DID COMMUNITY RATING INDUCE AN
ADVERSE SELECTION DEATH SPIRAL?
EVIDENCE FROM NEW YORK,
PENNSYLVANIA, AND CONNECTICUT

Thomas Buchmueller
John DiNardo

Did Community Rating Induce an Adverse Selection Death
Spiral? Evidence from New York, Pennsylvania and Connecticut
Thomas Buchmueller and John DiNardo
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ABSTRACT

Using data from the 1987 to 1996 March Current Population Surveys we find no evidence
for the "conventional wisdom" that the imposition of pure community rating leads to an "adverse
selection death spiral." Specifically, the percentage of individuals in small groups covered by health
insurance did not fall in New York (which enacted community rating legislation in 1993) relative
to either Pennsylvania (which enacted no insurance reform) or Connecticut (which enacted moderate
insurance reform without imposing community rating). Consistent with the predictions of the simple
Rothschild and Stiglitz (1975) framework, however, we find that the New York reforms appear to
have had a significant impact on the structure of the New York insurance market. Specifically, New
York has experienced a dramatic shift away from indemnity insurance toward HMOs. While this
shift took place during a period of nationwide increases in the percentage with managed care, the
increase in HMO penetration in New York's small group and individual markets was significantly
greater than in Pennsylvania or Connecticut.

Thomas Buchmueller
Graduate School of Management 3125
University of California, Irvine
Irvine, CA 92697

John DiNardo
Department of Economics 5100
University of California, Irvine
Irvine, CA 92697
and NBER
jdinardo@uci.edu

I Introduction

In the early 1990s, while comprehensive health care reform was being debated at the federal level in the US, forty-five states introduced their own regulations affecting the small group health insurance market. These state-level reforms were intended to curb insurance carrier practices that might limit the ability of small "high risk" firms to purchase insurance for their employees. A common feature of these reforms were restrictions on the extent to which insurers can vary premiums according to subscribers' risk status. The most extreme type of restriction is "pure community rating" which mandates that, for a given plan, the same rate must be charged to all individuals or small groups, regardless of their age, sex, or other risk characteristics.

Community rating continues to be a source of considerable controversy. Some industry groups and economists have argued that, contrary to the intended effect of insurance reform, community rating might actually reduce insurance coverage. The mechanism by which this may occur is known as an "adverse selection death spiral." In an unregulated market, premiums will be "risk-rated," that is, younger, healthier consumers are charged lower rates due to their lower expected claims. Since community rating requires insurance companies to charge the same premium to all consumers, the rate charged to younger individuals may rise in response to the higher costs imposed by older persons with the same coverage. If enough younger consumers react to this price increase by dropping coverage, expected claims for the covered group will rise, which will necessitate a further increase in premiums. In the extreme case, this cycle will continue until only those consumers with the highest expected medical

expenses will retain coverage.

While the notion that community rating leads to adverse selection death spirals appears to have passed into the "conventional wisdom," there has been little systematic attempt to document the magnitude of this effect. The most relevant economics literature is a number of case studies documenting adverse selection against specific health plans within employer-sponsored health benefit programs (e.g., Price and Mays (1985), Luft, Traener and Maerki (1985),Cutler and Reber (1998), and Cutler and Zeckhauser (1997)). A common finding from this literature is that plans that are more attractive to higher risk individuals are vulnerable to adverse selection death spirals, as lower risk workers migrate to less comprehensive or more "tightly managed" plans. The implications that these studies have for understanding the effects of mandating community rating in the small group or individual health insurance market, however, is unclear. In particular, since in the cases studied coverage is essentially universal, they offer little insight as to whether imposing pure community rating in a voluntary insurance market will reduce the number of persons purchasing coverage.

In this paper, we take a closer look at the effect of community rating by focusing on three states: New York, Pennsylvania, and Connecticut. These three states had similar insurance regimes until the early 1990s, and then diverged sharply. New York enacted comprehensive small group and individual market reforms that included pure community rating in both markets. Pennsylvania enacted no reform, and Connecticut enacted moderate reforms that placed very few restrictions on how insurers could set premiums. Despite some differences the experiences of these states provide a convenient "natural experiment" for evaluating the

effects of community rating.

While critics of the New York legislation have argued that the imposition of community rating in New York led to a market–wide adverse selection death spiral and a reduction in insurance coverage (see, for example, Gradison (1995) and Matthews (1997)), our analysis, using data from the 1987-1996 Current Population Survey, offers no evidence of such an effect. While insurance coverage rates in the New York small group market did fall, and the age distribution of the covered population did shift towards older persons in a manner consistent with a market-wide death spiral, we find almost identical changes in Pennsylvania and Connecticut. Although we find no effect on insurance coverage, we do find some evidence that New York's reforms led to an increase in the market share of HMO's in the small group and individual markets.

II Political Background of New York's Reform

The focus of state health insurance reforms of the early 1990s was the small group market. Two reasons commonly given for this emphasis are

- Employees of small firms and their dependents represent a disproportionate share of uninsured Americans.

- Prior to the reforms, the small group market was rife with insurer underwriting and marketing practices making it difficult for small groups deemed to be undesirable risks to obtain coverage. Their proponents argued that the small group reforms would increase private insurance coverage by removing the barriers faced by high risk groups.

Table 1 summarizes the main provisions of the reforms enacted in Connecticut[1] and New York.[2] With respect to most provisions, the reforms in the two states are quite similar to each other, as well as to model legislation proposed by the National Association of Insurance Commissioners and reforms passed elsewhere.[3] Both states require the guaranteed issue and guaranteed renewal of insurance to small groups regardless of the group's industry or risk status. Insurers are allowed to exclude coverage for pre-existing conditions for no more than one year after enrollment. Individuals who switch directly from one insurance plan to another, and were with the first for at least 6 months, are exempted from pre-existing conditions exclusions altogether.

One potentially important difference between the two states is that Connecticut's reforms apply only to the small group market[4], whereas New York's apply to both the small group and individual markets. This is significant because the individual market is generally seen as being more vulnerable to adverse selection than the small group market. Under New York's law, indemnity insurers can treat the two markets as separate, and therefore can choose to offer coverage to small groups, but not individuals (or vice versa). HMOs, however, are subject to a "one market rule," whereby any HMO offering group coverage in the state must also sell a

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[1] Connecticut Public Act 90–134.

[2] The Community Rating and Open Enrollment Law (C. 501).

[3] Hall (1994) and Blumberg and Nichols (1996) provide good general discussions of the small group reform movement. For detailed information on the provisions of each state's reforms, see General Accounting Office (1995) or Markus, Ladenheim and Atchison (1995). Recent Federal legislation, the 1996 Health Insurance Portability and Accountability Act (HIPAA), incorporated many features of small group legislation that had been previously enacted by the states. Our analysis is based entirely on data prior to 1997, when small group regulations in all states were required to conform to HIPAA.

[4] The Connecticut legislation initially applied to groups of 1 to 25; in 1993 the upper limit was extended to 50. To be considered a group of one, a person must be self-employed and work at least 30 hours per week year-round.

standardized product in the individual market (Hall 1998).[5]

The area where there is the most variation in state level reforms, and where the difference between the Connecticut and New York reforms is greatest, is the rules governing how premiums for a given plan may vary across subscribers. The Connecticut legislation allows premiums to vary with age, gender, region, industry, group size, coverage tier (e.g., single, family). Initially, the Connecticut law allowed further adjustments to account for differences in risk not captured by these variables, though these additional adjustments were phased out by July 1995. Various accounts of the effect of these rules and of similar rating regulations enacted elsewhere, indicate that they generally do not impose a binding constraint on the pricing decisions by Connecticut insurers. In contrast, New York's reforms require pure community rating. For a given plan, the same rate must be charged to all subscribers regardless of age, sex, health status, or other risk factors. [6]

While pure community rating is often depicted primarily as a mechanism to transfer wealth from consumers whose expected medical expenses are lower than average to those whose expected expenses are higher than average, such redistribution did not appear to be the objective of those designing New York's policy. Rather, according to policy makers, the goal was to "level the playing field" for the state's non-profit Blue Cross and Blue Shield plans (Curiale 1994). Prior to the reforms, Blue Cross and Blue Shield "voluntarily"sold community rated insurance on a guaranteed issue basis. Given that their competitors were

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[5]The New York reforms defined the small group market to consist of firms with 3 to 50 employees. In 1997, the lower bound was changed to 2 in concordance with HIPAA.

[6]Rates are allowed to vary with geography, coverage tier, and plan benefit design. In addition, carriers are allowed to define different rates for the small group and individual markets.

not bound by such rules, the Blues (as they are commonly known) argued that they were at a significant disadvantage and had been suffering from adverse selection for years.

III   The Economics of Rate Regulation in a Voluntary Insurance Market

Despite the prevailing belief that a reduction in insurance coverage due to an adverse selection death spiral is a likely consequence of community rating, it is not a prediction that comes naturally out of the simplest models of insurance provision. Despite its limitations (See Wilson (1977) for example) the Rothschild and Stiglitz (1976) framework provides a convenient model to analyze the consequences of community rating. Our description of the model will be largely graphical.

Consider a simple one-period, two state world, with the two states given by S_1 and S_2. There are two risk types $j = H, L$, who incur loss d with probability p_j where H and L correspond to high risk (older) and low risk (younger relatively healthier) types respectively such that $p_H > p_L$. An uninsured individual receives wealth $W_1 = W - d$ in the bad state S_1, and $W_2 = W$ in the good state S_1. Insurers are risk neutral and competition ensures that contracts receive zero profit in a (Nash) equilibrium. For high risk individuals this zero profit condition is given by the ray $\overline{EG}$; for low risk (younger) individuals the set of zero profit contracts is given by the ray $\overline{EF}$. Complete insurance is given by the 45 degree ray from the origin, and the point E in Figure 1 denotes the initial endowment (no-insurance) state.

While the Rothschild and Stiglitz model and others in the insurance literature are con-

cerned with the case where there is an "information surplus" favoring consumers, in reality health insurers have a considerable amount of information on which to base premiums. Indeed, most of the health care reform legislation that has been recently proposed and enacted has been motivated in large part by a dissatisfaction with the various ways that insurers use information on subscribers' demographic characteristics, health status, or prior claims experience to risk-rate premiums or ration coverage. Thus, the case of an unregulated market can be approximated by the situation where risk types are fully observable and each consumer can be offered coverage at an actuarially fair premium.[7] In Figure 1, the insurance contracts given by α_L and α_H represent complete insurance at such prices for young and old individuals, respectively.

Under a pure community rating regime, this equilibrium is not possible because insurers cannot charge young and old consumers different amounts for the same coverage. Suppose an insurer that had been offering the pair (α_L, α_H) attempted to continue offering complete insurance but charged a pooled premium equal to the average expected claims for the entire risk pool. A basic result of the Rothschild-Stiglitz model is that such a contract, represented in the figure by α_P, cannot survive in equilibrium, as young individuals will opt out of the risk pool in favor of contracts that offer a lower quantity of insurance at a lower price (i.e., ones that lie to the southeast of α_P). Indeed, if a simple (Nash) equilibrium exists, it is given by the separating equilibrium (α_H, β_L). Note that due to self-selection, both contracts are fully risk-rated, yet at the same time are in compliance with the community rating regulations.

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[7]Obviously, even when risk-rating is allowed, insurers do not have perfect information on consumers' risk status. See Hoy (1982) for a discussion of how insurers' use of observable information that is correlated with risk status affects market outcomes.

Note that the model represented in Figure 1 *does not* predict a decline in the number of persons with any insurance coverage (which is how coverage is typically measured in empirical research and policy discussions). The reason is that as long as both types of individuals are risk averse, low risks will prefer a low quantity contract like β_L to the uninsured endowment point E. In this framework, the number of persons with any insurance coverage will only fall if contracts on the line segment from E to β_L are either not available, perhaps because regulations such as mandated benefits effectively impose a minimum quantity constraint, or are not desirable to consumers. The latter situation may occur if low cost catastrophic coverage is seen by younger consumers to be inferior to the "free coverage" that arises from the requirement that hospitals provide certain types of emergency care even in the absence of payment.[8] As shown in Figure 2, if these considerations are relevant, insurance coverage may fall as low risk individuals faced with a choice between α_H and E choose the latter.

Our analysis therefore suggests one of two potential outcomes:

1. A market-wide adverse selection death spiral. Insurance coverage falls after the imposition of community rating, and there is an increase in the age of those individuals who have insurance.

2. No death spiral. Insurance coverage does not fall after the imposition of community rating, and the age composition of covered individuals does not change, but the average quantity of insurance purchased declines.

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[8]Similarly, low risk, low income individuals may choose not to purchase insurance because they expect to become eligible for Medicaid in the event that they incur catastrophic medical expenses (Cutler and Gruber 1996).

Note that second scenario is not inconsistent with the case where certain insurance carriers report the symptoms of an adverse selection death spiral. Insurers that offer contracts like α_P will observe young persons dropping coverage and the average cost of insured individuals rising. The experience of particular carriers, however, provides no information on how community rating affects the total number of persons purchasing insurance in the market. What must be the case for the second scenario to obtain, however, is that the individuals do not abandon coverage altogether but purchase (cheaper) less complete coverage.

IV   The Effect of New York's Reforms on Insurance Coverage

It is clear that after New York's reform went into effect in April 1993, there were significant changes in the market for health insurance. At first pass, many of these changes appear to be consistent with the existence of an "adverse selection death spiral."

For instance, NY Department of Insurance data indicate that 40% of individual policy holders saw their premiums increase by 20% or more, while 18% saw their premiums fall by at least 20%. As might be expected, younger insured individuals faced the greatest increases, and older insureds experienced the greatest decline (Barents Group 1996, Hall 1998). It was widely reported in the media how one indemnity insurer, Mutual of Omaha, raised rates for single males under age 30 by 170%. There appears to have been slightly less change in the small group market, though there too rates appeared to increase for younger groups relative to older groups (Hall 1998). Department of Insurance data indicate that enrollment in New York's individual and small group markets combined fell by 2.4% between March 31, 1993

(the day before the reforms became effective) and April 1, 1995 (the two year anniversary of the reform's enactment).

There are reasons to doubt, however, that these changes were *caused* by the New York reforms. While coverage appears to have fallen after the reforms, it is also the case that New York's reforms were enacted in the midst of a long secular decline in insurance coverage throughout the U.S. (Kronick 1989, Acs 1995, Long and Rodgers 1995, Olson 1995, Fronstin 1997). Indeed, data from the New York Department of Insurance show that combined individual and small group enrollment had fallen by 8.6% in the six months *prior* to the enactment of community rating.

Our approach is to estimate the reform's impact by comparing trends in insurance coverage in New York with trends in our "control" states of Pennsylvania and Connecticut. As is clear from our description of the legislation, we expect the contrast in outcomes to be starkest between New York (pure community rating imposed on both the small group and individual markets) and Pennsylvannia (no reform in either market). Connecticut, which implemented some reforms in the small group market but did not implement pure community rating and introduced no new regulations in the individual market is our intermediate case – we expect its outcomes to lie somewhere between New York and Pennsylvannia.

As we detail below, the focus of our investigation is the effect of the reforms on

1. The level of health insurance coverage.

2. The age ("health") distribution of those receiving coverage.

3. The quantity/quality of insurance coverage.

In each case, we first compare changes among small firms in New York to small firms in our two control states. We then look at changes among large firms – which were *not* directly affected by the reforms – in all three states. This provides us both with a possible additional source of identifying information, and a control for possible within-state trends.

A Descriptive Statistics

We use data from the March Current Population Surveys for the years 1988 to 1997. Since the insurance questions in the March CPS refer to coverage during the prior year, our data span the period from 1987 to 1996.[9]

Table 2A presents descriptive statistics on demographics, and employment characteristics for adults (18 to 64 years old) in the three states from the initial year of our data. With the exception of the percentage of minorities and urban residents, both of which are higher in New York than in the other two states, the three states are quite similar in terms of demographics. Because the New York reforms applied only to the small group and individual health insurance markets, we focus on employees of small firms and the self-employed as a "treatment group," using the employees of large firms as a within-state control group. The figures in Table 2A show that in 1988 44% of working adults in New York were either self-employed or employed by a firm with fewer than 100 employees. This is slightly lower than the comparable figures for Pennsylvania (48%) and Connecticut (51%). The industry distribution is quite similar

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[9]One potential limitation of the March CPS data is the possibility that respondents answer the insurance questions as if they pertained to their insurance status at the time of the survey rather than for the previous year as intended. (Swartz 1986, Berger, Black and Scott 1998). Because the New York reforms became effective in April 1993, our designation of pre- and post-reform years is the same whether we assume that respondents answered the questions as intended, or answered with respect to their current situation.

across the three states.

Table 2B compares the three states in terms of health insurance coverage. The figures show that in 1988, 77% of adults in New York had private insurance coverage, compared to 84% in Pennsylvania and 87% in Connecticut. Much of New York's lower coverage rate is due to a lower percentage of adults who are covered by private insurance as a dependent on someone else's policy. When we look at the percentage of those covered by insurance in their own name, the Pennsylvania-New York differential is only 2 percentage points, and the Connecticut-New York differential is 8 percentage points.

Among adults with private coverage, the distribution by source of coverage is very similar across the three states. Individually purchased coverage accounts for between 9.5 and 11.5% percent of all private insurance in these states. Among adults with employer-sponsored group coverage, the percentage insured through large firms (100 or more employees) is slightly higher than the percentage insured through small firms.

Figure 3 plots regression adjusted trends from 1987 to 1996 in the percentage of adults with private insurance in their own names for the three states.[10] In all three states coverage declined from the late 1980s until 1992, before increasing between 1992 and 1994. Coverage fell again after 1994, though by varying magnitudes. Throughout the entire period coverage was lower in New York than in the two control states. The difference between Pennsylvania and New York was at a minimum in the years 1988 and 1991, and appears to have grown

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[10]The plots are generated from regressions with private coverage as the dependent variable. The regressors included 7 industry dummies, dummies for full/part-time full/part year status, one firm size dummy variable, a dummy for students, female, married (plus the married and female dummies interacted), hispanic ethnicity, white, and SMSA (4 categories). The points were generated by fixing the values of the regressors at their mean value for New York.

slightly over the 10 year period. The Connecticut-New York differential increased between 1988 and 1993 before falling in the final year of our data.

From Table 2B it is clear that roughly half of adults in the three states obtain coverage through a large firm and therefore should not have been affected by rules governing the small group or individual insurance markets. Therefore, in Figure 4 we drop non–workers from our CPS sample and stratify workers according to their firm size and self- employment status. The upper panel presents the regression-adjusted trends in own name coverage for individuals who are self-employed or work in firms with fewer than 100 employees; the lower panel presents comparable results for workers in firms with 100 or more employees. [11] [12]

The results in the upper panel of Figure 4 show that for small firm workers, the Pennsylvania-New York differential increased over time. However, the gap between the two states widened in 1991, a year before New York's insurance reforms were signed into law and two years before they went into effect. From 1991 to 1996, the difference in coverage rates between the two states appears to be essentially constant. Foreshadowing some of our results in the next section, the changes for workers in larger firms parallel those in smaller firms.[13]

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[11]The firm size categories in the CPS (less than 25, 25 to 100, 100 to 499, 500 to 999, and 1000 or greater) do not match up perfectly with the definition of a small group under New York's reforms (3 to 50 full-time employees). We define small firms as those with fewer than 100 employees. This split ensures that workers in firms with 25 to 50 employees, who should have been affected by the reforms, will be in the "treatment group." Since the reforms apply to full-time workers and the CPS question refers to all workers, some firms with 50 to 100 employees were also subject to the reforms. Dropping workers in firms with 25 to 50 employees and comparing workers in very small firms (less than 25) to those in larger firms (100 or more) does not materially affect any of our results.

[12]Another limitation of the firm size information is that the firm size variable pertains to the March job, which may not be the job for the preceding year. This potentially introduces a small amount of "slippage."

[13]With very few exceptions, all firms with more than 100 employees offer health benefits. Therefore, the downward trend evident in the lower panel of Figure 4 is most likely explained by an increase in the number of workers in large firms who decline coverage that is offered to them. Three studies using different data sources provide evidence consistent with this explanation (Cooper and Schone 1997, Fronstin 1997, Rice 1998).

V Methods and Results

Our empirical analysis is divided in three sections, corresponding to the types of predictions made by the theoretical model discussed in section III. First, we examine the effect of New York's health insurance reforms on the level of health insurance coverage. Second, we examine changes in the age distribution of those receiving coverage before and after the reforms went into effect. Third, we investigate whether the reforms affected the quantity/quality of insurance coverage by looking at the percentage of individuals covered by HMOs.

A Measuring the Effect of the Reforms on Insurance Coverage

In this section, we generate a variety of different estimates of the effect of the reforms. The starting point for our analysis is the simple linear regression model:

$$I = X\beta + \sum_{j \in S} \gamma S_j + \sum_{j \in S} \delta D \cdot S_j \tag{1}$$

where X is a $n \times k$ matrix of demographic characteristics with associated parameters β, γ and δ are 1×3 vector of parameters corresponding to $S \in (NY, CT, PA)$. The binary variable $D = 1$ if the observation is from 1993 (the year the NY reforms went into effect) or later and 0 otherwise. Let $\overline{I}$ denote the appropriate regression adjusted mean level of insurance and let Δ be the operator that computes the difference before and after 1993. Two "difference in difference" (DD) estimates of the effect of the reform are:

$$DD_1 \equiv \Delta \overline{I}_{NY} - \Delta \overline{I}_{PA} = \widehat{\delta}_{NY} - \widehat{\delta}_{PA}$$

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$$DD_2 \equiv \Delta\overline{I}_{NY} - \Delta\overline{I}_{CT} = \widehat{\delta}_{NY} - \widehat{\delta}_{CT}$$

A limitation of this specification is that it assumes that the impact of the reform does not vary by employer size. As the reforms were designed to apply only to individuals working in firms with 50 or fewer full-time workers, we can augment our previous specification to include a firm size effect.

$$I = X\beta + \sum_{j \in S} \gamma S_j + F'\psi + \sum_{j \in S} \delta_{j,f} F \otimes D \cdot S_j \tag{2}$$

where $F = [B L]$ where B and L are binary variables indicating big and little firms respectively. Under the assumption that trends for workers in large firms reflect state-specific factors unrelated to the regulations applying to the small group and individual markets, this specification yields two additional "difference-in-difference-in-difference" (DDD) estimates of the effect of the reform:

$$
\begin{aligned}
DDD_1 &\equiv \left\{ \Delta\overline{I}_{NY,L} - \Delta\overline{I}_{NY,B} \right\} - \left\{ \Delta\overline{I}_{PA,L} - \Delta\overline{I}_{PA,B} \right\} \\
&= \left\{ \widehat{\delta}_{NY,L} - \widehat{\delta}_{NY,B} \right\} - \left\{ \widehat{\delta}_{PA,L} - \widehat{\delta}_{PA,B} \right\}
\end{aligned}
$$

$$
\begin{aligned}
DDD_2 &\equiv \left\{ \Delta\overline{I}_{NY,L} - \Delta\overline{I}_{NY,B} \right\} - \left\{ \Delta\overline{I}_{CT,L} - \Delta\overline{I}_{CT,B} \right\} \\
&= \left\{ \widehat{\delta}_{NY,L} - \widehat{\delta}_{NY,B} \right\} - \left\{ \widehat{\delta}_{CT,L} - \widehat{\delta}_{CT,B} \right\}
\end{aligned}
$$

In Table 3 we report the simplest estimates of the effect that corresponds to our equation (1). The results reported in the first rows of the table are from regressions using the full 10 years of data. We also estimated models using a more focused subsample consisting of data from 1991 to 1996; those results are reported in the second row. In brackets we report the probability that each difference equals zero. When we use the full 1987-1996 sample and consider Pennsylvania as the control group, the results suggest that New York's reforms led to a 1.1 percentage point fall in coverage (first row, first column). The evidence for an effect vanishes however if either we use Connecticut as a control (column 2) or we restrict our attention to the years 1991-1996 (second row). Restricting the pre-reform period in this way seems especially appropriate as Figure 3 suggests that this estimate avoids attributing to the reforms the widening of the Pennsylvania-New York coverage gap that occurred between 1987 and 1991.

One limitation of the specification in Table 3 (equation (1)) is that these estimates average the change in coverage for employees of small firms with employees of large firms who should not have been affected by the reforms. We therefore consider the augmented specification based on equation (2) that allows for differences between workers in large and small firms. The results of this exercise are reported in Table 4. We also report results for two dependent variables: a dummy for whether the worker has private insurance from any source (as in the previous table), and one for whether she has private coverage in her own name.[14]

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[14]While the number of individuals with insurance may be more interesting in some contexts than the source of that coverage, a focus on coverage in one's own name is consistent with our use of firm size and self-employment status to define treatment and control groups. A substantial share of workers in small firms are covered through family members working for large firms (Monheit and Vistnes 1994). In trying to estimate the effect of New York's reforms, we want to ignore changes in insurance coverage that arise from an individual's

Only when we use private insurance from any source as our dependent variable, treat Pennsylvania as the control, and use the entire 10 years of data, does the DDD estimate approach standard levels of statistical significance. That estimate implies that coverage fell by 1.7 percentage points in the wake of the reforms. However, when we use the same model but compare the trend in New York to that in Connecticut, the result is a precisely estimated zero effect. When we consider private insurance in one's own name, which is a more appropriate dependent variable for contrasting employees of big and little firms, the full-sample regressions yield estimated reform effects that are zero whichever control group is used. Finally, when we drop the data from years prior to 1991 (our preferred specifications) the results for both dependent variables and both control states imply the New York reforms had no effect on insurance coverage.[15]

B   The Effect of Reforms on the Age Distribution of Insured Persons

We now look at whether the reforms had any impact on the age distribution of insured individuals (our CPS data has no other information on health status). Under the "death spiral" scenario the decline in coverage is more dramatic for younger than for older individuals, which will cause the age distribution to shift to the right. Figures 5 and 6 display kernel density estimates of the age distribution of adults with insurance through a small firm (defined again

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family member gaining or losing employment with a large firm.

[15]To avoid any ambiguity concerning the treatment/control classification of workers in firms with 25 to 100 employees (some of whom should not have been affected by the New York reforms) we also estimated models comparing workers in very small firms (fewer than 25 employees) and those in larger firms (more than 100 employees). The results from these regressions are virtually identical to those in Table 4.

as fewer than 100 employees) and those with individually purchased coverage.[16]

Figure 5 displays the estimates for individuals with coverage through small firms before and after 1993.[17] The top panel pertains to New York and the bottom panel displays estimates for the same time period in Pennsylvania.[18] The inference from the density estimates is quite similar to the inference in the preceding subsection. Consistent with the predictions of an adverse selection death spiral, the age distribution of those persons in the small group market shifted toward older individuals in New York. As in the preceding subsection however, almost identical changes in the age distribution occurred in Pennsylvania.

Recall from Section II that the rules on how insurers can set premiums were not the only way the New York reforms were more comprehensive than those in our control states. A second difference was the fact that the New York reforms applied to *both* the individual and small group markets. In Connecticut, by contrast, the more limited reforms were restricted to the small group market. It could be argued that the adverse selection death spiral did not occur in the small group market because the formation of employer-sponsored groups had already enabled some pooling of young and old consumers, muting the impact of community rating on the distribution of premiums and therefore limiting the exodus of younger consumers

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[16]These insurance categories are determined using information on whether the individual has coverage in her own name or through a family member, whether that coverage is employer-sponsored, and, if so, the firm size for the individual in the family who is the source of coverage.

[17]We use the standard Rosenblatt (1956) and Parzen (1962) kernel density estimator $\widehat{f}_h$ of a univariate density f based on a random sample of ages of covered individuals $A_1, \ldots, A_n$ of size n, with sample weights $\theta_1, \ldots, \theta_n$ ($\sum_i \theta_i = 1$), is

$$\widehat{f}_h(A) = \sum_{i=1}^{n} \frac{\theta_i}{h} K\left(\frac{A - A_i}{h}\right), \tag{3}$$

where h is the bandwidth and $K(\cdot)$ is the kernel function. Our inference based the unsmoothed histograms is identical, however, the smooth histograms are more compelling visually.

[18]The results for Connecticut are essentially the same and are not reported for the sake of brevity.

from the market. According to this line of reasoning, a death spiral may still have arisen in the individual market, where in the pre-reform period there was less pooling and premiums for young and old consumers differed dramatically. Figure 6 presents density estimates for the individual insurance markets in New York (upper panel) and Pennsylvania (lower panel). While the shape of the age distribution is different, the results are qualitatively the same as those in Figure 5: the age distribution shifted to the right in a similar fashion for both states.

As before, we estimate the effect of the reforms with a difference–in–difference estimator. At each age (A_i), we can define an effect:

$$\text{Effect} = \left\{ \Delta \hat{f}_h^{\text{NY}}(A_i) - \Delta \hat{f}_h^{\text{PA}}(A_i) \right\}$$

where for state j,

$$\Delta \hat{f}_h^j \equiv \left\{ \hat{f}_h^{(j,\text{Post})}(A_i) - \hat{f}_h^{(j,\text{Pre})}(A_i) \right\}$$

The estimates of these quantities are given in Figure 7 and 8 along with two standard error bounds. As is clear, the difference in the change in the densities is small in magnitude and relatively precisely estimated. For sake of brevity we do not display the age distribution of insured individuals in large firms or the corresponding DDD-density estimate as these estimates leave the inferences completely unchanged.

C   The Effect of Reform on the Structure of the New York Market

Up to this point, the evidence strongly suggests that there was no market–wide death spiral induced by the health insurance reforms in New York. Although the qualitative evidence suggests to the contrary, one possible explanation for the results is that the reforms were ineffectual. We therefore return to the simple model we developed in Section III to look for an additional prediction. Recall that the model suggests that the imposition of community rating should not necessarily lead to a reduction in the number of covered *individuals*. Indeed, a more straightforward prediction of the model is that community rating should lead to a lower *quantity* of health insurance purchased by younger (low risk) individuals.

While we lack a precise measure of average quantity of coverage purchased by those with health insurance, we do have additional data that bears on this question. Specifically we can look at the change in the type of insurance – HMO or indemnity – purchased before and after the reforms. Although HMOs in some sense provide more complete insurance coverage (i.e. less exposure to large out-of-pocket costs), the ways that HMOs ration care and limit consumers' choice of physicians and treatments likely represents a lesser "quantity" of insurance. In particular, HMOs represent a form of insurance that is considerably less attractive to high-risk consumers, an essential prerequisite for the separating equilibrium we described in Section III (Feldman and Dowd 1994, Pauly 1985).

Although not a major issue in the debate that preceded the reforms, informed observers reported that the New York reforms appeared to have spurred an increase in HMO enrollment in the state's small group and individual market (Managed Care Week 1994). Moreover, other

more systematic studies, relying mainly on interviews with state regulators, insurance brokers and industry representatives, point to a similar conclusion (Chollet and Paul 1994, Hall 1998).

Although this evidence suggests that reforms did indeed have some impact, the fact that managed care enrollment was increasing throughout the country in the mid-1990s, makes it important to assess trends in New York relative to an appropriate counterfactual.

To do this we use data from 6 employer surveys conducted between 1988 and 1995 by the Health Insurance Association of America and KPMG/Peat Marwick.[19] Specifically we focus on the percentage of insurance–providing firms choosing HMOs rather than indemnity coverage. As before, we compute a simple difference–in–difference estimate (the change in New York less the change in the appropriate control group), and display the results in the first row of Table 5. Again we use the trends in the insurance coverage among large firms as an additional within–state control. The second and third rows display the change in the percentage of large firms offering HMO coverage and the associated difference–in–difference– in–difference (DDD) estimates respectively.

The results are quite striking. Prior to 1993 the three states had very similar rates of HMO penetration in the small group market (the differences are not significant at conventional levels.) Consistent with our simple model, however, after 1993 the percentage of small firms in New York offering HMOs more than doubled from its pre-reform levels, increasing by 25 percentage points. The corresponding growth in Pennsylvania and Connecticut, meanwhile, was quite small (and insignificantly different from zero.) Consequently, our difference–

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[19]The survey years are 1988, 1989, 1990, 1991 from HIAA and 1993 and 1995 from KPMG/Peat Marwick. The surveys from the different years use the same sampling scheme and very similar survey instruments. For additional information on this data see Shore-Sheppard, Buchmueller and Jensen (1998).

in–difference estimates (using either Pennsylvania or Connecticut as a control) suggest the reforms significantly altered the structure of the New York small group insurance market. The difference–in–difference estimate using either state as a control is about 23 percent.

Moreover, the relative change in the HMO penetration rate for large firms indicate that this result is not an artifact of a differences in statewide trends. If anything, the point estimates in the second row of Table 5 suggest that HMO coverage was increasingly more rapidly among large firms in Pennsylvania and Connecticut than in New York (although these changes are not significantly different from zero.) Consequently, the DDD estimates in the last row of the table – 31 percent and 32.5 percent using Pennsylvania and Connecticut as a control respectively – are even larger than the corresponding DD estimates.[20]

VI Concluding Remarks

Using data from the March CPS we find no evidence for the "conventional wisdom" that the imposition of pure community rating leads to an "adverse selection death spiral." Specifically, the percentage of individuals in small firms covered by insurance did not fall in New York (which imposed pure community rating in its small group and individual health insurance markets) relative to Pennsylvania (which enacted no new insurance regulations) or Connecticut (which enacted very moderate insurance reforms). Consistent with the predictions of

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[20]We do not have precisely comparable data for the individual market in these states although other evidence strongly suggests the same pattern was evident. Data from the NY State Department of Insurance show that the HMO share of the individual market increased from 8 percent in March 1993 to 25 percent in April 1995 (Hall 1998). Chollet and Kirk (1998) report market share data (measured as a percent of premium revenue) that indicate in 1995 HMOs had an 8 percent share in Pennsylvania and a 30 percent share in New York. (Their analysis is based on a sample of states that does not include Connecticut.)

the simple Rothschild and Stiglitz (1976) framework, however, we find that the reforms had a significant impact on the structure of the New York insurance market. Specifically, New York experienced a dramatic shift away from indemnity insurance toward HMOs. While this shift took place during a period of nationwide increases in the managed care enrollment, the increase in HMO penetration in New York's small group and individual markets was significantly greater than in either Pennsylvania or Connecticut.[21]

The implications of these results for policy are not immediate. Contrary to the "worst case" scenarios depicted by the insurance industry and other critics of reform, there is no evidence that the reforms led to a significant increase in the number of uninsured individuals. At the same time, our results suggest that the primary goal of reform proponents – to increase the percentage of persons with health insurance – was not met either.

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[21]We should note that while our finding that there was no "death spiral" runs counter to predictions that were made prior to the enactment of New York's reforms and arguments made by reform critics thereafter, our results are quite consistent with detailed qualitative studies of the New York experience (Chollet and Paul 1994, Hall 1998).

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**Table 1. A Summary of Connecticut and New York's Small Group
and Individual Health Insurance Reforms**

Reform Component	Connecticut	New York
Date Reforms Became Effective	June 1991 (extended October 1993)	April 1993
Definition of Small Group	1 to 25 (6/91 – 10/93) 1 to 50 (10/93 -)	3 to 50
Reforms Apply to Individual Market?	No	Yes
Guaranteed Issue	Yes	Yes
Guaranteed Renewal	Yes	Yes
Limits on Exclusion of Pre-Exist. Conditions	6/12	6/12
Rating Restrictions	Adjusted community rating	Pure community rating

Sources: US GAO (1995); Markus, Ladenheim,and Atchison (1995)

Notes: 6/12 means that conditions present 6 months prior to enrollment can be excluded for a maximum of 12 months. The Connecticut reform allows standard premiums to vary by age, gender, geographic region, industry, group size and coverage tier (i.e., single, family, etc.). Initially, insurers were allowed to make further adjustments to account for risk differences not captured by these variables. These adjustments were phased out by July 1995. In New York, premiums can vary by market (individual vs. small group), region and coverage tier.

Table 2A. Demographic and Job Characteristics:
New York, Pennsylvania, and Connecticut in 1988

Demographic Characteristics	New York	Pennsylvania	Connecticut
Age	38.3	38.9	38.0
Years of schooling	12.9	12.9	13.4
Married (0,1)	0.56	0.64	0.59
White (0,1)	0.84	0.92	0.93
Hispanic (0,1)	0.15	0.02	0.07
Female (0,1)	0.53	0.53	0.51
Student (0,1)	0.07	0.06	0.06
Resides in Central City (0,1)	0.44	0.18	0.14
Resides in MSA, not Central City (0,1)	0.38	0.44	0.38
Firm Size, Industry			
Self-employed or works for a small firm	0.44	0.48	0.51
Manufacturing	0.44	0.46	0.43
Transportation, Utilities, Communication	0.05	0.06	0.04
Wholesale/Retail Trade	0.13	0.15	0.15
Finance, Insurance Real Estate	0.07	0.05	0.07
Professional Services	0.19	0.18	0.2
Other Services	0.09	0.08	0.07
Public Administration	0.04	0.03	0.03
Number of Observations	4299	3779	845

Source: Sample means are tabulated using the 1989 March CPS. Sample consists of civilian adults between the ages of 18 and 64.
Notes: Self-employment status, firm size and industry are defined for workers only. Small firms are defined as having fewer than 100 employees at all locations.

Table 2B. Insurance Coverage:
New York, Pennsylvania, and Connecticut, 1988

	New York	Pennsylvania	Connecticut
Private Health Insurance, Any Source (0,1)	0.77	0.84	0.87
Employer-Sponsored Insurance (0,1)	0.69	0.76	0.77
Private Insurance in Own Name (0,1)	0.54	0.56	0.62
Uninsured (0,1)	0.13	0.10	0.10
Number of Observations	4299	3779	845
Private Insurance by Source of Coverage			
Non-group/Individual	10.4%	9.5%	11.5%
Small Employer-Sponsored Group	40.3	42.9	36.8
Large Employer-Sponsored Group	49.4	47.6	51.7

Source: Authors' tabulations using the 1989 March CPS. Sample consists of civilian adults between the ages of 18 and 64.

Table 3. Difference-in-Difference Estimates of the Effect of New York's Reforms on Insurance Coverage, Using Pennsylvania and Connecticut as Control Groups

		Change in NY less Change in PA	Change in NY less Change in CT
I.	**1987 to 1996 (N = 104,333)**	-0.011 [0.027]	-0.00004 [0.999]
II.	**1991 to 1996 (N = 60,502)**	-0.004 [0.517]	0.016 [0.170]

Notes: The samples consist of all adults ages 18 to 64. The dependent variable is an indicator variable for private insurance from any source. Probability that difference equals zero in brackets. All specifications include controls for age, age squared, education, education squared, and indicator variables for sex, white/non-white, hispanic ethnicity, marital status, currently in school, full-time/part-time employment status (5 classes), location size (4 classes), industry (7 classes) and class of worker (private, state government, local government, self-employed). "Post-reform" refers to the period 1993 to 1996. "Pre-reform" refers to years up to and including 1992.

Table 4. Estimates of the Effect of New York's Reforms on Insurance Coverage, Using Pennsylvania and Connecticut as Control Groups

|	Change in NY less Change in PA		Change in NY less Change in CT	
I. 1987 to 1996 (N = 74,386)				
Private insurance, any source				
1. Self-employed/employees of small firms	-0.035 [0.000]		-0.027 [0.044]	
2. Employees of large firms		-0.018 [0.010]		-0.018 [0.133]
3. Difference-in-Difference-in-Differences (row 2 less row 1)	-0.017 [0.105]		-0.009 [0.609]	
Private insurance in own name				
1. Self-employed/employees of small firms	-0.021 [0.029]		-0.014 [0.411]	
2. Employees of large firms		-0.007 [0.397]		-0.007 [0.642]
3. Difference-in-Difference-in-Differences (row 2 less row 1)	-0.014 [0.287]		-0.007 [0.758]	
II. 1991 to 1996 (N = 43,660)				
Private insurance, any source				
1. Self-employed/employees of small firms	-0.012 [0.289]		0.005 [0.801]	
2. Employees of large firms		-0.012 [0.207]		0.004 [0.816]
3. Difference-in-Difference-in-Differences (row 2 less row 1)	0.0003 [0.982]		0.001 [0.587]	
Private insurance in own name				
1. Self-employed/employees of small firms	0.006 [0.649]		0.013 [0.587]	
2. Employees of large firms		0.001 [0.965]		0.009 [0.661]
3. Difference-in-Difference-in-Differences (row 2 less row 1)	0.006 [0.746]		0.004 [0.890]	

Notes: Samples consist of working adults ages 18 to 64. The dependent variable is in italics, and the probability that relevant difference equals zero is in brackets. All specifications include controls for age, age squared, education, education squared, and indicator variables for sex, white/non-white, hispanic ethnicity, marital status, currently in school, full-time/part-time employment status (5 classes), location size (4 classes), industry (7 classes) and class of worker (private, state government, local government, self-employed). Small (large) firms are those with fewer (more) than 100 employees. "Post-reform" refers to the period 1993 to 1996. "Pre-reform" refers to years up to and including 1992.

Table 5. The Percentage of Insurance-Providing Firms Offering HMO Coverage, New York, Connecticut and Pennsylvania, Before and After 1993

	Change in NY less Change in PA		Change in NY less Change in CT	
1. Small firms	0.234		0.230	
	[0.015]		[0.083]	
2. Large firms		-0.076		-0.095
		[0.256]		[0.323]
3. Difference-in-Difference-in-Differences	0.310		0.325	
(row 2 less row 1)	[0.016]		[0.069]	

Notes: The data are from surveys of employers conducted by the Health Insurance Association of America in 1988, 1989, 1990 and 1991, and KPMG/Peat Marwick in 1993 and 1995. Small (large) firms are defined as establishments with fewer than (at least) 100 employees. The sample size is 1405. The figures in brackets represent the probability that the difference equals zero.

Figure 1. The Rothschild-Stiglitz Model of Insurance
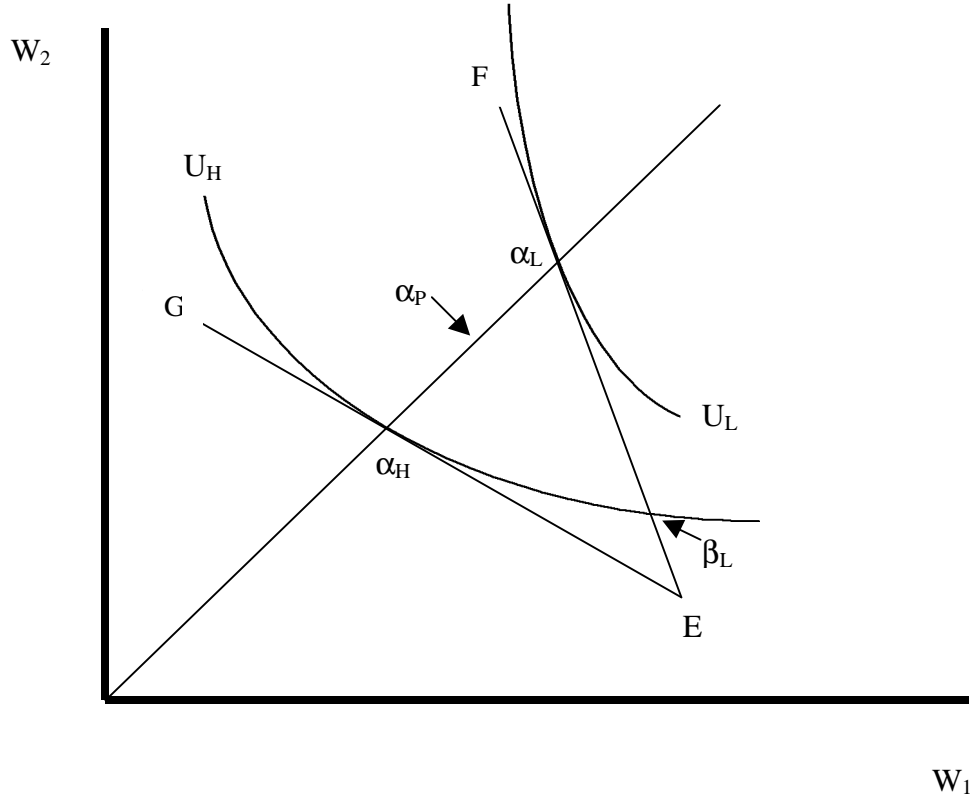
Figure 2. A Separating Equilibrium in the Presence of a Minimum Quantity Constraint
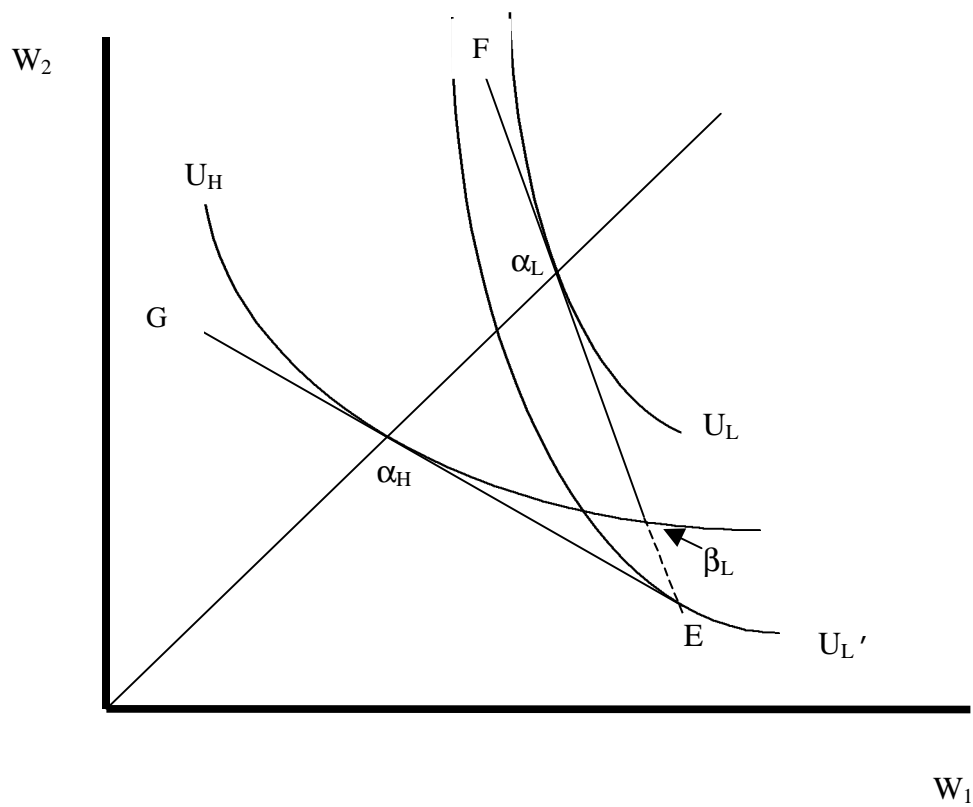
Figure 3. Trends in Private Health Insurance Coverage in New York, Pennsylvania, and Connecticut, 1987 to 1996
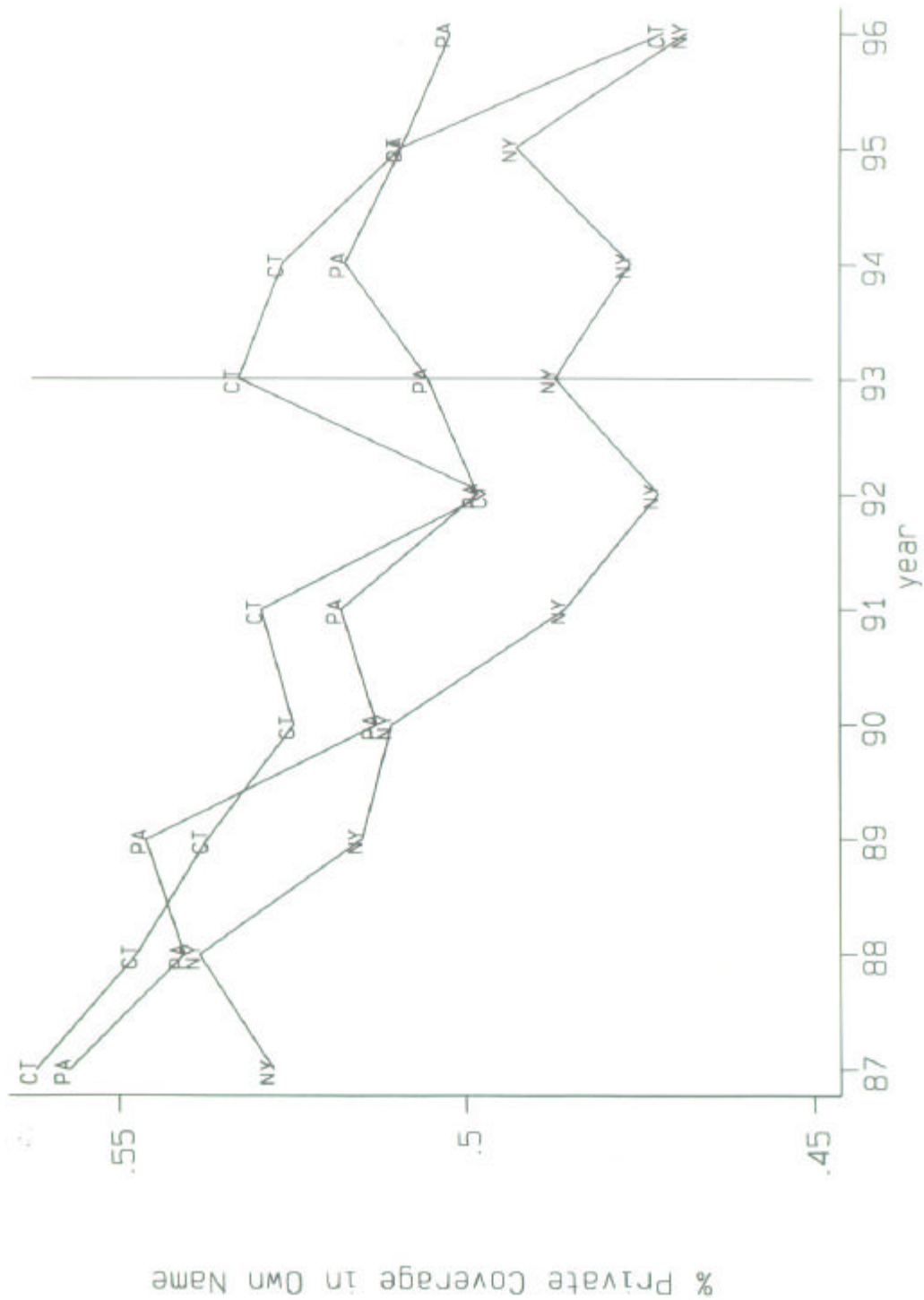
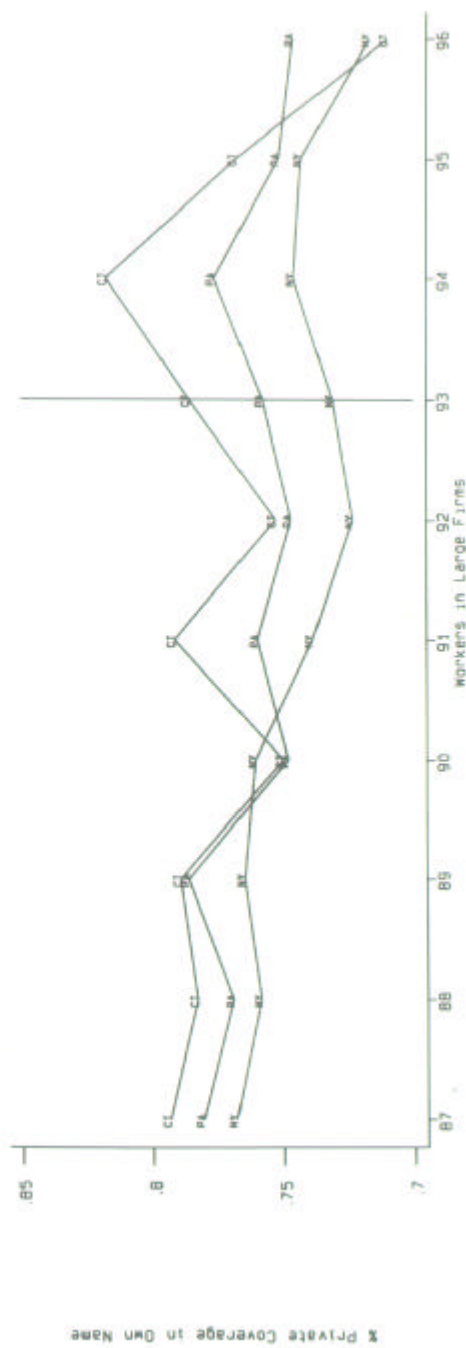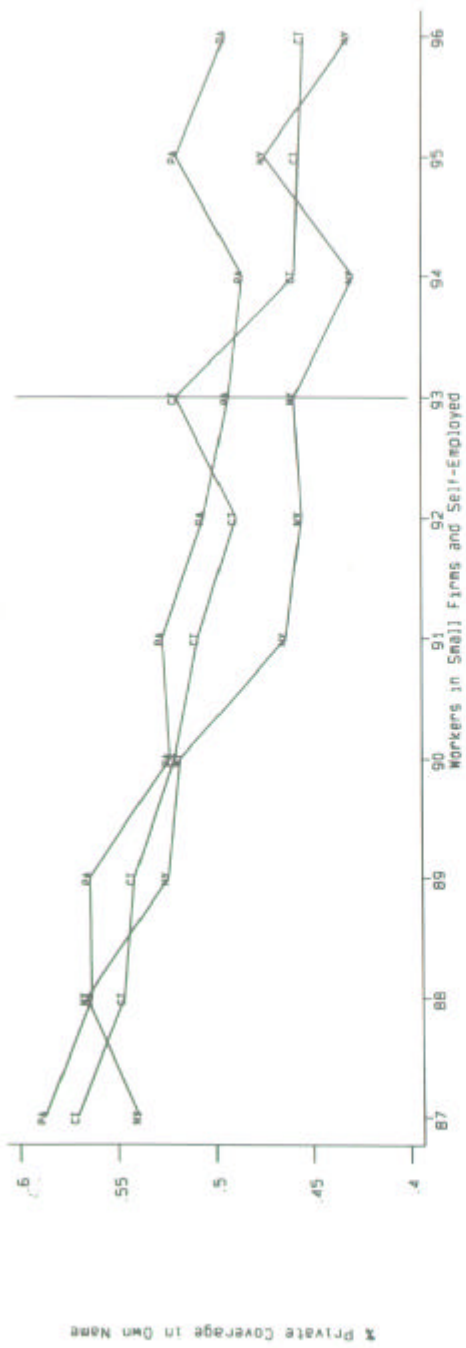Figure 4. Trends in Private Health Insurance Coverage by Firm Size, 1987 to 1996

Figure 5. The Age Distribution of Adults with Small Group Health Insurance, New York and Pennsylvania, Before and After 1993
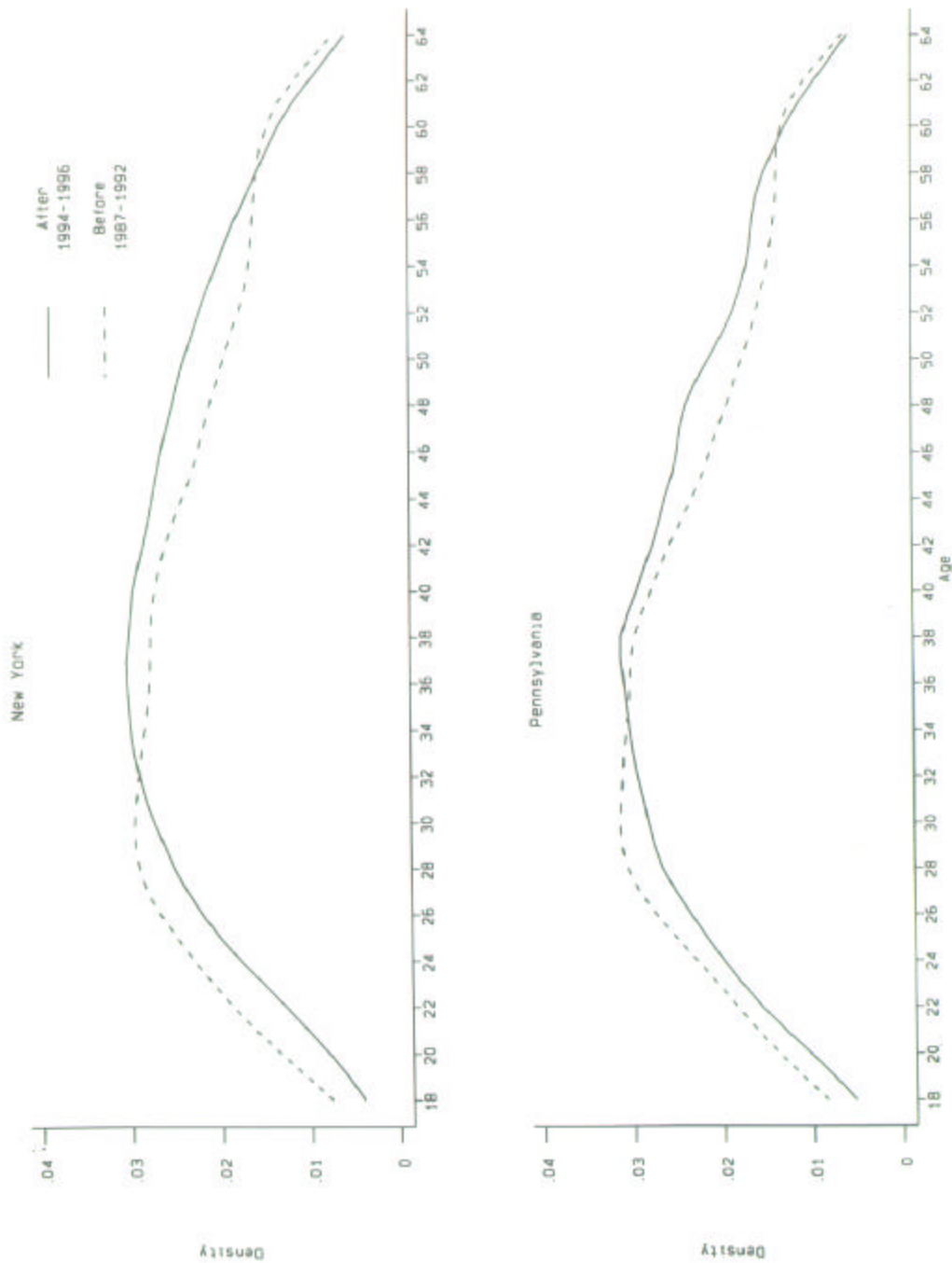
New York

After
1994-1996

Before
1987-1992

Pennsylvania

Density

Density

Age

.04   .03   .02   .01   0

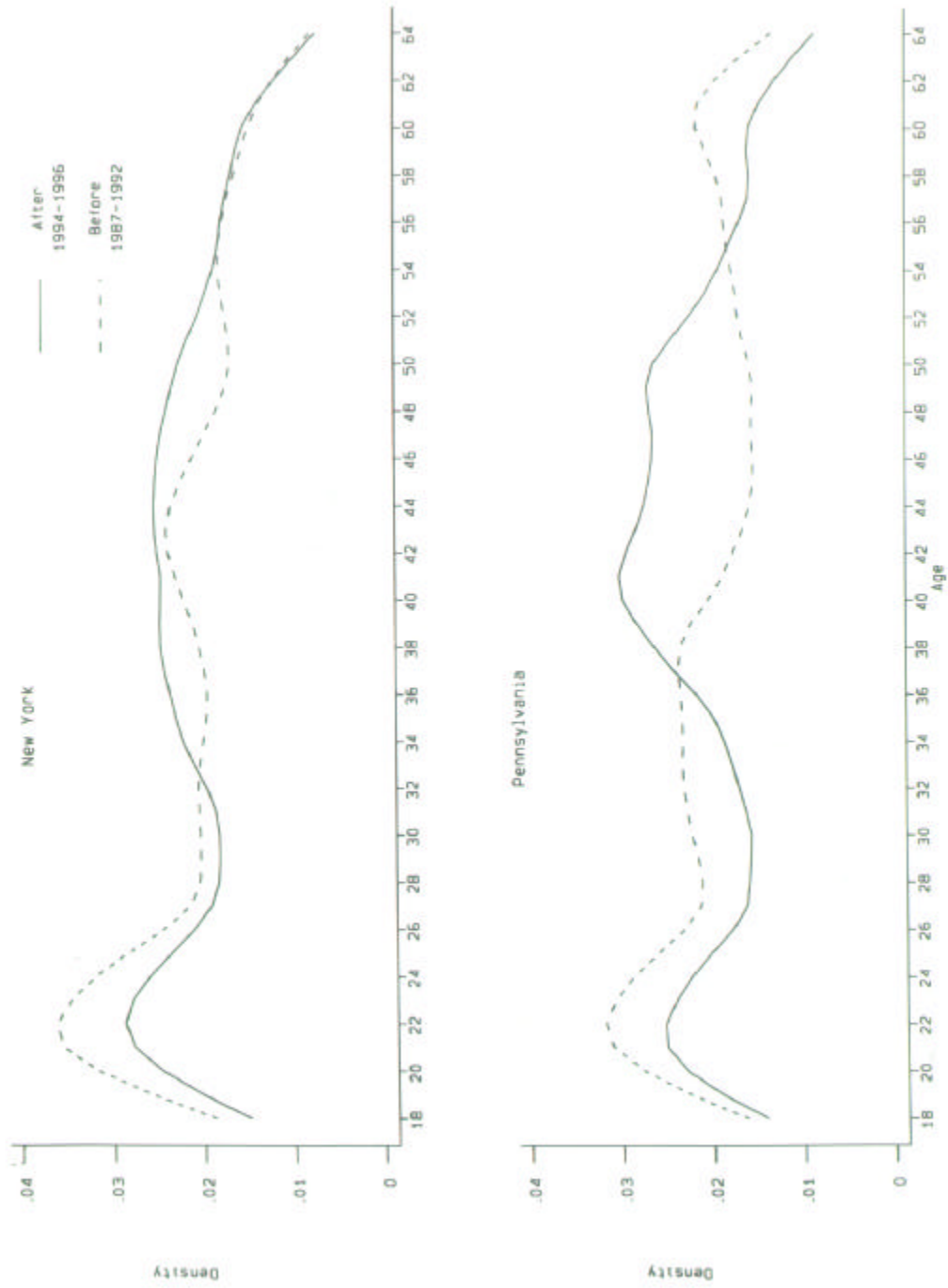18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64

Figure 6. The Age Distribution of Adults with Individually-Purchased Health
Insurance, New York and Pennsylvania, Before and After 1993

Figure 7: Difference in Density Estimates of the Age Distribution of Insured Adults with Small Group Health Insurance. Change in NY less Change in PA
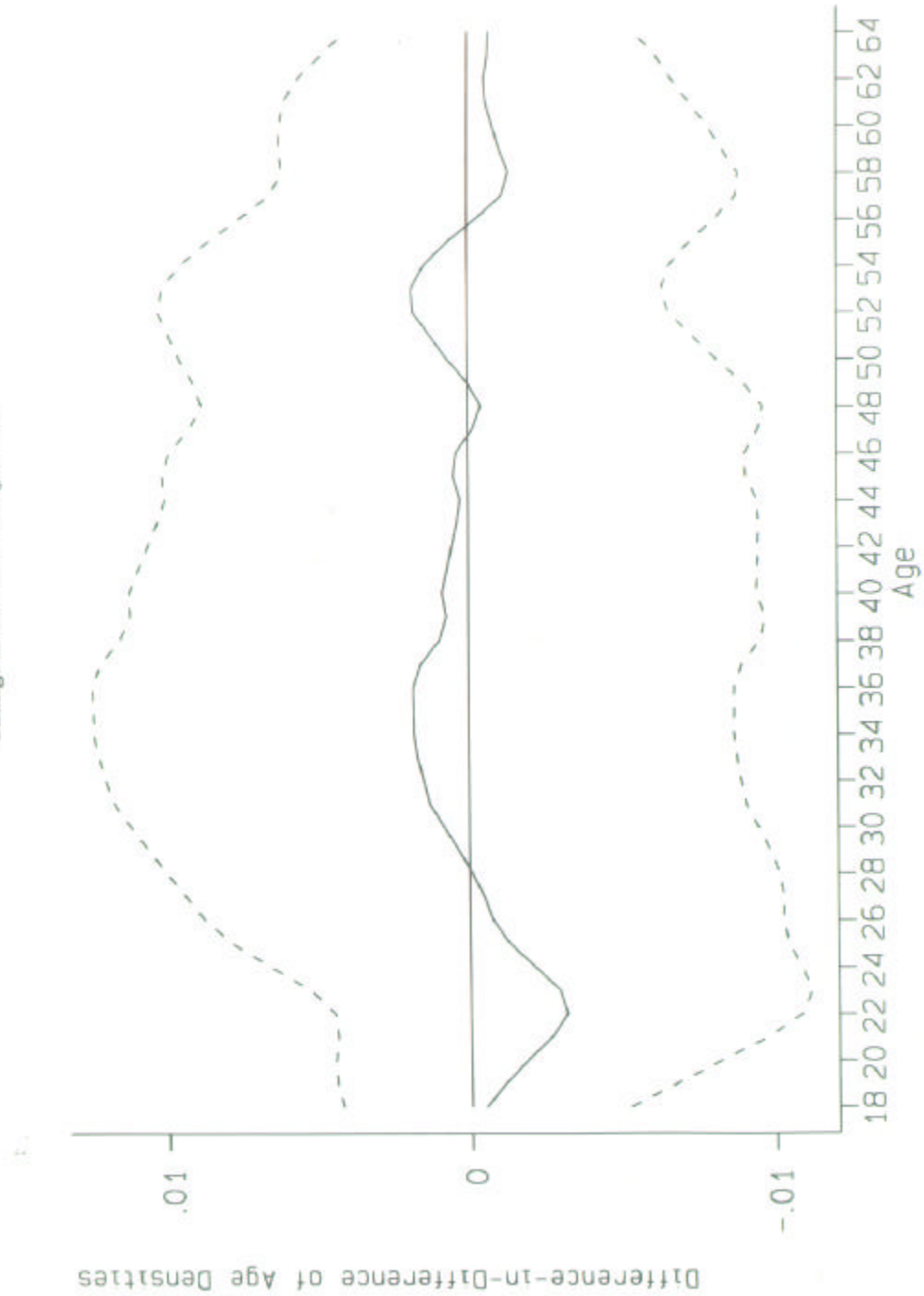
Figure 8: Difference in Density Estimates of the Age Distribution of
Insured Adults with Individually-Purchased Health Insurance.
Change in NY less Change in PA