause poor performance or does poor performance lead to limited access to credit?) are potentially fruitful avenues to pursue in future research.

Indeed, **“Commercial Lending Distance and Historically Underserved Areas,”** by Robert DeYoung, Scott Frame, Dennis Glennon, Daniel McMillen, and Peter Nigro, addresses the topic of access to credit by small businesses located in minority and low- and moderate-income neighborhoods, which have typically been underserved by financial services. There is generally little publicly available information about small

businesses with which to assess their creditworthiness. The inability to distinguish low-credit-risk small firms from high-credit-risk small firms can result in the rationing of credit to all small firms. Banks, in particular local banks, can help eliminate some of these information problems through repeated interactions with the firm. To the extent that minority and low- to moderate-income neighborhoods have less access to local financial services, they are potentially put at an even greater disadvantage at overcoming the imperfect information problems and gaining access to credit. However, the advent of new technologies, such as credit scoring models for small businesses, can help alleviate the problem of lack of proximate financial services by giving lenders not necessarily physically located in the local neighborhood the ability to distinguish more creditworthy firms from less creditworthy firms. These new technologies can substitute for the local bank-borrower relationship in alleviating imperfect information impediments to lending. Indeed, several previous studies have found an increase in the distance between U.S. small business borrowers and their bank lenders in recent years.

The authors extend the previous literature by examining changes in borrower-bank lender distance for low- and moderate-income areas and predominately (that is, over 50 percent) minority areas. Their data are a random sample of over 27,000 small business loans originated by U.S. commercial banks under the U.S. Small Business Administration loan program from January 1984 to April 2001 with term-to-maturity of three, seven, and 15 years. The data include locations for both borrower and lender, so the authors computed as-the-crow-flies distances for each pair. They then used mapping software to determine whether the borrower was located in

a low- and moderate- vs. middle- and high-income census tract or a predominantly minority vs. nonminority census tract.

The univariate analysis looks at borrower-lender distance by type of census tract over time. Their multivariate ordinary least squares regression analysis (which includes loans originated in the period January 1992-April 2001) relates distance to indicators of whether the borrower is located in a low- and moderate-income area, whether the borrower is located in a minority area, a linear time trend, interactions between type of census tract and the time trend, and a set of variables to control for borrower, lender, and loan characteristics at the time of loan origination.

The analyses indicate that during the 1980s and most of the 1990s, borrower-lender distances tended to be stable and shorter, on average, for small businesses in low and moderate-income areas and in predominately minority areas than for those in middle- and upper-income areas and nonminority areas, respectively. By the late 1990s, however, all borrower-lender distances had increased, but those for small businesses in low- and moderate-income areas and in predominately minority areas had increased more, so that the borrower-lender distances are now longer for firms located in these areas compared to firms in middle- and upper-income areas and nonminority areas, respectively. The timing is consistent with the introduction of automated small-business credit scoring models, and smaller loans in the sample (to which these credit scoring models are most often applied) seem to be driving the results. While these results are suggestive, the authors cannot directly test the hypothesis that the introduction of small-business credit scoring models has allowed for increased distance between borrower

and lender. A definitive test is an interesting topic for future research.

In discussing the DeYoung et al. paper, **Leora Klapper** of the World Bank said that two types of credit scoring models are currently being used for small-business lending. The most common produces the personal credit score of the business owner, which measures the probability that the owner will default and is based on data on the owner, including the owner's credit history and indebtedness. The other model, which is growing in usage, produces a business survival score, which measures the probability of business failure and is based on data on the business or business's industry, including information on management quality and industry risk. A business survival score can be derived when owners don't have much personal credit history, and such models are becoming increasingly used in emerging markets like India that don't have credit bureaus collecting data on personal credit histories.

Klapper suggested that more research needs to be done to determine whether the credit scoring models are actually increasing access to credit in low-income neighborhoods. Can these models substitute for bank branches in delivering credit to the smallest businesses? As the financial system moves to more quantitative underwriting models, are owners with limited credit histories able to obtain as much credit as they did under more qualitative relationship lending by a loan officer?

As Klapper pointed out, access to credit by African American business owners was a main theme in the paper by Robb and Fairlie. There is a growing international literature that links access to financial services and entrepreneurship. Aggregate level data show a relationship between economic growth and access to capital. Klapper showed that based on data on 90

countries, there is a strong significant positive relationship between the ratio of aggregate private credit to GDP (a measure of financial development) and entry rates of new businesses. However, empirically it is difficult to separate out the effects of personal wealth and credit history from access to capital to determine their independent effects. Klapper cited some previous literature that looked at the effect of windfall gains on entrepreneurship as a way of isolating the effect of access to capital

session, which focused on two particular products: payday lending and prepaid cards. As discussed in **"Strategic Pricing of Payday Loans: Evidence from Colorado, 2000-2005,"** by **Robert DeYoung** and **Ronnie Phillips**, payday lending has arguably extended credit availability to more households, but at what price? In a typical payday lending transaction, a customer receives a specified amount of cash in return for a personal check written to the lender for that amount plus a fee;

## As the financial system moves to more quantitative underwriting models, are owners with limited credit histories able to obtain as much credit as they did under more qualitative relationship lending by a loan officer?

on the self-employment decision. For example, Lindh and Ohlsson (1996) found that winners of the Swedish lottery are more likely to enter self-employment and remain successfully self-employed, controlling for other factors like demographics and inheritances. This evidence is consistent with access to credit being an important determinant of entrepreneurship.

Klapper suggested that as credit scoring becomes more important in the delivery of financial services and credit to small businesses, helping those in low-income and minority neighborhoods to understand their credit scores and learn ways to improve them will likely become more important in expanding their economic opportunities.

### SESSION 6: CAN ALTERNATIVE FINANCIAL SERVICES PRODUCTS HELP THE UNDERBANKED?

The theme of access to financial services was also taken up in the last

the lender holds this check for a specified short period, often two weeks or less. At the end of the holding period, the transaction can be terminated by the lender's depositing the check or the customer can pay another fee to roll over the loan. Critics of payday lending say it is credit offered at exorbitant prices — triple-digit APRs are not uncommon — and marketed to unsophisticated borrowers. Others say such lending fills a need for immediate, short-term credit. Why borrowers use payday loans rather than alternative forms of credit is not fully understood. Surveys show, for example, that the typical payday loan customer has a job and a bank account, and half have a credit card.

The paper investigates the pricing patterns of payday lenders in Colorado and concludes that these lenders behave strategically when setting their terms and fees. The authors' analysis is based on information on nearly 25,000 payday loans made in Colorado between June 2000 and August 2005.

These loans were made after legislation was passed that limited loan principal to \$500 for a term of 40 days or less, limited the finance charge to a maximum of 20 percent of loan principal up to \$300 and to 7.5 percent above \$300, and permitted only one renewal of the loan. The average APR on the loans is nearly 460 percent, and nearly 90 percent of the loans carried the maximum charge allowed by Colorado law. Because payday loan prices are constrained by the law, the authors use Tobit regressions to investigate the relationship between pricing, competition in the market, and demographic characteristics of the geographic market (ZIP code area) in which the loans are made. Since payday lenders appear in less than a quarter of the ZIP code areas in Colorado and this locational choice of the lenders might be related to the factors included in the Tobit regression (for example, the income in the market), there is a potential sample selection bias; that is, the sample may not be randomly selected. The authors correct for this using the standard two-stage Heckman procedure.

The analysis indicates that over time, payday loan prices in Colorado have drifted to the state-legislated price ceiling, and that this occurred more quickly in markets with more payday lenders where explicit collusion was more difficult. Thus, the legislated price ceiling seems to have behaved as a focal point and may have had an unintended effect of facilitating implicit collusion. The authors' empirical results also suggest that lenders take advantage of borrower switching costs by offering lower prices on initial loans than on refinanced loans (although the difference is small). Lenders that face fewer competitors appear better able to exploit relationships in this way; that is, they charged an even lower initial price than did lenders facing more competition. This inter-

temporal pricing strategy might be less profitable for lenders in more competitive markets, since they face a higher probability of losing their customers to competitors before being able to make up for the low initial price. Perhaps more surprisingly, the authors also find that payday loan prices are higher in markets with more commercial bank branches. This suggests that commercial bank products are not a substitute for payday loans. Indeed, to the extent that borrowers need a checking account to take out a payday loan, commercial banking services serve as a complement to payday lending.

While payday loans offer an alternative to other forms of credit, prepaid cards offer an alternative to other forms of payment. **"Cardholder Use of General Spending Prepaid Cards: A Closer Look at the Market,"** by Sherry Rhine, Katy Jacob, Yazmin Osaki, and Jennifer Tescher, studies the current and potential use of this rapidly growing payment instrument. Traditional gift cards are typically used to make small-dollar transactions with specific retailers. In contrast, general spending prepaid cards can hold considerable value and can be used to make payments at a variety of establishments. For example, a firm may offer payroll cards to its employees through which the firm will pay employees their wages in lieu of direct deposit into checking accounts, which some employees may not have. Prepaid cards have also been used to distribute payments after natural disasters. As the authors explain, network-branded general spending reloadable cards offer functions similar to traditional credit and debit cards. Their transactions are processed using the same systems as these network brands (MasterCard, Visa, American Express, or Discover) and the cards can be used to withdraw funds from ATMs, to make retail purchases, or to pay bills in person, online,

or by phone wherever the network brand is accepted.

The study uses transactions and cardholder demographic data from four general spending prepaid card providers – a random sample of 500 cardholders was drawn from each of the four firms, resulting in a sample of over 1900 active cardholders. Transactions for each cardholder were tracked over a 12-month period during 2005-2006. These data were augmented with information obtained during discussions with other industry providers. The analysis suggests that many providers are marketing their cards to underbanked customers, a potentially sizable market. Most cardholders spend nearly all of the funds loaded onto their cards each month – they are not using the cards as a store of value but as a transactions method. They use the cards mainly for point-of-sale purchases and not to withdraw cash from an ATM, suggesting that the cards may be acting as a substitute for cash. The analysis indicates that the average cardholder loads funds onto his card once a month and the average amount loaded is \$217. The average cardholder makes 3.5 point-of-sale transactions per month, each averaging a little less than \$40. And he withdraws funds from an ATM less than once a month, with the average amount of withdrawal a little more than \$40. The authors' study is one of the first to document the usage of these types of cards. They suggest that one avenue for future research is to augment their data with information from consumers about their motivations for using such cards.

**Victor Stango** of Dartmouth College discussed the two papers on alternative financial services. As he pointed out, there are clearly new alternatives available to the underbanked, but given the high cost of these alternatives, the question is whether they are beneficial to their

users. The DeYoung and Phillips paper discusses the high cost of payday lending. Stango indicated that the cost of prepaid cards is also very high. He estimated, based on the data in the Rhine, et al. paper, that the average cardholder has a monthly balance of between \$100 and \$200 and pays about \$20 in fees per month. Stango posed some questions for future research: Why do people use these alternative financial services given their high cost? Do consumers have sufficient information to make informed usage decisions? Are the markets for these alternatives operating as one might expect a competitive market to operate?

The conference concluded with **Federal Reserve Chairman Ben Bernanke** speaking on the Community Reinvestment Act (CRA). As the Chairman explained, the CRA affirmed the obligation of federally insured depository institutions, which benefit from access to the financial safety net, including federal deposit insurance and the Federal Reserve's discount window, to help meet the credit needs of their communities, in a safe and sound manner. But over the 30 years since it was enacted, the CRA has evolved with the financial services industry. When the CRA was passed in 1977, many felt that poor conditions in American cities, and in particular in lower-income and minority neighborhoods, were partly caused by limited credit availability. As Chairman Bernanke explained, the CRA and other legislation passed in the 1970s, including the Equal Credit Opportunity Act, the Fair Housing Act, and the Home Mortgage Disclosure Act, were intended to reduce credit-related discrimination, expand

access to credit, and increase the information available to assess lending patterns. The banking industry has undergone significant changes since then, with interstate banking and branching, industry consolidation, the rise of the secondary mortgage market, and securitization. Banks have gained experience in underwriting loans in lower-income neighborhoods. Chairman Bernanke cited a Federal Reserve

rural areas and in disaster areas.


Chairman Bernanke said that the CRA will have to continue to evolve to reflect changes in financial markets and in the economy. He concluded his talk by pointing out some of the challenges that lay ahead. First, defining "local community" is becoming more difficult as institutions become more national in scope and with the advent of nontraditional delivery mechanisms

**The CRA affirmed the obligation of federally insured depository institutions, which benefit from access to the financial safety net, to help meet the credit needs of their communities, in a safe and sound manner.**

study that indicated that in general, CRA-related mortgage lending was at least somewhat profitable and usually did not involve disproportionately higher default rates than non-CRA mortgage lending (Avery, Bostic, and Canner, 2000).

In 1995, the CRA regulations were amended to emphasize performance over process and to lessen the compliance burden. Large institutions' compliance with CRA would be judged based on their performance with respect to lending, investments, and services, and small banks would be allowed to meet their requirements via a streamlined examination that focuses on lending activities. In 2005, further refinements were made, including expanding the definition of community development to cover activities that benefit middle-income communities in distressed

like the Internet. Second, nonbank institutions are becoming more important providers of financial services to lower-income communities. But these institutions are not subject to CRA. Third, access to credit in lower-income communities has increased, but more lending does not necessarily imply better outcomes. Distinguishing beneficial from harmful lending poses a challenge for regulators as they seek to ensure that the CRA continues to assist community economic development.

The presentations and discussion at the 2007 Federal Reserve System Community Affairs Research Conference help illuminate several aspects of community reinvestment and development finance. They also suggest that much remains to be learned. It is hoped that this conference will inspire further rigorous research in this area. 



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## NET WORTH AND HOUSING EQUITY

This paper documents the trends in the life-cycle profiles of net worth and housing equity between 1983 and 2004. The net worth of older households significantly increased during the housing boom of recent years. However, net worth grew by more than housing equity, in part because other assets also appreciated at the same time. Moreover, the younger elderly offset rising house prices by increasing their housing debt and used some of the proceeds to invest in other assets. The authors also consider how much of their housing equity older households can actually tap, using reverse mortgages. This fraction is lower at younger ages, such that young retirees can consume less than half of their housing equity. These results imply that “consumable” net worth is smaller than standard calculations of net worth.

*Working Paper 07-33, “Net Worth and Housing Equity in Retirement,” Todd Sinai, The Wharton School, University of Pennsylvania, and NBER, and Nicholas Souleles, The Wharton School, University of Pennsylvania, and Visiting Scholar, Federal Reserve Bank of Philadelphia*

## INCOME TAX REBATES AND CREDIT CARD ACCOUNTS

The authors use a new panel data set of credit card accounts to analyze how consumers responded to the 2001 federal in-

come tax rebates. They estimate the monthly response of credit card payments, spending, and debt, exploiting the unique, randomized timing of the rebate disbursement. They find that, on average, consumers initially saved some of the rebate by increasing their credit card payments and thereby paying down debt. But soon afterward their spending increased, counter to the canonical permanent-income model. Spending rose most for consumers who were initially most likely to be liquidity constrained, whereas debt declined most (so saving rose most) for unconstrained consumers. More generally, the results suggest that there can be important dynamics in consumers’ response to “lumpy” increases in income such as tax rebates, working in part through balance-sheet (liquidity) mechanisms.

*Working Paper 07-34, “The Reaction of Consumer Spending and Debt to Tax Rebates: Evidence from Consumer Credit Data,” Sumit Agarwal, Federal Reserve Bank of Chicago; Chunlin Liu, University of Nevada, Reno; and Nicholas Souleles, The Wharton School, University of Pennsylvania, and Visiting Scholar, Federal Reserve Bank of Philadelphia*

## MEASURING BANK PERFORMANCE: TWO EMPIRICAL APPROACHES

Great strides have been made in the theory of bank technology in terms of explaining banks’ comparative advantage in producing informationally intensive assets and financial services and in diversifying or offsetting a variety of risks. Great strides

have also been made in explaining sub-par managerial performance in terms of agency theory and in applying these theories to analyze the particular environment of banking. In recent years, the empirical modeling of bank technology and the measurement of bank performance have begun to incorporate these theoretical developments and yield interesting insights that reflect the unique nature and role of banking in modern economies. This paper gives an overview of two general empirical approaches to measuring bank performance and discusses some of the applications of these approaches found in the literature.

*Working Paper 08-1, "Efficiency in Banking: Theory, Practice, and Evidence," Joseph P. Hughes, Rutgers University, and Loretta J. Mester, Federal Reserve Bank of Philadelphia, and The Wharton School, University of Pennsylvania*

#### **BANK EFFICIENCY AND STRUCTURE: RECENT RESEARCH**

This paper discusses the research agenda on optimal bank productive efficiency and industrial structure. One goal of this agenda is to answer some fundamental questions in financial industry restructuring, such as what motivates bank managers to engage in mergers and acquisitions, and to evaluate the costs and benefits of consolidation, which is essentially an empirical question. The paper reviews the recent literature, including techniques for modeling bank production and the empirical results on scale economies, scope economies, and efficiency in banking.

*Working Paper 08-2, "Optimal Industrial Structure in Banking," Loretta J. Mester, Federal Reserve Bank of Philadelphia, and The Wharton School, University of Pennsylvania*

#### **INTERNATIONAL TRADE COSTS, INVENTORIES, AND DEVALUATIONS**

Fixed transaction costs and delivery lags are important costs of international trade. These costs lead firms to import infrequently and hold substantially larger inventories of imported goods than domestic goods. Using multiple sources of data, the authors document these facts. They then show that a parsimoniously parameterized model economy with importers facing an (S, s)-type inventory management problem successfully accounts for these features of the data. Moreover, the model can account for import and import price dynamics in the aftermath of large devaluations. In particular, desired inventory adjustment in response to a sudden, large increase in the relative price of imported goods creates a short-term trade implosion, an immediate, temporary drop in the value and number of distinct varieties imported, as well as a slow increase in the retail price of imported goods. The authors' study of six current account reversals following large devaluation episodes in the last decade provides strong support for the model's predictions.

*Working Paper 08-3, "Inventories, Lumpy Trade, and Large Devaluations," George Alessandria, Federal Reserve Bank of Philadelphia; Joseph Kaboski, Ohio State University; and Virgiliu Midrigan, New York University*