



**Credit  
Research  
Center**

**MONOGRAPH NO. 28**

**Theory and Evidence of the Impact of  
Equal Credit Opportunity**

**An Agnostic Review of the Literature**

**1989**

**THEORY AND EVIDENCE OF THE IMPACT OF EQUAL CREDIT  
OPPORTUNITY:  
AN AGNOSTIC REVIEW OF THE LITERATURE**

**Gregory E. Elliehausen and Thomas A. Durkin\***

Abstract

As amended in 1976, the Equal Credit Opportunity Act (ECOA) outlawed discrimination in granting credit on the basis of race, color, religion, national origin, sex or marital status, and age. This paper examines the difficulties of transforming the goals of the act into effective regulation, looks at what economic theory implies about the possibility of discriminatory behavior in credit markets, and reviews existing statistical evidence concerning discrimination in consumer credit markets. On balance, theory predicts little impact for the act, although a few cases are identified in which the ECOA could have an effect. Available studies have failed to produce much evidence of systematic discrimination. Moreover, there is little evidence that membership in ECOA-protected groups provides information about lack of creditworthiness or that the act has increased credit availability to anyone. Thus, the ECOA would not appear to have a profound effect on the operation of consumer credit markets.

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# **THEORY AND EVIDENCE OF THE IMPACT OF EQUAL CREDIT**

## **OPPORTUNITY:**

### **AN AGNOSTIC REVIEW OF THE LITERATURE**

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#### Introduction

Climaxing more than a decade of sharply intensified federal efforts to promote civil rights, Congress extended civil rights legislation to credit markets by passing the Equal Credit Opportunity Act (ECOA) in October 1974 (Public Law 93-495, Title V) and by substantially broadening its coverage in March 1976 (Public Law 94-239). Not limited exclusively to consumer credit, although both proposers and enforcers have devoted most of their attention to consumer credit, the original Equal Credit Opportunity Act of 1974 made it "unlawful for any creditor to discriminate against any applicant on the basis of sex or marital status with respect to any aspect of a credit transaction." Only five months after the effective date of the original act, Congress 2 expanded coverage in early 1976 to outlaw discrimination on the basis of<sup>2</sup>

1. race, color, religion, national origin, sex or marital status, age (provided the applicant has the capacity to contract);
2. because all or part of the applicant's income derives from any public assistance program; or
3. because the applicant has in good faith exercised any rights under the Consumer Credit Protection Act.

Again allowing one year for necessary drafting of implementing regulations, the revised act became effective on March 23, 1977.

Congress believed that ECOA would provide consumers with two significant benefits--enhanced credit access and consumer education. Of these, the major intended benefit involved easier access to credit for those classes of

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<sup>1</sup> Public Law 93-495, section 701

<sup>2</sup> Public Law 94-239, section 701

potential borrowers protected by the legislation. Congress stated this goal in the original act's statement of purpose and findings:<sup>3</sup>

The Congress finds that there is a need to insure that the various financial institutions and other firms engaged in the extensions of consumer credit exercise their responsibility to make credit available with fairness, impartiality, and without discrimination on the basis of sex or marital status .... It is the purpose of this Act to require that financial institutions and other firms engaged in the extension of credit make that credit equally available to all creditworthy customers without regard to sex or marital status.

The second intended benefit involved consumer education. Although this purpose was not as fully defined in the law, review of the legislative history and, the text of the act itself clearly reveals that congress also intended an educational benefit. As set out in section 701(d) of the revised act, Congress mandated that creditors provide applicants with notification of actions taken on credit applications and, most notably, with "specific reasons" for any "adverse actions" taken. According to the Senate Committee on Banking, Housing, and Urban Affairs which drafted the initial version of this provision, this section was to be "a strong and necessary adjunct to the antidiscrimination purpose of the legislation...."<sup>4</sup> In the Committee's view, this requirement would discourage creditors from discriminatory denials since reasons for denials must be revealed. In addition, the Committee believed this provision would satisfy wider educational goals. According to the Committee's Report on the pending bill, "Yet this requirement fulfills a broader need: rejected applicants will now be able to learn where and how their credit status is deficient and this information should have a pervasive and valuable educational benefit."<sup>5</sup>

The purpose of this paper is to review available evidence concerning the impact of this important law on consumer credit markets, particularly on credit availability for protected classes of consumers. The law's background and intent are examined in more detail in section II. Section III looks at the economic theory of discrimination to determine what theory reveals about circumstances when discrimination might be expected or not. Section IV then focuses on available empirical evidence concerning credit discrimination in consumer credit markets.<sup>6</sup>

### Background and Intent

Ultimately, the ECOA grew out of hearings on credit discrimination against women held by the National Commission on Consumer Finance (NCCF) in May 1972. The Commission did not recommend federal legislation in this area although it did urge the states to examine their laws for constraints--such as a prohibition of loans to both a husband and a wife by one lender--that could limit credit availability to creditworthy women. Beyond this, the Commission apparently preferred to let changing times and competitive markets work to reduce the extent of any discriminatory practices that may have existed at the time. According to the Commission,<sup>7</sup>

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<sup>3</sup> Public Law 93-495, section 502. Congress did not change this particular wording when it extended the act's coverage to include the other protected classes, but the legislative history and the text of the revised act as a whole make it amply clear that Congress viewed enhanced credit availability for all protected classes as the major goal of the revised law.

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<sup>4</sup> United States Senate (1976), p. 4

<sup>5</sup> Ibid.

<sup>6</sup> No attempt will be made to review the evidence on discrimination in mortgage markets. King (1979) and Benston (1981) provide excellent reviews of literature in this area. Recent studies include MacRae, Turner, and Yezar (1982), Barth, Cordes, and Yezar (1983), Shear and Yezar (1983), Avery and Canner (1984), and Black and Schweitzer (1985)

<sup>7</sup> National Commission on Consumer Finance (1972), p.153.

Many practices to which witnesses have objected have been inherited from past decades, if not centuries. They fail to reflect the times. The extensive publicity that accompanied the Commission's hearings has caused many credit grantors to reexamine their policies with respect to the existence of sex discrimination. In a competitive market, creditors responsive to these complaints will capture business from their more archaic competitors.

Even though it did not recommend federal legislation in its Report, the NCCF recalled that witnesses had presented the Commission with numerous documented accounts of difficulties women faced in obtaining credit. Characterizing the evidence as "anecdotal" (presumably as opposed to "systematic"), the Commission listed five points in its summary of the hearing record:<sup>8</sup>

1. Single women have more trouble obtaining credit than single men (this appeared to be more characteristic of mortgage credit than of consumer credit).
2. Creditors generally require a woman upon marriage to re-apply for credit, usually in her husband's name. Similar reapplication is not asked of men when they marry.
3. Creditors are often unwilling to extend credit to a married woman in her own name.
4. Creditors are often unwilling to count the wife's income when a married couple applies for credit.
5. Women who are divorced or widowed have trouble re-establishing credit. Women who are separated have a particularly difficult time, since the accounts may still be in the husband's name.

#### Passage of the Law

Less than six months after publication of the NCCF's Report, the Senate Committee on Banking, Housing, and Urban Affairs quoted the NCCF's summary as an important element of the Committee's analysis of the need for legislation.<sup>9</sup> The Committee also provided a long list of examples of other actions which, in its view, constituted discrimination on the basis of sex or marital status. Eventually, the bill which the Senate Committee developed became Title V of an omnibus bill amending a variety of financial regulatory acts. The bill passed both Houses of Congress in October 1974 and was signed by President Ford on October 28 of that year.

In April 1975, only six months after passage of the initial law and well before its effective date, the Subcommittee on Consumer Affairs of the House of Representatives Committee on Banking, Currency, and Housing held the first hearings on expanding the Equal Credit Opportunity Act. In its Report, the full Committee stated that new legislation was needed because the original ECOA was enacted in the waning days of the 93rd Congress when "it was impossible to achieve legislation that would have covered all forms of credit discrimination."<sup>10</sup> The Committee indicated that "numerous instances of denial of credit for reasons other than a person's creditworthiness" had been brought to the Committee's attention during its hearings, and that these and "further examples ... contained in the Committee's files" suggested the need for additional legislation.<sup>11</sup>

<sup>8</sup> National Commission on Consumer Finance (1972), p.152

<sup>9</sup> See United States Senate (1973),pp. 16-18

<sup>10</sup> United States House of Representatives (1975), p. 3

<sup>11</sup> ibid

The revised version of ECOA prohibiting discrimination on the basis of age (provided the applicant has the capacity to contract), race, color, religion, or national origin, as well as sex or marital status, passed the House first and was amended by the Senate to include prohibitions of discrimination based on receipt of public assistance benefits and good faith exercise of rights under the Consumer Credit Protection Act. The Senate also added a requirement for disclosure of reasons for adverse action. The Senate amendments in both areas were accepted by the House and both Houses of Congress agreed to the amended act on March 9, 1976; President Ford signed the act on March 23. Like the original ECOA, the revised act required the Board of Governors of the Federal Reserve System to issue the necessary implementing regulations. After public comments and necessary drafting periods, the Board issued the revised regulation (Regulation B, 12 C.F.R. 202) in December 1976 to be effective March 23, 1977.

### Some Difficulties of Transforming Intentions into Effective Regulation

As mentioned above, Congress intended two benefits from the ECOA - enhanced credit opportunity for protected classes and consumer education. To promote these twin goals, the law which emerged from the Congressional process is a hybrid containing both civil rights elements and disclosure requirements. Unfortunately, however, both areas illustrate the difficulties of transforming worthwhile ideas and goals into an effective regulatory structure.

First, in the civil rights area, to enhance credit opportunity for classes of protected borrowers, the law prohibits "discrimination" on the basis of any of a group of specified criteria. The problem is that it has proven difficult to define "discrimination" narrowly enough to outlaw all socially unacceptable differential treatment while permitting all legitimate efforts of creditors to screen bad risks at reasonable cost. The legislative history of the act shows quite clearly Congress did not intend to bar legitimate credit screening.<sup>12</sup> Always the challenge has been to produce an operational regulatory structure that enhances the credit opportunities of protected classes while permitting creditors to exclude poor credit risks legitimately.<sup>13</sup>

Congress itself avoided the sticky issue of how to make its civil rights objective operational by not defining "discriminate" in the text of the law, leaving this important decision to the Federal Reserve Board. In Section 202.4 of Regulation B, the Board stated the general rule implementing the civil rights portion of the act: "A creditor shall not discriminate against an applicant on a prohibited basis regarding any aspect of a credit transaction." The term "discriminate against an applicant" was defined in Section 202.2(n) as meaning "to treat an applicant less favorably than other applicants." Thus, in Regulation B, the Federal Reserve Board articulated the major civil rights protection of the act as prohibiting treatment of any credit applicant less favorably than any other on a prohibited basis in any aspect of a credit transaction. However, by itself, this rule does not offer an unquestionably unambiguous operational definition of socially unacceptable "discrimination" in a screening context where limited selections are constantly being made from a longer list of applicants. In fact, there are at least three alternative regulatory approaches. Because of its rule-writing obligation, the Federal Reserve had to examine the merits of each.

The first approach might be characterized as the "effects approach." Such an approach would emphasize the effects of credit screening, holding illegal any credit screening method that has the effect of treating a protected class less favorably, regardless of the reason for this effect. An extreme form of the effects approach might require credit

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<sup>12</sup> See, for example, United States Senate (1973). In discussing the definition of discrimination the Committee reported, "the committee recognizes that credit should be granted only to creditworthy individuals, valid and reasonable criteria used to determine creditworthiness must be determined by the members of the credit industry who bear the risk of extending credit," (p. 18)

<sup>13</sup> In the remainder of this paper the term "discrimination" is used in its pejorative sense to mean socially unacceptable differential treatment.

allocation based on population proportions or shares of credit applications. If amounts of credit supplied to protected groups were less than proportional to their share of the population or of credit applications, there would be a violation under a pure effects standard. The legislative history of ECOA demonstrates clearly that Congress never intended such an extreme form of credit opportunity. However, based on its discussion of the subject, it appears Congress did envision a more limited effects approach known as the "effects test."<sup>14</sup> Under the effects test, evidence of disproportionate credit granting would not, by itself, establish a violation. Nevertheless, such evidence could be used to establish a *prima facie* (rebuttable) case of discrimination which creditors might defend by showing the criteria they used in analyzing applications had a manifest relationship to creditworthiness.<sup>15</sup> In general, Regulation B does not take the effects approach, although it does mention the effects test in a footnote to Section 202.6(a).

The second approach might be called the "intent approach." Under this view of compliance and enforcement, a creditor firm would be judged in violation if it *intended* to treat applicants less favorably because they were members of some protected class. For example, any creditor intending to deny credit to applicants of a particular nationality regardless of creditworthiness would be in violation under this standard. Presumably, violations of a pure intent standard would be less frequent than violations of a pure effects standard. Violation of an intent standard would come about only through intentionally discriminatory acts, but disproportionate effects could arise in many other ways as well. For example, disproportionate amounts of credit granted to different population segments might arise from different employment, income, and other factors affecting creditworthiness, as well as from different purchasing and saving habits affecting credit demand and credit applications.

A third approach to ECOA compliance and enforcement might well be characterized as the "practices approach." Under this method, compliance efforts would not be judged on either effect or intent. Instead, both creditors and regulators would measure compliance by comparing practices to a mandatory list of do's and don't's. Essentially, this approach makes the basic assumption that complying with the list of requirements produces results satisfying the act's goals. In large degree, this is the approach of Regulation B. Rather than focusing on intent or ultimate effect, Regulation B provides a long list of required and prohibited practices. They range from mandatory requirement of separate credit histories for married women (Section 202.10) to prohibitions on requesting designation of courtesy titles (such as Mr. or Ms.) on application forms unless the forms "appropriately disclose that the designation of such a title is optional" (Section 202.6(d)(3)). Enforcement is inherently easier under this approach than under effects or intent standards, since examiners can be dispatched armed with simple checklists. The problem, of course, is the question whether the assumption is valid that compliance with any particular checklist satisfies the act's goal of enhanced opportunity.<sup>16</sup>

Beyond these fundamental definitional problems associated with ECOA's civil rights provisions, difficulties have also arisen in the education area. Essentially, the non civil-rights protections of ECOA require creditors to follow certain procedures, and especially to make certain disclosures, in the handling of credit applications. Section 701(d) of the act specifies requirements in two areas. First, creditors must notify applicants of actions taken on applications within 30 days of receipt of an application for credit (except for classes of credit transactions for which the Federal Reserve Board was permitted to specify longer "reasonable" times). Second, if the creditor takes "adverse action" on an application, then the applicant must be given notice of the "specific reasons" for the adverse action. As noted previously, Congress regarded provision of specific reasons for adverse action as an important tool for educating credit

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<sup>14</sup> See United States House of Representatives (1975), pp. 4-5; and United States Senate (1976), p. 4.

<sup>15</sup> The "effects test" grew out of United States Supreme Court decisions in the employment area. See *Griggs v. Duke Power Co.*, 401 U.S. 424 (1971), and *Albemarle Paper Co. v. Moody*, 422 U.S. 405 (1975). For discussion of applicability in the credit area see Board of Governors (1977) and Hsia (1977).

<sup>16</sup> For further discussion of this point see Chandler and Ewert (1976).

applicants about the credit process. However, problems arise because acceptance or rejection of credit applications (whether judgmentally or by numerical credit scoring) normally involves simultaneous consideration of the effects of many variables resulting in acceptance or rejection of the entire profile. Consequently, specifying any subset as the "specific reasons" for acceptance or rejection is not possible in most cases.<sup>17</sup> Federal Reserve attempts to wrestle with this problem by interpreting Regulation B produced a lengthy regulatory proceeding lasting from April 1979 until October 1982.<sup>18</sup> Little more will be said about education in the remainder of this paper which will focus on the credit-availability function of the ECOA.

### Economic Theory of Discrimination

The theoretical framework for analyzing discrimination in consumer credit markets is based on economic models developed originally for studying discrimination in labor markets.<sup>19</sup> In general, these models adopt the intent approach to defining discrimination. The models themselves are representations of assumptions, hypotheses, and theory, usually in mathematical form, which are used to delineate conditions when intentional discrimination might be expected or not. Within the frameworks established, analysts then employ empirical methods to test theoretical conclusions against actual market results.

Fundamentally, there are two types of labor-market discrimination models. The first postulates that individuals or firms have a preference (or "taste") for discrimination and derives implications of this assumption using traditional neoclassical economic theory. A fundamental conclusion of these theoretical studies is that intentional discrimination will not exist in equilibrium in a competitive market. The second approach appends to traditional neoclassical economics a newer branch of theory known as the "economics of information."<sup>20</sup> This approach points out that obtaining information about market participants may be costly in many cases. In these cases, group membership may be an imperfect but less costly source of information on the performance of market participants. As a result, intentional discrimination can exist under such circumstances, even if firms themselves do not exhibit a taste for discrimination.

### Preferences for Discrimination

Models postulating a "taste" for discrimination are based ultimately on the work of Gary Becker (1971). According to Becker, an individual has a "taste for discrimination" if he acts as if he were willing to pay something, either directly or indirectly in the form of reduced income, to be associated with some people rather than others. Becker explored this willingness to pay for discrimination by using a statistic he developed and referred to as a "discrimination coefficient." The discrimination coefficient reflects the relative difference between the potential money costs of a possible transaction and the (higher) net costs of the same transaction where the cost of discriminating is included as part of net costs. Specifically, the discrimination coefficient is the difference between money costs and higher net costs expressed as a proportion of money costs. For example, suppose that an employer would employ white workers at a wage rate  $w_w$  but would be willing to employ equally productive black workers only at a lower wage rate  $w_B$ . In this case, the employer's taste for discrimination would cause him to pay an amount  $w_w - w_B$  per worker to avoid employing black workers. Becker's discrimination coefficient, DC, is defined as:  $DC = (w_w - w_B)/w_B$ .

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<sup>17</sup> For extended discussion of this problem see Eisenbeis (1980).

<sup>18</sup> Board of Governors (1982).

<sup>19</sup> Labor market models have also been widely used in studying the theory of credit rationing. See Milde (1974) and Baltensperger (1978).

<sup>20</sup> This branch of theory traces its origins to Stigler (1961). For a more recent survey see Rothschild (1973).

This example can be used to illustrate an individual employer's behavior. Suppose that discrimination in the market establishes a higher equilibrium money wage rate for white workers than for black workers. The relative difference between these wage rates is the market discrimination coefficient  $DCMI$ . However, an individual employer acts on the basis of his own discrimination coefficient rather than the market coefficient (or, in other words, on the basis of (subjective) net wage rates rather than money wage rates). Thus, if the employer's own coefficient is less than the market coefficient (that is, this employer would not be willing to pay as much to discriminate as the market would pay on average), then this employer would hire only black workers because the savings in money wages would exceed the disutility of employing black workers. Similarly, an employer with a discrimination coefficient greater than  $DCM$  would hire only white workers because the disutility of employing black workers exceeds the additional cost of paying the extra wage for white workers. Obviously, the distribution of individual firms' discrimination coefficients is an important factor in determining the extent of their discrimination in the market.

Becker argued that under a wide range of circumstances market forces would push market discrimination coefficients toward zero or, in other words, that under these conditions discrimination would not exist in equilibrium. He divided the discussion into two fundamental cases: competitive and imperfectly competitive output markets. First, he showed that in competitive markets if the industry is characterized by either constant or decreasing unit costs as output expands, then the firm with the smallest discrimination coefficient would have the lowest unit cost and it could undersell all other firms. As a result, the least discriminating firm would produce the total output, and ultimately the market discrimination coefficient would equal this firm's discrimination coefficient. Moreover, even if only one employer lacks a taste for discrimination (that is, its discrimination coefficient is zero), then the equilibrium market coefficient would be zero.<sup>21</sup>

Second, Becker suggested that even in imperfectly competitive output markets, the equilibrium market discrimination coefficient would also equal zero if capital markets are competitive, firms' assets are transferable, and at least one producer has no taste for discrimination. A firm in an imperfectly competitive market with a relatively large discrimination coefficient would have higher net costs and receive a lower net income than other potential producers. However, the owner of the firm could receive a larger net income by selling the firm to an individual with a lower discrimination coefficient than by keeping the firm. It follows, then, that if capital markets are competitive and assets are transferable, the firm would be sold to the bidder with the lowest discrimination coefficient since this firm would make the highest bid. Again, if at least one potential employer had a discrimination coefficient of zero, then the equilibrium market coefficient would be zero as well.<sup>22</sup>

Peterson and Peterson (1978) and Peterson (1979 and 1981) adopted Becker's model as a framework for studying possible discrimination in consumer credit markets. Following Becker, they proposed that a creditor with a taste for discrimination would adjust the expected costs of a requested loan by adding a discrimination coefficient.

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<sup>21</sup> These conclusions would not necessarily follow if firms' production functions were characterized by decreasing returns to scale (increasing unit costs). In this case the less discriminatory firms would not produce total output. Firms with smaller discrimination coefficients would have larger profits and would tend to expand relative to other firms, but in this case rising unit costs would limit the levels of output for which firms have a cost advantage. The limited expansion of firms with smaller discrimination coefficients would force the wage rate for black workers to rise relative to the wage rate for white workers and reduce the market discrimination coefficient. But, in this case, decreasing returns to scale would prevent the least discriminatory firm from producing the total output, and the resulting market discrimination coefficient would be greater than the lowest firm's coefficient.

However, this case does not appear important for consumer credit markets because statistical cost studies suggest that consumer credit costs are constant or slightly decreasing over normal output ranges. See Benston (1965, 1972, 1977), Bell and Murphy (1968), Durkin (1972, 1977), Rogers (1974), Durkin and McAlister (1977), and Murphy (1972).

<sup>22</sup> In contrast, if a firm's assets were not transferrable, then there would be no market incentive reducing the market discrimination coefficient. For discussion of all the possible conditions, see Becker (1971). In general, completely nontransferrable assets are not found in most industries.

Thus, because this adjustment would make these loans subjectively more costly to creditors, the Petersons argued creditors would treat those discriminated against differently before they would grant them credit. In particular, the Petersons contended that discriminating creditors would apply higher standards of creditworthiness, charge higher interest rates, or impose more stringent nonprice credit terms on credit to unfavored applicants than they would require on credit to equally creditworthy favored borrowers. However, the Petersons argued that even if creditors have preferences for discrimination, competition in both output and capital markets would act to reduce or eliminate equilibrium discrimination coefficients, as predicted by Becker's model.<sup>2324</sup>

In contrast to Becker, Alchian and Kessel (1962) suggested that public regulation could provide conditions conducive to discrimination in imperfectly competitive product (output) markets, even if capital markets are competitive and firms' assets are transferable. Public regulation often protects monopolists from competition, but at the same time it often fixes prices to prevent rates of return above competitive rates. Monopolists who appear to be too profitable are likely to face pressures to reduce prices; and, consequently, they may prefer to take potential excess profits in nonpecuniary forms which can be treated as costs.<sup>25</sup> For example, a profit-maximizing public utility monopolist with only small taste for discrimination might prefer to hire only higher-wage white workers because the firm would not be allowed not keep the additional profits from hiring black workers at a lower wage anyway. In the credit area, creditors with even a small taste for discrimination might be induced to ignore profitable loans to unfavored groups and to prefer loans to more marginal risks among favored classes. Ultimately, the restriction on pecuniary income caused by public regulation or its threat could prevent potential producers with lower discrimination coefficients from making a sufficiently large enough bid to induce relatively more discriminatory monopolists to sell their firms.

Chartering and branching restrictions on commercial banks, convenience and advantage licensing of finance companies, and historical differential rate ceilings and loan size limits by institutional class potentially limit entry and restrict competition in consumer lending.<sup>26</sup> Thus, if no other information were available, the presence of these regulatory constraints on entry and prices might suggest that Alchian and Kessel's model could be applicable to consumer credit markets. However, a variety of empirical studies found evidence of strong inter-institutional competition in consumer credit markets.<sup>27</sup> These studies suggest that regulation may not constrain lenders' behavior in at least the portions of the markets studied and, based on Becker's model, they imply that competition will reduce discrimination in consumer lending.

In sum, neoclassical theoretical models show how a firm's tastes for discrimination may result in discriminating behavior in the market and suggests that over time competition will tend to eliminate intent-based discrimination unless

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<sup>23</sup> The Petersons' empirical findings, which support their theoretical discussion, are reviewed in the next section of this paper.

<sup>24</sup> Within the Becker framework, the Petersons also maintained that important other conditions in credit markets suggested that discrimination there would likely be less than in labor markets. For example, unlike the labor market where contact between an employer and an employee is frequent, the usual contact between a creditor and an applicant is limited to a short period of time when the application is made. Consequently, according to the Petersons, discrimination coefficients resulting from creditor's aversion to contact with members of another group are likely to be much lower in credit transactions than in the work environment. As a result, they predicted there would be less discrimination in credit markets than in labor markets. Of course, by itself, this argument is not entirely satisfactory for drawing conclusions about the likely extent of discrimination. Arrow (1972) has suggested that dislike of association with certain groups depends on the nature of the association and that physical proximity may be significant only in some contexts. For example, unlike race, it seems unlikely that physical proximity would be a reason for creditors to discriminate on the basis of attributes such as sex or marital status. Other considerations could have to explain these kinds of discrimination. Thus, limited contact between parties in credit markets does not necessarily imply that lenders' preferences for discrimination would be relatively weak in all cases. In many situations other social considerations might be important instead. However, as noted, the Petersons did not rely solely on the proximity argument.

<sup>25</sup> Alchian and Kessel suggested that any large firm may manifest the behavior of a regulated monopoly. If an unregulated large firm appears too profitable, the firm bears the risk the state may subject it to explicit regulation or destroy it through antitrust action.

<sup>26</sup> For discussion of entry barriers and rate ceilings in consumer lending, see National Commission on Consumer Finance (1972), Chapter 7.

<sup>27</sup> See Fand and Forbes (1968), Shay (1970, 1974), Sartoris (1972), Smith (1973), Boczar (1978), and Johnson and Sullivan (1981).

constrained by regulation. However, the neoclassical approach has a number of limitations. First, the neoclassical models offer no insights about timing, of events, such as how long it will take for competition to have its predicted effects. If time periods are long because competition works slowly, then discriminating firms may exist for a time, even if they continuously lose ground and ultimately are eliminated from the market as theory predicts. To explore this possibility, empirical work seems in order. Second, the neoclassical models do not explain reasons for existence of the taste for discrimination which is costly to those that have it. Costly preferences for discrimination are simply postulated for theoretical purposes, and their implications are explored leading to the conclusion that markets will eliminate such tastes. As will be discussed further in the next section, the information-cost models analyze the implications of another possibility --that discriminatory behavior arises because in some cases it can reduce costs. Obviously, these implications might be different from those of the neoclassical models.

Nonetheless, despite their limitations, the neoclassical models are important for producing conclusions about possible discrimination arising from tastes, and the timing issue raises three fundamental empirical questions for study:

1. extent of discrimination against protected classes before passage of the law;
2. impact of the law in increasing credit opportunity of protected classes; and
3. other effects of the law, if any.

### Information-Cost Models of Discrimination

As mentioned above, in recent years economists have used a new branch of theory called the "economics of information" to add to neoclassical theoretical models of discrimination. The information theory approach goes beyond the neoclassical approach to explore in more detail possible reasons for discrimination. But, rather than assuming that discrimination arises from tastes and is costly, the information approach argues that discrimination can arise instead from attempts to reduce costs. Under these circumstances, there are cases in which discrimination may be economically rational. As it turns out, competitive markets may not always eliminate such discrimination.

For example, in the labor market an employer does not know the performance of a job applicant until after the applicant is hired. The employer could hire every applicant and dismiss those who were unqualified, but this would require the employer to incur an investment cost in each applicant. Alternatively, the employer could find some less expensive source of information which is related to job performance--such as an education criterion--and could base decisions on this information. Similarly, a creditor does not know beforehand whether a loan applicant will be able and willing to repay as promised. The creditor could extend credit to all applicants and incur losses on credit to unqualified borrowers, or the firm could evaluate applicants on the basis of more inexpensively observed attributes--such as occupation or credit references--which are related to repayment performance. In both cases, discrimination may result if membership in some demographic group is related to (provides information about) market performance.

An early information-theory model of discrimination was developed by Edmund S. Phelps (1972).<sup>28</sup> In Phelps' model, an employer administers a test to job applicants and uses the test to predict an applicant's job performance. In the absence of any further information about applicants, performance would be predicted solely on applicants' test scores. However, employers fully realize that test scores are not a perfect predictor of performance; some employees

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<sup>28</sup> Arrow (1972) independently developed a similar model.

will perform better than predicted by their score and some will not perform as well.<sup>29</sup> As a result, employers are interested in obtaining additional information about potential employees before going to the expense of hiring them.

For discussion, Phelps assumed that employers also are able to observe whether or not applicants are members of particular groups (to use some simple examples, say, whether or not they are law-school graduates, veterans, athletes, born in New Jersey, and so forth) and that membership in some groups is somehow related to performance. Thus, based on prior experience, if the employer knows that applicants who are members of some groups perform better on average than nonmembers --even if their test scores are the same--then the employer has additional information that may be useful in hiring.<sup>30</sup> Of course, using such information for making hiring decisions could lead to socially unacceptable differential treatment (discrimination) if the group criterion used is socially sensitive, such as a social or religious criterion.<sup>31</sup>

Phelps discussed two possible cases where group membership provides additional information. In the first case, the impact of group membership on performance is independent of level of test score. In this case, it is always better to be a member of the favored (high-performing) group, regardless of level of test score. If employers planning to hire additional workers require some minimum (threshold) level of expected performance, they would tend to favor members of the favored group at every test-score level. Examined from the other perspective, applicants who were not members of the favored group would have to exhibit higher test scores before they would be hired. Clearly, depending on the group-membership variable, unacceptable discrimination could result.

Under the conditions that group membership provides additional information about performance and that the group membership effect is independent of test score, any legal limitation using this additional information would tend to benefit members of the disadvantaged (lower-performing) group relative to the advantaged class. If, for example, being born in New Jersey were an indication of good job performance and were, therefore, a positive factor to prospective employers, prohibiting employers from using this information would benefit relatively those not born in the state. Of course, relative gains might not translate into absolute gains. If, for example, limitation or prohibition on using group membership information significantly worsened the quality of hiring decisions (that is, made the decisions significantly more costly), then fewer might be hired from both groups despite relative improvement in the position of the lower-performing group.

In his second case, Phelps added an additional complexity. Instead of assuming a group effect that is independent of test score, Phelps explored the possibility that variability of performance (and, consequently, the credibility of test scores as a predictor of performance) depends on group membership. In this case, group membership might have a widely different impact at different levels of test score.<sup>32</sup> For example, being from New Jersey might be a large negative factor at low test scores, but it might be only a small negative factor or even a positive factor at high scores. Furthermore, if test scores of applicants from New Jersey are less reliable than scores of other applicants (that is, they measure performance with greater error), then being from New Jersey might be a positive factor or only slightly negative at low test scores, but it might be a large negative factor at high test scores. Obviously, the impact of group

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<sup>29</sup> In formal terms, the test score  $y_i$  measures the applicant's expected job performance  $q_i$  with random error  $e_i$ . That is,  $y_i = q_i + e_i$ , where  $e_i$  is a random variable with mean zero.

<sup>30</sup> In econometrics, models of this general form are known as "errors-in-the-variables" models. For general discussion of models of this type see Johnston (1972), pp. 281-283.

<sup>31</sup> If beliefs about group differences are not based on fact, then the effects of Phelps's model are similar to models based on tastes even though the genesis is different. For discussion see Arrow (1972), p. 97.

<sup>32</sup> Econometrically, the slope of the regression of performance on test score depends on group membership.

membership is ambiguous in this case. At low test scores, there may be one impact and at higher scores there may be another.

From a public policy standpoint, Phelps' second case poses the special problem that prohibitions on using group membership information in selection procedures may not always help "protected" classes, even relatively. Because the group effect is not independent of the test score, prohibiting use of group membership information may help protected classes at one level of test score. But, at other levels of these scores, such a prohibition may actually relatively disadvantage them. Thus, to determine the (possibly ambiguous) effect of prohibiting use of group membership information, empirical work seems necessary.

Phelps' model can readily be applied to consumer credit markets. Instead of administering employment tests, a creditor examines applicants' characteristics that have proven to be reliable indicators of creditworthiness. The creditor's evaluations are summarized by an index or credit score which imperfectly predicts applicants' likely performance.<sup>33</sup> But, as in the labor market, the creditor's previous experience indicates that on average one group's performance is better or worse than that of another group. In this case, other things equal, creditors would tend to favor the better-performing group.

Consequently, prohibiting use of this information should improve the position of the disadvantaged class relatively, other things equal. However, the relative gain might not translate into an absolute benefit if costs rise. Moreover, if group membership has a different relationship to performance at different levels of credit score, prohibiting creditors from categorizing applicants into these groups could have differing impacts depending on score.

Empirically, Phelps' information-theory model adds some questions for investigation to those suggested by the neoclassical models. In summary, these involve the usefulness of information in making judgments and the impact on protected groups of eliminating use of the information:

4. extent, if any, to which demographic group membership provides information about market performance;
5. whether or not the group membership effect, if any, is independent of credit-evaluation test score; and
6. whether any relative benefits due to prohibiting group membership information translate into absolute gains for any group.

Avery (1981a) developed a model of credit screening under imperfect information which is based on the Phelps approach. Actually, the Avery model is a generalization of the Phelps approach to a wider variety of cases. In Avery's model, the creditor collects information on financial and economic characteristics of the applicant (the "economic variables" in Avery's terminology for the "test scores" in the Phelps model) and summarizes this information as a probability distribution of rates of return. The creditor also observes group membership and notes that group membership provides information about the probability distribution of returns. However, no matter whether

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<sup>33</sup> Although the term "credit score" is generally associated with statistical evaluation systems, this discussion applies to judgmental credit evaluation systems as well. Both statistical and judgmental systems are based on the same principal; the only difference is the method by which creditworthiness is estimated. For further discussion, see Chandler and Coffman (1979) and Eisenbeis (1980).

performance expectations are based on economic or both economic and group-membership variables, the creditor's decision rule is to grant credit if expected return is greater than expected costs (including a provision for possible default costs).

Avery considered two possible ways group membership information might be related to the distribution of returns. In the first case, both the distribution of economic variables and the related distribution of rates of return are uniformly higher for one group than they are for the other. Using the previous example and assuming that the only economic variable is income, then this case postulates that the income distribution and the related expected return are uniformly higher for credit applicants born in New Jersey than for credit applicants born outside the state. As a result, a random credit applicant is more likely to be accepted if he is from New Jersey--not because of his group membership, but because if he is from New Jersey, he is more likely to be higher income and more likely to produce an acceptable return. Consequently, even for equal numbers of random applicants from the two groups, the acceptance ratio and the number accepted would be higher for the New Jersey group.

Avery called this possibility the "endowment effect." It would not constitute discrimination under the intent or practices approaches discussed earlier because the differential acceptance rates arose from unlike distributions of the economic variables between groups, not from group membership itself.<sup>34</sup> Realistic examples of the endowment effect abound. If blacks, for example, earn lower incomes than whites, then to the extent creditworthiness is related to income, whites would be more likely than blacks to be granted credit.

Avery's second possibility is the case in which group membership itself provides information about expected returns beyond the information provided by the economic variables alone. In particular, in this case creditors observe group membership and believe that the expected rate of return given the economic variables and group membership differs from the expected rate of return given only the economic variables. This is the first case explored by Phelps.<sup>35</sup> Again using the New Jersey example, in this case applicants from New Jersey are better risks for any given level of income than applicants not from New Jersey. Thus, group membership provides additional information--in effect, it becomes another economic variable. Avery called this possibility the "mean shift effect." Under this assumption, any consideration of group membership reduces the probability of acceptance for applicants from the low-return group. For example, in the past some creditors have contended that marital status is a group-membership variable that provides information about creditworthiness. If married applicants are, in fact, better credit risks on average than divorced applicants, then marital status provides information beyond that supplied by other available variables.

After developing his two cases (endowment effect case and mean shift effect or "Phelps" case), Avery used the model to examine how a creditor might react to two of the ECOA approaches mentioned earlier, the practices approach and the effects approach. Thus, in all, Avery considered four situations--each of two ECOA approaches under each of two information cases.

First, under the practices approach, ECOA prohibits use of group membership information in the credit screening process. Avery's model shows this would have no effect on the credit screening process if group differences arise solely from an endowment effect. Simply stated, if group membership provided creditors no additional useful information, then prohibiting its use has no particular impact on credit screening.<sup>36</sup>

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<sup>34</sup> The different acceptance rates would constitute "discrimination" under the effects approach also discussed above.

<sup>35</sup> Econometrically, it is the "errors-in-the-variables" model.

<sup>36</sup> There may be, of course, an impact on costs as creditors comply with regulatory requirements.

However, the situation is different under the practices approach to ECOA when there is a mean shift effect (the "Phelps" information case). In the mean shift case, group membership provides additional information; consequently, prohibiting its use has an impact. In particular, prohibiting use of group membership information raises the probability of acceptance for a random applicant from the low-return group and it reduces the probability of acceptance for a random applicant from the high-return group.<sup>37</sup> However, the prohibition also makes the credit screening process less accurate and probably more costly overall. As a result, credit is more costly because default losses increase, potentially profitable applicants are rejected, or a more costly screening process must be used.

Next, Avery examined implications of ECOA under the effects approach to defining unacceptable discrimination.<sup>38</sup> As defined earlier, the effects approach would prohibit any credit screening which leads to significant differences in credit rejection rates for different groups. In other words, the effects approach would require that the probability of acceptance be the same for members of the low-return and high-return groups.

In this case, Avery's model produces the not-very-startling result that the pure effects approach will have an impact on credit markets-regardless whether group differences are associated with an endowment effect or a mean shift effect. In particular, the effects approach will produce a higher acceptance ratio for the low-return group, a lower acceptance rate for the high-return group, and a less accurate and more costly credit screening process.<sup>39</sup> In addition, if an endowment effect is present (with or without a mean shift effect), the model shows that the effects approach also produces reverse discrimination: applicants would have to be treated unequally to achieve an equal probability of acceptance for low- and high-return groups. Specifically, the creditor would have to set a higher threshold rate of return for high-return applicants than for low-return applicants., As a practical matter, the implication of reverse discrimination under the effects approach with an endowment effect need not be overemphasized since, as mentioned earlier, the basic thrust of ECOA through Regulation B involves the practices approach rather than the effects approach.<sup>40</sup>

Nevertheless, since the practices approach produces an impact on markets when there is a mean shift effect, presence or not of this effect is a major empirical issue raised by the Avery model.<sup>41</sup> If group differences are caused solely by an endowment effect, then the practices approach will have no impact except to cause some compliance costs among creditors if they must change procedures, reprint forms, keep additional records, etc. If, in contrast, group differences are caused by a mean shift effect, then Avery's model predicts the practices approach prohibiting use of group membership information would change acceptance probabilities as well as make the credit screening process less efficient and more costly.

In sum, consistent with the Phelps model, Avery showed that the practices approach to ECOA adopted in Regulation B could increase credit acceptance rates among protected classes if denials arose from a mean shift effect (the Phelps case). Under the effects approach, higher acceptances would result if either the endowment or mean shift effects were present. Unfortunately, in either case the higher acceptance rates would be achieved only at higher cost and with greater inefficiency in the screening process.

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<sup>37</sup> This is the relative gain predicted by the Phelps model. Of course, this may not generate an absolute gain. Also, if the second Phelps case were present (group effect not independent of score), even relative impact could be ambiguous, as discussed above.

<sup>38</sup> Avery used slightly different terminology than employed here, using the term "effects test" for what is referred to here as the pure "effects approach."

<sup>39</sup> This is the same impact as the practices approach with a mean shift effect, discussed above.

<sup>40</sup> This could, of course, change in the future if the courts extend the effects- test approach to credit markets in a significant way.

<sup>41</sup> This question of the extent to which group membership provides information (i.e., presence or not of Avery's "mean shift effect") was also raised by the Phelps model.

There is no reason to assume that creditors will simply accept higher costs, however. Instead, it seems likely that creditors would take subsequent actions to reduce costs. Indeed, economic theory suggests that in a competitive market, firms must take all available options of reducing production costs or they will be driven from the market in the long run. For this reason, in a final major section of his paper Avery extended his model to the situation where creditors economize on screening costs by controlling which potential applicants actually apply. The basic idea of the extended model is that the creditor performs an initial screening of potential applicants using a limited subset of information (which, for simplicity, Avery assumed could be collected without cost). The creditor's decision rule is to take an application if the expected rate of return based on this first subset of information exceeds a threshold rate of return which reflects the cost of processing applications. Simply stated, if a (costlessly collected) subset of information suggests it is worthwhile to take an application, the creditor firm will do so; otherwise, it will not. If the decision is made to take an application, then the creditor will collect additional (costly) information and decide whether to grant credit based on expected returns from doing so. Avery called the initial screening of potential applicants "indirect screening" to distinguish it from the screening of actual loan applications, which he called "direct screening."

In the context of his extended model, Avery showed that if indirect screening using group membership information is possible, the ECOA will cause the creditor to raise indirect screening thresholds. This would happen because the ECOA-prescribed restrictions on information use reduce the profitability of credit (since if Regulation B has any impact, more unprofitable low-return applicants and fewer profitable high-return applicants will be accepted). Moreover, Avery's analysis also showed that the threshold for the low-return group will be raised relatively more than the threshold for the high-return group. Thus, even if ECOA raises the probability of obtaining credit among applicants in the low-return group (through the act's restrictions on using group membership information as a direct-screening variable), the higher costs that result will encourage greater indirect screening which reduces the number of applicants from both groups. Furthermore, the impact of indirect screening will be greater on the low-return group, presumably the group the act is designed to protect. In effect, the impact of prohibitions on information use in the direct screening process may be counteracted in large part by the effects of indirect screening that arise as a substitute for direct screening.

In practice, indirect screening is likely to take the form of activities by the lender to make it more costly for certain potential applicants to apply for credit rather than an explicit refusal to accept applications. For example, if prospective debtors are more likely to apply for credit in their own neighborhoods, a creditor could indirectly screen potential applicants by the selection of the neighborhoods in which stores or branches are located. Because potential debtors are discouraged from applying, it may be difficult to distinguish indirect screening from differences in the demand for credit. In the example given above, a lack of offices in certain neighborhoods might also be explained by insufficient credit demand in these neighborhoods. Thus, the possibility of indirect screening increases the difficulty of assessing the impact of ECOA since the applicant pool itself may change as a result of the law.

In sum, unlike the neoclassical models, Phelps' and Avery's information-theory models suggest that there are some plausible conditions under which ECOA will have an impact on markets. In particular, under the practices approach adopted in Regulation B, ECOA can be expected to have an impact if group membership provides information about creditworthiness beyond the information provided by other variables (Avery's mean shift effect). Of course, the presence or not of a mean shift effect and the degree of resulting impact of ECOA are empirical questions. However, the models predict that if there is an impact, it would be to raise the acceptance probabilities of protected groups, but at higher level of cost and inefficiency. Greater inefficiency would then lower the acceptance probabilities of all groups, possibly disadvantaging everyone absolutely.

Beyond Phelps and Avery, Spence (1973, 1974) developed a third information-theory model with implications for ECOA. Importantly, the Spence model suggests that under certain circumstances, the practices approach to ECOA may have negative impacts on protected groups even relatively. This anomalous result comes about if members of protected groups use different information to "signal" their creditworthiness to creditors, but the law and regulation prevent creditors from "seeing" the signal.

In both the Phelps and Avery models, employers or creditors predict applicants' performance based on previous experience with applicants exhibiting similar characteristics, where "characteristic" refers to all relevant variables including group membership. However, neither model attempts to explain the reasons why applicants' characteristics may be related to performance. Spence examined this issue. Concentrating on labor markets, Spence focused on the possibility that at least some characteristics are related to performance because job applicants choose to use alterable characteristics to reveal or "signal" future performance to prospective employers. Within this context where some characteristics are signals, Spence then explained why group membership might be an important dimension to employers, even if group membership is not alterable and, by itself, it provides no information about performance.

In Spence's model, the employer observes the relationship between performance and individual characteristics for recently hired employees and expresses the relationship as a conditional probability distribution. In other words, there is a probability distribution of possible performance levels conditional on the states of individuals' characteristics. To use an example, an employer might realize that the distribution of workers' productivity levels is conditioned on their education levels. If so, then employers would be prompted to consider variable wage offers based on education level. As long as a higher wage to better-educated employees was more than offset by greater productivity, then the employer would be better off to hire applicants with more education.

Potential employees would, of course, quickly notice higher wages to better-educated applicants and invest in education if there is sufficient return to acquiring the education. In this way, potentially productive employees would "signal" their greater potential productivity to employers. However, it is easy to see that a characteristic cannot effectively serve as a signal if everyone can acquire it easily (i.e., acquire it at low cost). Thus, a decision to acquire a characteristic can serve as a signal only as long as the costs of acquiring the characteristic (the "signaling costs") are inversely related to performance. For example, education can serve to signal performance as long as high-performance individuals can acquire education more easily than low-performance individuals. If high-performance individuals can acquire, say, a high school diploma or a college degree more easily than low-performance individuals, then education can serve to signal performance. If this inverse cost relation exists and the difference in wages is sufficient to induce high performance (but not low-performance) individuals to invest in education, then education can serve as a signal of performance.<sup>42</sup>

Spence's signaling theory presents the possibility that group membership might be an important evaluative criterion, even if group membership itself is completely uncorrelated with performance. The reason is that unalterable characteristics might have the effect of defining groups with different signaling capabilities. In this case, signaling information of one group could be independent of signaling information of other groups. Under these circumstances,

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<sup>42</sup> This process is part of what is known as an information feedback loop. After hiring and subsequent observation of how signals relate to performance of signaling employees, the employer will adjust the conditional probabilities and a new round will begin. In general, the conditional probability distribution for the new group will differ from the distribution for the previous group. However, a stable signaling equilibrium will exist if the employer starts out with a conditional probability distribution that is not disconfirmed in the next round by the incoming data. For further discussion and mathematical analysis of signaling equilibrium see Spence (1974).

observers' assessment or conditional probabilities of performance would depend on both group membership and signaling variables even though group membership is totally uncorrelated with performance.

Suppose, for example, that in the bank credit card market the proportion of high-performance men (those who always pay on time) is exactly the same as the proportion of high-performance women. Assume also that card issuers have discovered through experience that "time on the job" is a useful signal of creditworthiness. Now, suppose that, on average, creditworthy women have fewer years on their jobs (because of past employment discrimination or some other reason). The result is that a particular number of years on the job will potentially signal different levels of creditworthiness among men and women. Under the circumstances because the signals are different, properly assessing creditworthiness among both men and women would depend on the signals and group membership, even though performance itself is uncorrelated with group.<sup>43</sup>

Spence's signaling approach to the impact of group-membership variables has potential implications for administration of the Equal Credit Opportunity Act. A practices approach which forbids use of group-membership variables in a credit evaluation scheme essentially assumes that the relationship between performance and alterable characteristics of applicants (i.e., "signals") is the same for all groups. If this is true, then the impact of ECOA will be to make differential treatment more difficult for those who intend to discriminate on a prohibited basis. However, if signals are not the same among groups, then the impact could be quite different. In this case, allowable credit criteria would be based on experience with the dominant group, to the possible disadvantage of others.

In conclusion, it seems that neither neoclassical nor information-theory models predict much success for the ECOA. Neoclassical models of the Becker type do not predict the existence of discrimination as long as output markets are competitive or firms' assets are transferable, both of which conditions seem to characterize consumer credit markets. Thus, if no one discriminates, then ECOA will not wipe out any discrimination, though it may raise operating costs. In contrast, information-theory models specify some plausible conditions under which differential treatment may occur, namely, when group membership provides some information potentially useful in predicting applicants' scores. Under these conditions, both the practices approach and the effects approach to ECOA would have an impact on markets, although the impact on protected groups is unclear from theory alone and may be detrimental. In all, the theoretical models raise at least six interesting empirical questions, which may be grouped into three classifications:

#### A. Group Membership and Information About Market Performance

1. Extent, if any, to which demographic group membership provides information about market performance.
2. Whether or not the group membership effect, if any, is independent of credit-evaluation test score.

#### B. Existence of Discrimination

3. Extent of discrimination against protected classes before, passage of the law.

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<sup>43</sup> In general, any factor that causes groups to invest differently in signals will cause this result. Moreover, if resulting conditional probability assessments are not disconfirmed in the subsequent round, different stable signaling equilibrium will be obtained for each group.

## C. Effects of ECOA

4. Impact of the law in increasing credit opportunity of protected classes.
5. Whether any relative benefits due to prohibiting group membership information translate into absolute gains for any group.
6. Other effects of the law, if any.

### Empirical Evidence

As discussed in the previous section, theoretical models of discrimination raise some important questions that can be answered only with empirical methodologies. At the time of enactment of the Equal Credit Opportunity Act, empirical evidence on these questions was largely anecdotal; not much statistical evidence was available. Unfortunately, passage of time has done little to change this situation. Empirical information is limited, although a few empirical studies have been done and some statistical evidence has been produced. This section reviews this information.

#### Group Membership and Information About Market Performance

The first question is whether knowledge of credit applicants' (protected) group membership provides creditors with information about their market performance (creditworthiness). If group membership does not provide information about performance, then theory predicts ECOA will have no impact (except perhaps to raise costs) unless tastes for discrimination exist that the market has not had time to eliminate. In contrast, if group membership does provide information, then ECOA could change acceptance probabilities as well as costs.

The relationship between personal characteristics and creditworthiness was first studied statistically by Durand (1941). Exploring data from 21 commercial banks and 12 industrial banks and finance companies, Durand concluded that women and older borrowers were better credit risks than men and younger debtors. In contrast, he found little difference among consumers of different marital status. While the findings for sex and age might have arisen as a consequence of prior discrimination that eliminated women and elderly borrowers with less than impeccable credit credentials, it suggests that economic forces would have been on the side of finding ways of lending more to women and older borrowers, not less.

In a review of 13 credit scoring models for consumer loans developed before ECOA, Altman et al. (1981) noted that 8 of these models included ECOA-prohibited variables, with sex, age, and marital status being the most frequently occurring prohibited variables.<sup>44</sup> Most models tended to find women and older borrowers less risky than other borrowers. In contrast to Durand, however, several studies detected a relationship between marital status and creditworthiness.

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<sup>44</sup> The credit scoring studies using ECOA-prohibited variables are Durand (1941), Myers and Forgy (1963), Smith (1954), Prat and McGhee (1967), Boggess (1967), Chatterjee and Barcun (1970), Apilado, Warner, and Dauten (1974), and Sexton (1977).

Newer findings concerning the relationship of sex, age, and marital status to creditworthiness are largely consistent with Durand's conclusions.<sup>45</sup> In a statistical study of 2,000 credit card applicants and account holders at a major bank 1971-74, for example, Chandler and Ewert (1976) found that being female was positively related to creditworthiness. Using data from a large bank credit card issuer Boyes, Hoffman, and Low (1986) again found that older borrowers were less likely than younger borrowers to default and that being married appeared to be unrelated to creditworthiness. And, in a study of a large number of accounts at a single consumer finance company, Avery (1982) found that older customers appeared to be better risks. However, Avery also found evidence suggesting that marital status was related to creditworthiness.

Obviously, more evidence would be useful, especially from controlled experiments that freed results from any influences of credit screening processes. But, at present, there is no available information suggesting that women or the elderly are worse credit risks than others, other things equal, or that marital status might be an especially important criterion. As a result, there is no reason to conclude that credit discrimination against these protected groups would arise from rational courses such as Avery's mean shift effect. Two important implications stem from this conclusion: First, any credit discrimination that does arise would ascent from "tastes" for discrimination as discussed by Becker (1971). This is the kind of discrimination that markets would eliminate. (Whether markets operate speedily enough to have accomplished this task acceptably is an empirical question that will be discussed further in the next subsection.) Second, if ECOA supports market forces rather than opposes them, benefits to protected classes may not be as great as envisioned by proponents. However, if, as limited evidence suggests, some protected classes are actually more creditworthy than some nonprotected groups, ECOA could work in the long run to the disadvantage of these protected groups. (This possibility is also discussed further below.)

The one potential problem area from the studies concerns race. In his study using data from a single consumer finance company from the period before ECOA, Avery (1982) found that blacks and young applicants appeared less likely than other applicants to pay off their accounts as scheduled, even after controlling for applicants' financial and credit characteristics. Similarly, Boyes, Hoffman, and Low (1986) found in their study of a bank card issuer's accounts that blacks were somewhat more likely than whites to default, other things equal. While two studies involving only two creditors can hardly be regarded as conclusive of anything, they do suggest the need for care in examining creditors behavior toward blacks for evidence of differential treatment apart from the effect of normal credit granting criteria.

### Existence of Discrimination

Since passage of ECOA, a number of researchers have attempted to examine credit market conditions before passage of the antidiscrimination law. Unfortunately, their efforts have been hampered by unavailability of useful data on market conditions many years ago. Nevertheless, a few studies have become available.

In one study, Marshall (1979) compared credit rejection rates between unprotected and ECOA-protected classes of consumers. Using data from two large finance companies collected before and after enactment of ECOA, he

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<sup>45</sup> The credit scoring models reviewed by Altman et al. (1981) were developed from samples that contained only approved applicants. Such samples, which exclude rejected applicants, are subject to selection bias. In order to counteract the effects of creditors' current credit policies, more recent studies by Chandler and Ewert (1976), Avery (1982), and Boyes, Hoffman, and Low (1986) discussed below attempt to correct for this bias using statistical methods. Chandler and Ewert used a method based on sampling theory called augmentation, which weights each accepted account by the reciprocal of its probability of being accepted (see Cochran 1963, pp 371-4). Avery and Boyes, Hoffman, and Low used a method developed by Heckman (1979), which uses a similar weighting procedure to adjust for selection bias.

constructed a logistic model to estimate the probability of loan approval conditional upon three factors: sex, age, and credit score.

Only one firm could provide information on sex of credit applicants, but through his statistical work, Marshall found that sex of applicant appeared to have no impact on the credit-granting decision at this firm either before or after ECOA. Although, obviously, the study universe is very limited, this finding is not consistent with the hypothesis of sex discrimination in credit granting. In contrast Marshall found that age of applicant did appear to have some impact on credit decisions. At one company, rejection of older applicants before ECOA was higher than would be predicted by credit score alone, a phenomenon that disappeared after ECOA. At the other company, he observed this finding both before and after ECOA, evidence of possible age discrimination at this company.

A search for evidence of credit discrimination using a larger data base was undertaken by Peterson and Peterson (1978) and Peterson (1979 and 1981). Data consisted of account information on 37,000 consumer loans at 30 banks over the periods 1965-71 collected by the Federal Reserve Board for a study of bank consumer credit practices. As described above, the Petersons used these data to test a model of credit market discrimination based on Becker's (1971) model of labor-market discrimination.

From their model, the Petersons argued that if creditors discriminated against some groups of people, results of the discrimination would show up in the form of higher standards of creditworthiness required of these people, higher interest rates charged, or more stringent nonprice credit terms. Higher credit standards would manifest themselves in the form of lower default rates among the group discriminated against, since they would be forced to exhibit higher degrees of creditworthiness before being accepted.<sup>46</sup> These conclusions from their theoretical model gave the Petersons testable hypotheses for checking against the data.

Because they had information on the sex of applicants, the Petersons focused their analyses on sex discrimination. Peterson and Peterson found no significant differences in default rates between men and women for most types of loans which caused them to reject the hypothesis of systematic discrimination. But, in two cases differences in default rates between men and women were significant. Women defaulted at a disproportionately higher rate on used car loans suggesting that discrimination may have existed against men in granting used car loans. One interpretation of this finding is that banks may have been overly conservative in granting used car loans to men, erroneously judging men to be poorer credit risks because men tend to be greater automobile insurance risks than women. On the other hand, women defaulted at a disproportionately lower rate on home improvement loans. This result may indicate discrimination against women, but other evidence suggests a weaker interpretation. The loan loss to credit advanced ratio on home improvement loans was higher for women than for men. Bankers may have applied higher credit standards on home improvement loans to women in order to compensate for larger loan losses on home improvement loans made to women. Consequently, no unambiguous conclusions could be drawn about evidence of discrimination against women on home improvement loans.

In a second study, Peterson followed a similar approach to test for discrimination by sex in direct consumer lending during the years 1966 to 1971. This study differed from the earlier study by Peterson and Peterson that used the same data base in that it considered only direct loans and analyzed interest rate, charge-off, and loan loss data.

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<sup>46</sup> The Petersons assumed that the basic risk distributions of male and female applicants were similar, so that average default rates reflect marginal credit standards. In contrast, if the assumption of similar risk distributions is not correct, then discrimination against one group or the other could exist even if average default rates were the same. For example, if the Durand suggestion is correct that women are better credit risks all other things equal, then equal default rates would indicate discrimination in favor of women (against men). For further discussion of the assumption of similar risk distributions among applicant groups, see Peterson (1981), pp. 555-9.

Peterson found no statistically significant difference in loan loss to credit-advanced ratios or in charge-off ratios for male and female borrowers. To test for differences in interest rates, Peterson regressed the interest rate on the borrower's sex, life-cycle and financial attributes of the borrower, loan terms, and a variable representing whether the borrower is a former customer. In all but one case the sex variable was not significantly related to the interest rate, and in that case (household goods loans) the sign of the sex coefficient indicates that women paid significantly less for household goods credit at banks than men. In sum, the Petersons were unable to produce rigorous statistical evidence of systematic discrimination against women before ECOA.

Evidence concerning racial discrimination before ECOA is more mixed, although on balance it suggests that discrimination probably was not pervasive. Avery (1982) in his study of a consumer finance company found that black, single, and young applicants were less likely than other applicants to be accepted. This is the same study in which he found that black and young applicants who were accepted also appeared to default more often, other things equal. Using a different approach in another study, Avery (1981b) also found evidence of possible credit discrimination against blacks and Hispanics. Using data on 1,300 low income households that participated in the 1968-72 New Jersey negative income tax experiment, he estimated a cross-section stock-supply and demand model for consumer credit. The estimated supply function, which was based on the assumption that creditors face a fixed interest rate and ration households at that rate, indicated that after taking financial and credit characteristics into account, blacks and Hispanics had significantly lower levels of consumer debt than non-Hispanic whites. Since his analysis showed that blacks and Hispanics did not demand less debt, Avery concluded that race appeared to play a role in creditors' lending decisions at that time.

Other evidence, however, is not consistent with this conclusion. Using survey data from a single city (Atlanta), Lindley, Selby, and Jackson (1984) found little evidence to support the hypothesis of racial discrimination in credit granting either before or after extension of the ECOA to cover race. The authors felt so strongly about the findings of their probit analysis that they suggested " ... the legislation was not only ineffective, but also unnecessary" (p. 740), which is probably an overstatement. In a study of 2,000 finance company borrowers which the authors believed was representative of Texas borrowers in 1973, Elliehausen and Lawrence (1988) also failed to find evidence of racial discrimination. Basing their analysis on the Becker (1971) model and using the canonical correlation statistical technique, they found no relationship between race and credit terms.<sup>47</sup> Absence of racial discrimination before ECOA is also suggested by survey findings (discussed below) which find similar debt levels held by similarly situated blacks and others.

Even if researchers have not uncovered much evidence of systematic discrimination, though, this does not prove that discrimination does not exist. For this reason, analysts have also used survey methods to study consumers' perceptions of discrimination. Although, of course, perceptions of discriminatory treatment cannot be regarded as proof that discrimination exists or not either, perceptions may reflect consumers' experiences and provide some information about the market and the extent of the problem.

To provide benchmark information on perceptions, a number of questions on credit discrimination were asked as part of the federal banking agencies' 1977 national consumer survey.<sup>48</sup> In the survey, respondents were first asked whether they felt that they had ever been treated unfairly in credit transactions. Approximately 24 percent of the

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<sup>47</sup> Elliehausen and Lawrence did find possible differential treatment of widowed females, but they attributed the difference in credit terms to demand factors. They found no other apparent impact of sex or marital status.

<sup>48</sup> See Durkin and Elliehausen (1978).

respondents had some experiences which they regarded as unfair; however, fewer than 5 percent of respondents reported problems related to sex, marital status, age, or race. These responses may reflect consumers' belief that personal characteristics are not very important factors in creditors' lending decisions. In another question, respondents were asked to indicate which factors they thought creditors considered most important in deciding to grant credit. Respondents viewed financial variables such as credit history (64 percent) and income (62 percent) as the most important credit criteria. Of the criteria governed by ECOA, age (9 percent) and marital status (6 percent) were most frequently mentioned, while sex and race (less than 2 percent) were among the factors mentioned least often. The pattern of responses did not change significantly when membership in protected classes was taken into account. Although protected groups mentioned protected variables more frequently than other consumers, only one factor (age) was reported by more than 10 percent of respondents of the group.

To study perceptions more closely, respondents to the 1977 survey who had experienced a credit denial or limitation in the previous five years were asked a number of direct questions about that experience. In all, about one-fifth of the respondents reported being either turned down or unable to obtain the desired amount of credit. Of these, when asked directly, 64 percent reported that they believed that age, race, nationality, sex, or marital status were not a factor in denial or limitation of credit. Of those who believed that one of these factors may have contributed to denial or limitation (36 percent of those turned down or limited), most mentioned age or marital status as the discriminatory reason they perceived. Only a few respondents mentioned sex or race.

In another study Brandt and Shay (1979) examined both perceptions of discrimination and the relationship of perceptions to credit availability. Data for this study were from two consumer surveys, one conducted in 1977 and the other conducted in 1970. The 1977 survey was based on three probability samples of 967 households across the United States.<sup>49</sup> The 1970 survey was based on two probability samples of 793 California households.<sup>50</sup>

With respect to perceptions of discrimination, 13 percent of the respondents to the 1977 survey reported perceiving discrimination. Age, sex, and marital status were the most frequent bases for discrimination reported, but 28 percent of responses were reasons not related to the ECOA. Not surprisingly, perceptions of discrimination were strongly associated with credit denials. One-third of the respondents who were denied credit in the last two years believed that discriminatory treatment may have been involved, while fewer than 5 percent of respondents who were not denied credit perceived discrimination.

Brandt and Shay used regression analysis to look at the relationship between measures of credit availability, perceptions of discrimination, and protected class membership while holding other borrower characteristics constant. They estimated two regression models, the first using an ordinal-scaled variable reflecting perceived difficulty in obtaining credit as the dependent variable and the second using the level of nonmortgage debt as a dependent variable. Both models contained the same independent variables: a variable indicating whether the respondent perceived discriminatory treatment, variables indicating membership in protected groups, and other financial and life-cycle characteristics of the respondent. Estimated regression equations showed that perceived greater difficulty in obtaining credit was associated with perceived discriminatory treatment, but perceptions of discrimination were not significantly related to lower levels of nonmortgage debt. Single males and minorities perceived significantly greater difficulty in obtaining

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<sup>49</sup> Samples consisted of surveys of all households, unmarried women who are heads of households, and residents of disadvantaged areas in central cities. The latter two surveys were required to obtain a sufficient number of cases of individuals belonging to protected groups. Research by Kosobud and Morgan (1964) indicates that combining the sub-samples does not seriously bias the results where the focus is on between-group differences.

<sup>50</sup> See Day and Brandt (1973) for a description of the 1970 survey.

credit, but these groups did not have significantly lower levels of nonmortgage debt. Of the groups protected by ECOA, only respondents 62 years of age or older had significantly lower levels of nonmortgage debt. However, discrimination is not necessarily involved, since this group also tends to demand less credit.

Similar procedures were used to analyze results of the 1970 survey although the 1970 survey had not asked direct questions about discrimination. However, the methodology and a number of questions in the 1970 survey were similar to the 1977 survey. Regression analysis showed that female family heads, single males, and minorities perceived significantly greater difficulty in obtaining credit in 1970. Respondents 62 year of age or older had lower levels of total debt, but minorities had significantly higher levels of total debt despite perceptions of greater difficulty in obtaining credit.<sup>51</sup>

In sum, the 1977 Consumer Credit Survey and Brandt and Shay's survey work suggest that most consumers did not believe that they had received discriminatory treatment in the credit market. When discrimination was perceived, marital status and age were the most frequently mentioned problems. Regression analysis indicated that perceptions of discrimination were related to perceptions of credit availability. But neither perceptions of discrimination or protected group membership appeared to be associated with levels of nonmortgage debt. Of course, it might be possible that protected groups obtained comparable levels of debt at less favorable terms. Limited evidence from the 1970 survey analyzed by Brandt and Shay suggested that protected groups perceived greater difficulty in obtaining credit before the ECOA. However, despite these perceptions, most protected groups did not owe significantly less total debt at that time either. In all, after considering these studies, there is still little available statistical evidence of systematic credit discrimination either before or after passage of ECOA.

### Effects of ECOA

Discussion in the prior two subsections ("Group Membership and Information About Market Performance" and "Existence of Discrimination") could lead to the conclusion that ECOA has had ultimately little impact on credit markets. If (protected) group information rarely provides creditors detrimental information, then prohibiting its use should not change acceptance probabilities materially. And, if available evidence is correct that credit discrimination has not been widespread, then ECOA should not affect things very much.

Unfortunately, another group of empirical studies suggest that conclusions about the impact of ECOA may not be so simple. As pointed out earlier, Spence's (1973 and 1974) information model suggested that group identification could be an important decision variable, even if it was unalterable and, by itself, it was uncorrelated with market performance. According to Spence's hypothesis, this anomolous result could come about if the relationship of alterable characteristics to market performance differed between distinct groups. Under these circumstances, prohibitions on considering group membership could have profound impacts by subordinating the "signals" generated by a minority to the stronger signals characterizing the majority. A few empirical studies indicate such an unintended result may have come about under ECOA.

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<sup>51</sup> In the regression model for total debt, the signs of the age (age =: 62) and sex (female) coefficients are reported negative in the text and positive in the table. Since older consumers tend to demand less credit, the negative age coefficient reported in the text is probably correct. If the negative sex coefficient reported in the test is also correct (significant only at the 10 percent level), then women had lower levels of debt. This result may indicate that lenders discriminated against women in granting credit in 1970.

For example, Chandler and Ewert (1976) estimated four multiple regression credit scoring models which differed only in their treatment of sex. Model 1 was in full compliance with the ECOA and Regulation B. Model 2 contained the same applicant characteristics as Model 1 plus a dummy variable to account for sex. Models 3 and 4 also contained the same applicant characteristics as Model 1, but Model 3 was estimated solely on the basis of female applicants and Model 4 solely on the basis of male applicants. Each of the four credit scoring models was then used to classify a holdout sample consisting of one-third of the original sample.

Through their statistical work, Chandler and Ewert found that ECOA appeared to disadvantage rather than benefit female credit card applicants. Their Models 2 and 3 that took sex into account each accepted a larger proportion of women than Model 1 which complied with ECOA. The difference was most striking for Model 3 which accepted a considerably larger proportion of historically rejected female applicants than either Models 1 or 2. This result suggests that risk profiles for male and female borrowers differ markedly and that separate models for evaluating male and female applicants may identify credit risk more precisely than a model which ignores applicants' sex or one which allows for only limited differences in male and female risk profiles.

Shinkel (1980) also studied the effect of limiting information in credit scoring models. Using a sample of about 9,900 new applicants at a major finance company from 1968 through 1970, Shinkel developed eight discriminant models.<sup>52</sup> <sup>53</sup> Seven models were constrained to exclude consideration of attributes prohibited by the ECOA or state statutes concerning discrimination, and one model was not constrained to exclude prohibited variables.<sup>54</sup> Each model was used to classify applicants in a holdout sample. Results indicate that exclusion of prohibited variables reduced the number of good loans accepted (0.3 percent to 2.3 percent) and increased the number of bad loans accepted (0 to 2.6 percent) with a reduction in profitability of 2 to 16 percent.

Shay and Sexton (1979) examined credit applications from a national retailer and a large finance company made prior to the ECOA to determine whether information on sex, marital status, and age improved the accuracy of credit scoring models. Using discriminant analysis, they estimated two credit scoring models for each set of applications. The first model contained variables for sex, marital status, and age; the second model excluded these variables. Unlike Chandler/Ewert and Shinkel, they found that classification of holdout samples revealed no significant differences in the predictive accuracy of the two models. Unfortunately, both Shay/Sexton data sets may suffer from selection bias since they excluded rejected applicants from their analysis.

Nevin and Churchill (1979) attempted to determine whether marital status and age were useful in differentiating good accounts from bad accounts at two large finance companies. They found that consideration of marital status and age reduced classification errors 12 to 14 percent below those based on sample proportions but that marital status and age had a negligible impact on predictive accuracy in a discriminant model which included predictor variables such as discretionary income, occupation, and years on job. However, again both samples may be subject to selection bias because rejected applicants were excluded.

In sum, Chandler and Ewert presented evidence suggesting that male and female bank credit card applicants possessed different characteristics (perhaps reflecting discrimination in other areas such as employment) and that their

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<sup>52</sup> This is the same data base used by Avery (1982).

<sup>53</sup> Shinkel used a method called reclassification to account for rejected applicants. In reclassification, a credit scoring model developed for accepted good and bad accounts is used to classify rejected applicants. Chandler and Coffman (1980) concluded that reclassification and augmentation have about the same predictive ability to separate past good and past bad accounts but that augmentation accepts more rejected applicants. They cautioned, however, that these conclusions were based on analysis of one set of data.

<sup>54</sup> Prohibited variables considered by Shinkel were race, marital status, age, and occupation.

characteristics relate differently to credit performance. Shinkel found that variables for marital status, age, and race increased the predictive accuracy of his credit scoring model for finance company applicants. In both of these studies, classification results suggest that inclusion of prohibited variables would increase the availability of credit to protected groups. Studies by Shay and Sexton and by Nevin and Churchill, on the other hand, concluded that consideration of sex, marital status and age were not useful criteria for distinguishing good credit risks from bad credit risks, although results may be influenced by sample bias. Regardless, it is still correct to say there is no empirical study-which shows that ECOA has increased credit availability for anyone.<sup>55</sup>

### Conclusion

In conclusion, although they have merely touched the surface of the empirical questions raised by the Equal Credit Opportunity Act, available statistical studies do not offer any more grounds for optimism about the law's impacts than the theoretical ones. Clearly, more study on the six empirical questions derived from the theoretical work would be useful. However, pending more study, a few tentative conclusions have emerged.

First, there is little available evidence that membership in now-protected groups provides information about lack of creditworthiness, other things equal. If anything, limited evidence about women and older consumers suggests the opposite. For this reason, it seems unlikely that rational creditors would arbitrarily exclude members of protected groups, although ones with a taste for discrimination might do so in markets slow to eliminate such behavior. Thus, ECOA would not have a substantial impact in changing acceptance probabilities unless tastes for discrimination are widespread and markets are slow to react. On their face, these do not seem like good assumptions.

Second, available studies (again, albeit, limited) have failed to produce much evidence of systematic discrimination despite persistent complaints. The reason for the apparent inconsistency is that there is probably some truth to both sides: some creditors probably did discriminate, but the market as a whole probably did not. As a result, those persistent enough to be discouraged may have always been able to obtain credit on terms reflecting their creditworthiness.

Third, Equal Credit Opportunity legislation probably has done little to enhance credit opportunities overall. Although society has now given itself a club to use on creditors with tastes for discrimination, it has also, in effect, required each creditor's acceptance criteria to reflect characteristics of the firm's majority customers. Although Regulation B permits special credit programs for protected groups, there is little doubt that the law has complicated "signaling" of credit-worthiness by minorities. Even if Chandler/Ewert and Shinkel are not correct that ECOA has absolutely decreased credit availability for protected groups, ECOA apparently has raised costs and made credit evaluation more bureaucratic. And, unfortunately, there is no evidence currently available that ECOA has actually improved credit availability for anyone.

Thus, rather than profoundly impacting credit markets, the ECOA stands as a monument to principles. The principles, of course, are the ones dearest to all Americans--freedom, equality and justice. Who, or why, would anyone say such principles are unimportant.

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<sup>55</sup> A group of studies does show that ECOA and Regulation B have increased costs for financial institutions. See Smith (1977), Murphy (1980), and Elliehausen and Kurtz (1988).

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