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REGULATORY REDISTRIBUTION IN THE MARKET FOR HEALTH INSURANCE

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ABSTRACT

In the early 1990s, several U.S. states enacted community rating regulations to equalize the health insurance premiums paid by the healthy and the sick. Consistent with severe adverse selection pressures, their private coverage rates fell by around 8 percentage points more than rates in comparable markets over subsequent years. By the early 2000s, following substantial public insurance expansions, coverage rates in several of these states had improved significantly. As theory predicts, recoveries were largest where public coverage expanded disproportionately for high cost populations. The analysis highlights that the incidence of public insurance and community rating regulations are tightly intertwined.

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A variety of health policy instruments serve social insurance objectives. Examples include public insurance programs and community rating regulations, each of which play roles in the Patient Protection and Affordable Care Act (PPACA). This paper shows that the effects of these measures on private insurance markets are tightly intertwined.

Community rating and guaranteed issue regulations prevent insurance companies from adjusting premiums or denying coverage on the basis of pre-existing conditions. Their intent is to generate within-market transfers from the healthy to the sick. This may result in adverse selection, since the healthy can escape these transfers by reducing or dropping their coverage (Rothschild and Stiglitz, 1976; Buchmueller and DiNardo, 2002). The severity of resulting adverse selection depends crucially on the distribution of costs across potential buyers. Costs associated with the market's least healthy participants will be particularly relevant due to the long right tail of the health spending distribution.

I show that public insurance programs influence community-rated markets by altering the pool of potential purchasers. When state Medicaid programs cover individuals with high health costs, they relieve adverse selection pressures.[1] By reducing community rating's distortions, Medicaid expansions can thus *crowd in* private coverage when targeted at the sick. This contrasts with the usual expectation that public coverage will partially crowd out private coverage (Cutler and Gruber, 1996). The converse is true as well; if the healthy prove more likely to take up Medicaid than the sick, then Medicaid expansions may worsen the performance of community-rated markets.

The experience of U.S. states sheds light on the empirical relevance of the forces described above. Many states imposed some form of premium restrictions on their insurance markets during the early 1990s. A set of New England and Mid-Atlantic states stood out by implementing relatively pure community rating and guaranteed issue

[1]Medicaid, for example, can be targeted at unhealthy individuals through eligibility via disability or through income thresholds that explicitly take household medical spending into account. The latter approach is known as a medically-needy income concept.

regimes in both the individual and small-group insurance markets. Later years ushered in substantial public insurance expansions, driven in part by the 1997 authorization of the State Children's Health Insurance Program (SCHIP). Beyond SCHIP, several of the most tightly regulated states obtained waivers that unlocked federal funding for coverage of low-income and medically-needy adults. Public coverage of the disabled also increased significantly during this period.

I find that community-rated markets experienced adverse selection pressures more severe than have been documented by past research.[2] Within 3 years of adopting community rating, I find that coverage rates had fallen by around 8 percentage points in tightly regulated markets relative to control markets. Past work has estimated the average effect of these regulations over the years immediately following their implementation. The data show that coverage declines escalate over this period; medium run declines are much larger than short run declines. This is not surprising, as even the unraveling of a single insurance plan can take multiple years to unfold (Cutler and Reber, 1998).

I next characterize the Medicaid expansions of the late 1990s and early 2000s. In states with comprehensive premium regulations, Medicaid expansions covered more adults, and in particular more unhealthy adults, than they covered in other states. These public insurance expansions were associated with private coverage increases in the tightly regulated markets, but not elsewhere. Consistent with the mechanisms described above, community-rated markets experienced their strongest recoveries in states where Medicaid expansions most disproportionately covered unhealthy adults.

New York provides the most striking example of the experience described above. In

[2]Papers finding near-zero coverage impacts include Buchmueller and DiNardo (2002), Simon (2005), Zuckerman and Rajan (1999), Herring and Pauly (2006), LoSasso and Lurie (2009), Davidoff, Blumberg, and Nichols (2005), Monheit and Schone (2004) and Sloan and Conover (1998). Buchmueller and DiNardo (2002), Buchmueller and Liu (2005), and LoSasso and Lurie (2009), find evidence that the implementation of community rating resulted in increases in the market share of Health Maintenance Organizations (HMOs).

1993, New York adopted community rating and guaranteed issue regulations as strict as those in any state. Relative to comparable markets in other states, coverage rates in New York had fallen 8 percentage points from 1993 to 1997. Subsequently, New York aggressively expanded its Medicaid program, making disproportionate use of federal SCHIP appropriations (Herz, Peterson, and Baumrucker, 2008) and increasing adult enrollment far more than other states through its Healthy NY and Family Health Plus programs. By the mid-2000s, private coverage rates had largely recovered.

1 The Evolution of State Insurance Regulations

Over the last quarter century, U.S. states have engaged in substantial experimentation with health insurance regulations. As the Clinton Administration's health plan stalled during the early 1990s, many states adopted some form of community rating and/or guaranteed issue regulations. Community rating rules restrict insurers from adjusting premiums on the basis of an individual's health status (and, to degrees that vary across states, on the basis of age and other demographic characteristics). Guaranteed issue rules prevent insurance companies from rejecting beneficiaries or limiting their coverage on similar bases.

Table 1 highlights states with at least some experience in community rating. As defined for this paper's purposes, a state adopted a comprehensive regulatory regime if it meets two criteria. First, it must have modified or pure community rating rules, as defined by GAO (2003), in both its non- and small-group markets. Under pure community rating, premiums are only allowed to vary on the basis of family composition and geography; premium variations due to pre-existing conditions and age are disallowed. Modified community rating allows (limited) premium variations on the basis of age, but disallows the use of pre-existing conditions. Many states allow premiums to vary within

Table 1: State Health Insurance Regulations and Public Insurance Programs

State	Community Rating				Guaranteed Issue	Public Insurance	
	Non-Group	Years Effective	Small-Group	Years Effective	Strict?	High Risk Pool by 2002	Share of National Population Eligible for Medicaid under 1996 State Rules
Panel A: Core sample of states with regimes likely to induce adverse selection							
Kentucky	Comm. Rating	1996-1998	Comm. Rating	1996-1998	Yes	No	0.30
Maine	Comm. Rating	1993-	Comm. Rating	1993-	Yes	No	0.29
Massachusetts	Comm. Rating	1997-	Comm. Rating	1992-	Yes	No	0.24
New Hampshire	Comm. Rating*	1995-2002	Comm. Rating	1994-2002	Yes	No	0.38
New Jersey	Comm. Rating	1993-	Comm. Rating	1994-	Yes	No	0.22
New York	Comm. Rating	1993-	Comm. Rating**	1993-	Yes	No	0.28
Vermont	Comm. Rating	1993-	Comm. Rating**	1993-	Yes	No	0.45
Panel B: Additional community rating states with regimes less likely to induce adverse selection							
Colorado	None	n/a	Comm. Rating	1995-	Yes	Yes	0.20
Connecticut	None	n/a	Comm. Rating	1992-	Yes	Yes	0.36
Maryland	None	n/a	Comm. Rating	1992-	Yes	No	0.34
North Carolina	None	n/a	Comm. Rating	1992-	Yes	No	0.29
Oregon	Comm. Rating	1996-	Comm. Rating	1992-	No***	Yes	0.27
Washington	Rating Band*	1993-	Comm. Rating	1994-	Yes	Yes	0.42

*Washington and New Hampshire (post repeal of community rating) have relatively tight rating bands, allowing premiums to vary by only 20% within demographic groups on the basis of health. This compares with the remainder of the rating band states that allow premiums to vary anywhere from 50-200% on the basis of health.

**New York and Vermont have pure community rating, which completely prohibits risk-rating on the basis of demographic characteristics as well as health status.

***Oregon is the only state that fails to make the core sample of regulated states due to its lack of a strict guaranteed issue requirement in its non-group market (Lo Sasso and Lurie, 2009) and its small-group market (Simon, 2005).

Sources: Information on state insurance market regulations comes from GAO (2003), Simon (2005), Leida and Wachenheim (2008), and CBO (2005). The share eligible for Medicaid in 1996 was calculated by the author using imputations from the March Demographic Supplement to the Current Population Survey.

prescribed bounds (known as "rating bands") on the basis of pre-existing conditions. In practice, these bands significantly reduce the transfers associated with community rating, hence I do not consider such states to be comprehensively regulated.[3]

The second requirement is that the state must have guaranteed issue rules that go beyond the federal requirements in the 1996 Health Insurance Portability and Accountability Act (HIPAA) and the 1985 Consolidated Omnibus Budget Reconciliation Act (COBRA). This typically involves requiring shorter exclusion periods for pre-existing conditions and longer periods of continuation coverage for those who lose health insurance due, among other reasons, to loss of employment. Guaranteed issue rules can also vary in terms of the range of products to which they apply, with the strictest regulations requiring guaranteed issue of all insurance products. For categorizing the stringency of a state's guaranteed issue requirements in the small- and non-group markets, I rely on Simon (2005) and LoSasso and Lurie (2009) respectively.

I designate 7 states as having adopted comprehensive regulations. Ordered chronologically, they are Maine, New York, Vermont, New Jersey, New Hampshire, Kentucky, and Massachusetts. Two of the states, namely Kentucky and New Hampshire, abandoned their comprehensive regulations during the sample.[4]

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[3]Most state rating bands allow premiums to vary by at least 100 percent. For a typical family policy in the non-group market in 2002, this implies premium variation on the order of $4,400 (see, e.g., Bernard and Banthin (2008)). The within-market transfers implied by the rating laws in such states are negligible in comparison with states that adopt pure community rating. Even in the minority of states with relatively tight rating bands (e.g., Washington), the implied transfers are on the order of $1,000 less than they would be under a community rating regime.

[4]Wachenheim and Leida (2007) report that insurance companies exited Kentucky's market in large numbers and repeal of the law began a mere two years after its enactment. New Hampshire's law was similarly repealed amidst fears of declining coverage.

2 Why Public Insurance Matters for Community-Rated Markets

This section characterizes the relationship between public insurance programs, community rating regulations, and equilibrium health insurance coverage rates. Like the subsequent empirical work, the model focuses on the extensive margin of the insurance purchasing decision. The supply side of insurance markets may also respond on the intensive margin of coverage generosity. Appendix A.7 assesses the potential relevance of such responses for this paper's empirical findings.[5]

2.1 Community Rating Regulations and Coverage Rates

The outcome of interest is an individual's decision between purchasing a standardized insurance product and remaining uninsured. Individual i has two relevant characteristics, namely the plan's expected payout on i's health care, c_i, and net insurance value, v_i. Net insurance value reflects a variety of underlying characteristics, including risk aversion and the uncertainty to which type i is exposed. Individuals may also differ in the value they place on the care made accessible by the plan.[6] The characteristics

[5]Recent work by Handel, Hendel, and Whinston (2013) shows that the relevant regulations will likely induce substantial selection on the intensive margin of coverage generosity; they predict that most individuals will purchase the minimum coverage allowed by regulation. The current paper can be viewed as focusing on the margin of the decision to purchase this minimum coverage rather than remain uninsured. Ericson and Starc (2012) provide further analysis of choice in the context of insurance exchanges. Earlier work on rating regulations similarly finds a role for intensive-margin adjustments in the form of increases in the prevalence of coverage through HMOs (Buchmueller and DiNardo, 2002; Buchmueller and Liu, 2005). Absent these intensive margin adjustments, declines in coverage rates would likely have been even larger than those estimated in this paper's empirical work. Appendix A.7 shows that changes in HMO coverage are not a plausible explanation of variation in the long-run performance of community-rated markets.

[6]Rich individuals may have relatively high willingness to pay for mid-life cancer screenings, for example, while consumption of such services may be a manifestation of moral hazard from the perspective of the poor. Such differences are conceptually related to "moral hazard types" as analyzed by Einav, Finkelstein, and Ryan (2013).

are defined such that i's total willingness to pay is $D_i = c_i + v_i$. Market-wide demand for insurance is determined by the joint distribution of c_i and v_i, denoted $F(c, v)$ with probability density function $f_{c,v}(c, v)$.

I treat premiums as having two components, namely a loading cost that is constant across consumers, l, and a component linked to the plan's expected health expenditures. While insurers are assumed to observe c_i, regulations may restrict their use of this information in determining type i's premium. Absent regulations, premiums are "experience rated." The experience rated premium offered to type i is $p_i = c_i + l$. With such premiums, any individual for whom v_i exceeds the loading cost will purchase insurance. The market-wide coverage rate is thus

$$\text{Cov. Rate}_{\text{exp. rating}} = \int_c \int_v 1\{v_i > l\} f_{c,v}(c, v) dv dc, \tag{1}$$

where $1\{v_i > l\}$ is an indicator equal to 1 when net insurance value exceeds the loading cost.

Community rating regulations prevent insurers from differentiating premiums on the basis of expected health care costs. Insurers will thus charge $p = \bar{c} + l$, where $\bar{c}$ is the average expected cost associated insurance purchasers. Keeping in mind that $\bar{c}$ incorporates market-wide purchasing decisions, the coverage rate under community rating is

$$\text{Cov. Rate}_{\text{comm. rating}} = \int_c \int_v 1\{v_i > l + \bar{c} - c_i\} f_{c,v}(c, v) dv dc. \tag{2}$$

The difference between type i's experience- and community-rated premiums is $\bar{c} - c_i$, which I interpret as a within-market transfer from type i to other insurance purchasers.

Community rating's effect on coverage depends largely on two factors. The first is the distribution of c_i and the second is the relationship between c_i and v_i. Past work

emphasizes that if healthy individuals are highly risk averse, they may sufficiently value insurance to prevent adverse selection from posing a problem (Cutler, Finkelstein, and McGarry, 2008; Einav and Finkelstein, 2010). This paper focuses on the distribution of c_i. Specifically, I emphasize that community rating will significantly increase the premiums of most market participants when the market contains many high cost individuals.

Analyses of community rating regulations typically take the distribution of health risks as given (Handel, Hendel, and Whinston, 2013; Hackmann, Kolstad, and Kowalski, 2012). This paper emphasizes that the relevant distribution depends crucially on other features of the policy environment. Public insurance programs are particularly relevant, as they alter the pool of potential market participants.

A simple method for gauging adverse selection pressures is to compare the average health spending of relevant population groups. Consider the spending of adults covered by non-group and small-group insurance plans in the 2011 Medical Expenditure Panel Survey (MEPS). Among privately insured adults employed at "small" firms (i.e., those with 50 or fewer employees), average total health costs were $4,300. For those in the top two thirds of the distribution of self-reported health, average expenditures were $3,200.[7] Those with lower self-reported health averaged $6,800. For those among the healthiest two thirds of the distribution, community rating thus increases the average costs of the relevant pool by 34 percent.

Adults on Medicaid have higher health costs than those with private policies. In the 2011 MEPS, costs for the full population of non-elderly, adult Medicaid beneficiaries averaged $8,300. Medicaid's coverage of these individuals thus reduces average costs among the privately insured. Pooling adult Medicaid beneficiaries with non- and small-group policy holders, for example, pushes average costs from $4,300 to $5,100. Because Medicaid pays lower rates than most private plans, average costs would be closer to

[7]This corresponds to individuals with self-reported health status of "Excellent" or "Very Good."

Table 2: Population Counts for Stylized Example

		Net Insurance Value Type: v_i		
	Type	\$1,000	\$2,000	\$3,000
Expected Health Cost Type: c_i	\$3,000	60	65	75
	\$5,000	30	20	30
	\$10,000	10	5	5

Note: Cell entries are population counts for the cost/insurance value types associated with the example discussed in Section 2.2. For example, there are 60 individuals with c_i = \$3,000 and v_i = \$1,000 and 65 individuals with c_i = \$3,000 and v_i = \$2,000.

\$6,000 if all were privately insured.[8] This is nearly twice the \$3,200 associated with the healthiest two thirds of private policy holders.

2.2 Medicaid's Implications for Community-Rated Markets

This section walks through a numeric example illustrating how public insurance programs influence community-rated insurance markets. Table 2 contains counts for each type, $\{c_i, v_i\}$, in the example population. There are three cost types and three insurance value types. Expected health costs are \$3,000, \$5,000, or \$10,000. Insurance value is \$1,000, \$2,000, or \$3,000. The loading cost, l, for the insurance policy is \$1,300.

Recall that under experience rating types with $v_i > l$ purchase insurance. In the present example, types with $v_i = \$1,000$ opt out of coverage. The resulting coverage rate is 67 percent.

Suppose now that community rating regulations are introduced. Were the full population to purchase insurance, $\bar{c} = \$4,000$ and $p_i = \$5,300$. At this premium, types $\{\$3000, \$1000\}$ and $\{\$3000, \$2000\}$ exit the market. Absent these individuals, $\bar{c}$ rises just above \$4,700 and the premium above \$6,000. Adverse selection continues until only

[8] See work by Zuckerman, McFeeters, Cunningham, and Nichols (2004) and Clemens and Gottlieb (2013) for more on the relationship between public and private payments for health care services.

types $\{\$10000, \$2000\}$ and $\{\$10000, \$3000\}$ are in the market, implying a 3 percent coverage rate. Community rating thus generates no redistribution across health types while reducing the welfare of the newly uninsured.

Now consider a public insurance program that covers all types with $v_i = \$1,000$, which could be a proxy for low income. If types with $v_i = \$1,000$ are removed from the market, the community-rated equilibrium is for types $\{\$5000, \$3000\}$, $\{\$10000, \$2000\}$, and $\{\$10000, \$3000\}$ to purchase insurance at $p = \$7,550$. In this example, public insurance improves the community-rated equilibrium despite covering individuals who were not in the initial pool of purchasers. This occurs because type $\{\$10000, \$1000\}$ was near the margin of purchasing insurance in the community-rated market. Their presence among the uninsured breaks the pooling equilibrium in which type $\{\$5000, \$3000\}$ enters the market.

Finally, consider a public insurance program that covers all types with $c_i = \$10,000$. With these types removed from the market, equilibrium is for type $\{\$3000, \$3000\}$ and all types with $c_i = \$5,000$ to purchase insurance. The private coverage rate is 52 percent. The effect of public insurance works through coverage of both the initially insured and uninsured types with $c_i = \$10,000$. Had public insurance only covered types $\{\$10000, \$2000\}$ and $\{\$10000, \$3000\}$, the equilibrium purchasing pool would include types $\{\$5000, \$3000\}$ and $\{\$10000, \$1000\}$. As in the previous paragraph, the presence of type $\{\$10000, \$1000\}$ among the uninsured significantly influences the final equilibrium. This reflects the fact that, among the uninsured, high cost types will tend to be relatively close to the margin of purchasing insurance.

3 Estimating the Effects of Regulations

This section presents my framework for estimating the effect of community rating on insurance coverage. Non- and small-group markets governed by comprehensive regulations are the treated markets of interest. Equivalent markets in less tightly regulated states serve as controls within a difference-in-differences framework. The existing literature on community rating's effects includes estimates of this form as well as triple-difference estimates in which the large-group markets in all states serve as within-state control groups (Buchmueller and DiNardo, 2002).

The difference-in-differences framework is presented below:

$$COV_{i,s,t} = \beta_{1_t}\text{Reg. State}_s \times Post_t + \beta_{2_s} State_s + \beta_{3_t} Year_t + X_{i,s,t}\gamma + \varepsilon_{i,s,t}. \quad (3)$$

$COV_{i,s,t}$ is an indicator for the coverage status (e.g., has private coverage) of individual i who resides in state s in year t. Equation (3) contains the standard features of difference-in-differences estimation, namely sets of year ($Year_t$) and state ($State_s$) indicator variables. The primary coefficient of interest is β_1, which is an estimate of coverage changes in comprehensively regulated markets net of coverage changes in other markets. I estimate the standard error on β_1 using the block bootstrap method with clusters drawn at the state level (Bertrand, Duflo, and Mullainathan, 2004).

β_1 will be an unbiased estimate of the effect of comprehensive regulations on insurance coverage under a standard "parallel trends" assumption. That is, conditional on $X_{i,s,t}$, it must be the case that the treatment and control states would have experienced the same changes in coverage had the treatment states not adopted comprehensive regulations. This assumption faces standard threats. It could be violated, for example, if treatment and control states experienced significantly different changes in economic conditions. It could also be violated if treatment states differentially adopted additional

policies that are likely to affect insurance coverage.

I take several steps to account for threats to the parallel trends assumption. First, the baseline covariates in $X_{i,s,t}$ provide a set of controls for the economic circumstances of the households in the sample. The full set of controls includes a set of 2-digit occupation dummy variables, region dummy variables interacted with family income as a percent of the poverty line, an indicator for having a single mother as the household's head, and an indicator for being black, additional indicators for having two full time workers in the household and for the education levels of household adults, an indicator for home ownership, and age group indicators. In additional analysis I control directly for state-level economic covariates and changes in health expenditures. I further explore the relevance of threats to the parallel trends assumption by applying matching criteria for selecting the individuals and/or states included in the control group.

An additional check on the validity of the estimates is to construct a within-state control group for use in a triple-difference framework. This framework appears below:

$$\begin{aligned} COV_{i,s,t} = {} & \beta_1 Post_t \times \text{Reg. State}_s \times \text{Small Firm}_i \\ & + \beta_{2_s} State_s \times \text{Small Firm}_i + \beta_{3_{s,t}} State_s \times Year_t \\ & + \beta_{4_t} Year_t \times \text{Small Firm}_i + \beta_{5_s} State_s + \beta_6 \text{Small Firm}_i + \beta_{7_t} Year_t \\ & + X_{i,s,t}\phi + \varepsilon_{i,s,t}. \end{aligned} \tag{4}$$

Equation (4) augments the fixed effects from equation (3) with an indicator for being on the non- and small-group insurance markets (Small Firm_i). It further incorporates two-way interactions between Small Firm_i and the state and year fixed effects. These interactions control for differential trends across treatment and control states as well as across the large- and small-group markets. They also allow the difference between large- and small-group markets to differ at baseline across the states. The primary coefficient

of interest is again β_1.

In the triple-difference framework, unbiased estimation relies on three assumptions that are not wholly satisfied in practice. First, it requires correct assignment of units to the within-state treatment and control groups. In practice, the small- and large-group markets cannot be cleanly segregated using firm-size data from the CPS. This misclassification will tend to attenuate the triple-difference estimates towards 0. Second, triple difference estimation requires that the policy not have spillover effects on the within-state control group. This may be violated, for example, if regulation-induced losses lead an insurer to raise premiums in all markets so as to meet its capital requirements. Third, for the within-state control group to effectively control for state-specific shocks, these shocks must similarly influence insurance coverage in the within-state treatment and control groups. This is likely violated due to the stability of coverage offerings by large firms relative to coverage offerings by small firms. For these reasons I estimate equation (4) as a check on the robustness of estimates of equation (3) rather than as the baseline specification.

4 Classification of Treatment and Control States

I separately estimate the effects of comprehensive regulations as adopted by two groups of states. The first group includes New York, Maine, and Vermont. I characterize these states as early adopters of stable regulatory regimes. Their regulatory regimes have two empirically notable characteristics. First, they regulated their non- and small-group markets simultaneously, which aids in examining community rating's dynamic effects. Second, their regulatory regimes were maintained in essentially the same form for the duration of the sample, hence their designation as "stable."

The second group of states includes Kentucky, Massachusetts, New Hampshire, and

New Jersey. I characterize these states as staggered adopters of relatively unstable regulatory regimes. Kentucky and New Hampshire's regimes were unstable in that they repealed community rating during the period under study. Massachusetts was unique in terms of the gap between its regulation of the individual and small group markets (regulated in 1992 and 1997 as shown in Table 1). Within this group, New Jersey's community rating regime most closely resembles those of Maine, New York, and Vermont. Its regulatory instability lies in its substantial changes to other insurance market regulations during the sample period.

Because the treatment states are concentrated in New England and the Mid-Atlantic, control group selection is non-trivial. The setting is such that no one method for selecting the control group is obviously preferred to all others. While the paper's main text presents estimates of equations (3) and (4) in which the sample includes all U.S. states, robustness to a range of alternative approaches has been checked. Two of these, including synthetic cohort and individual-level propensity score approaches to matching, are presented graphically in the main text. Results from additional robustness checks can be found in Appendix 1.

5 Sample Selection and Baseline Characteristics

I estimate equations (3) and (4) using samples of individuals from the March Supplements of the Current Population Survey (CPS) for years 1988-2007. The CPS provides information on insurance status and key household economic and demographic characteristics for years 1987-2006. I focus on individuals in households with at least one child and at least one full-time employed adult.[9] This places attention on the market

[9]Previous studies similarly restrict the sample population to the employed. Appendix Figure A4 presents coverage tabulations in which the unemployed are included in the sample. The principal rationale for excluding the unemployed involves the assumptions underlying the triple-difference framework of Equation (4). The triple difference framework assumes that the insurance coverage of workers at large

segments that were most directly affected by changes in Medicaid eligibility over this time period.[10] Since these sample selection margins could, in principal, be affected by the policies under study, Appendix Figures A3 and A4 display the evolution of coverage for samples in which these restrictions have not been imposed.

The summary statistics in Table 2 highlight two pre-regulation differences between baseline insurance coverage in the treatment and control states. The first visible difference is that treatment states had relatively high private coverage rates (75.3% vs. 69.4%). The second visible difference is that the treatment states had higher rates of Medicaid coverage than did control states (10.2% vs. 7.4%). Taken together, these differences resulted in a 7 percentage point difference in the fraction of individuals without insurance during the pre-regulation period (1987 to 1992). Households in treatment states also moderately higher incomes and education levels than households in control states.

6 A Graphical View of Coverage Changes

Panel A of Figure 1 shows the evolution of the fraction of individuals that has neither private nor public insurance in the treatment and control groups. In this figure, the treatment group consists of the states that contemporaneously adopted stable regulatory regimes in both their non- and small-group markets, namely New York, Maine, and

firms are subject to the same shocks as workers at small firms. As noted previously, this assumption may not hold for several reasons. Importantly, the insurance coverage of workers at large firms tends to be more stable than coverage of workers at small firms. The assumption would become increasingly implausible if the treatment group included the unemployed. A related issue is that essentially all unemployed adults with children will be eligible for Medicaid for at least some portion of the calendar year. Their participation in private insurance markets may thus tend to be limited.

[10]The exclusion of childless households is a difference between the current study and previous work on community rating regulations. I focus on households with children due to my emphasis on the interplay between community rating regulations and subsequent Medicaid expansions. Community rating regulations treat households with and without children as separate market segments. By design, Medicaid expansions covered very few childless adults over this time period. The market for coverage of single adults would thus not have been affected by contemporaneous public insurance expansions. Appendix Figure A3 presents coverage tabulations in which childless households are included in the sample.

Table 3: Baseline Characteristics of Small- and Non-Group Market Participants in Comprehensive Regulation States and Control States: 1987-1992

	(1)	(2)
	Unrestricted Sample	
	States with Comp. Regs.	Control States
Variable	Mean	Mean
	(St. Dev.)	(St. Dev.)
Private Insurance	0.753	0.694
Uninsured	0.169	0.239
On Medicaid	0.102	0.074
Income as % of Poverty Line	304	285
	(238)	(234)
Household Size	4.29	4.26
	(1.41)	(1.38)
College Educated Adult	0.549	0.513
Black	0.081	0.062
1 Worker Household	0.689	0.649
Observations	10090	94815

Sources: Baseline summary statistics were calculated by the author using data from the March Economic and Demographic Supplement to the Current Population Survey for years 1987-1992.

Note: Samples consist of individuals in households with at least one child and one full-time working adult, but with no adults working at a firm that has more than 100 employees. For the otherwise unrestricted samples shown in columns 1 and 2, CPS person weights are applied. For the samples selected using the matching methods described in the text, shown in columns 3 through 6, equal weights are applied. The Comprehensive Regulation states are restricted to New York, Maine, and Vermont, each of which fully implemented its comprehensive regulations in 1993. The "Control" states in Column 2 are all states other than the comprehensive regulation states listed in Panel A of Table 1. A household is defined as having a college educated adult if one of the adults in the household has at least some college education.

Vermont. New York accounts for roughly 75 percent of the underlying observations in this sample. Panels A, B, and C provide a stark depiction of two of this paper's central empirical findings. In large-group markets everywhere and in the small- and non-group markets of unregulated states, Medicaid expansions and declines in private coverage have roughly offset one another. The fraction of individuals without insurance changed little in these markets throughout the sample (1987-2006). In contrast, the comprehensively regulated small- and non-group markets followed quite different paths. After New York, Maine, and Vermont adopted comprehensive regulations in 1993, the fraction uninsured in the unrestricted sample (Panel A) increased by around 70%, from 0.18 to 0.31 in 1997. This erosion reversed in subsequent years, with the fraction uninsured declining to 0.16 by 2006.

Panels B and C show that the coverage changes observed in Panel A are robust to alternative sample selection procedures. Panel B presents tabulations of coverage rates from samples constructed using synthetic cohort methods.[11] Panel C presents tabulations of coverage rates from samples constructed using individual-level propensity score matching.

Panels D, E, and F of Figure 1 are similar to Panels A, B, and C, but report the fraction of the population covered by private insurance. Private coverage rates turn sharply for the worse in the comprehensively regulated markets between 1993 and 1996. After 1997 these markets show signs of recoveries, with the recoveries appearing to be complete in the unrestricted sample and partial in the matched samples. In Panel E, for example,

[11]The synthetic cohort analysis proceeds as follows. On a sample restricted to years prior to 1993, I estimate the relationship between private insurance coverage the covariates used as controls in estimating equations (3) and (4). I then use the coefficients from this regression to estimate individuals' propensity to have private insurance coverage. I estimate these propensities for individuals from all years, including years subsequent to the adoption community rating regulations. Using these propensity scores, I then form nearest neighbor matches (without replacement) between observations from treatment and control states. Finally, I construct the sample by matching treatment and control observations that occur during the same year.

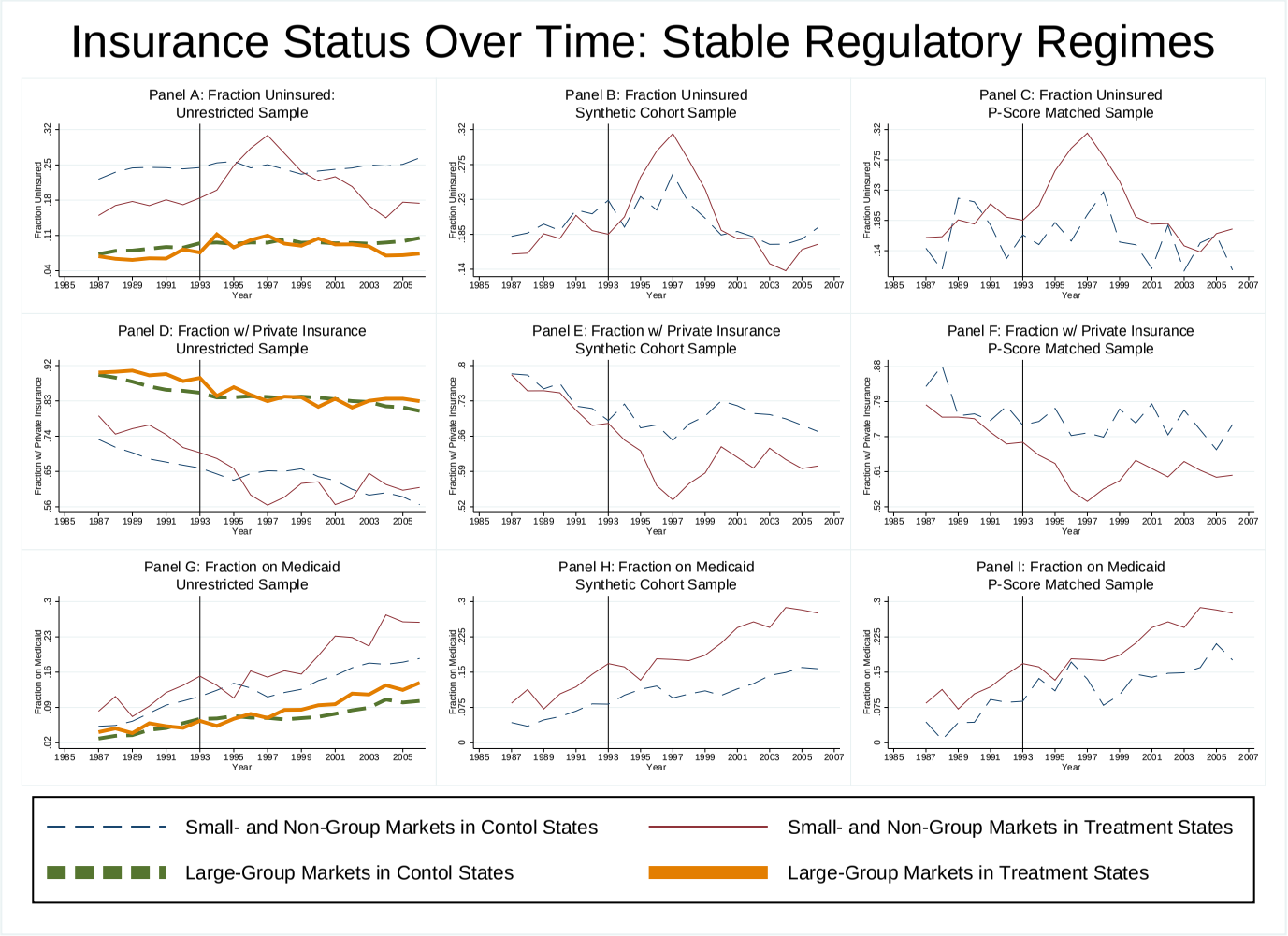

Figure 1: **Insurance Status Over Time: Households with Children.** The figure contains tabulations constructed using the March Demographic Supplement of the Current Population Survey (CPS). All samples consist of the adults and children (aged 18 and lower) in households with at least one child and at least one full-time working adult. The samples in Panels B, E, and H are restricted to matched pairs, constructed as described in the text. The samples in Panels C, F, and I are further restricted to exclude individuals in households with incomes less than 133% of the poverty line or headed by single mothers. The treatment states in all panels include New York, Maine, and Vermont, which were the three states to adopt their comprehensive regulatory regimes in 1993 (as indicated by the vertical black lines in each panel). In Panels A, D, and G, which display coverage rates in states' large-group markets as well as in their non- and small-group markets, individuals are defined as having access to the large-group market if at least one adult in the household is employed at a firm with more than 100 employees (and to the non- and small-group markets otherwise). Insurance status is taken directly from the Minnesota Population Center's Summary Health Insurance variables, which are imputed using the CPS. CPS person weights are applied in tabulations involving the unrestricted samples (Panels A, D, and G), while observations are equally weighted in panels using observations selected through the matching procedure (Panels B, C, E, F, H, and I).

coverage rates are equal prior to the implementation of comprehensive regulations and decline by an excess of 12 percentage points in the regulated markets between 1993 and 1996. They remained down by an excess of 4 or 5 percentage points over the last four years of the sample.

A look across the panels of Figure 1 highlights an important point. Following 1997, the comprehensively regulated markets experienced sharp declines in the fraction of individuals without insurance. The sharpness of this decline results from the fact that both the fraction of individuals covered by Medicaid *and* the fraction of individuals with private insurance increased in these markets relative to other markets. This positive correlation is unique across time periods and market types, as public insurance's tendency to crowd out private insurance typically dominates the relationship between these forms of coverage (see, e.g., Cutler and Gruber (1996) and Gruber and Simon (2008)).

Figure 2 presents tabulations in which the treatment states are Kentucky, Massachusetts, New Hampshire, and New Jersey. These states differ from Maine, New York, and Vermont in that their implementation of insurance market regulations was both staggered and less stable. Because their regulatory activity included potentially confounding policy changes, it is less clear that mid-1990s coverage movements can be interpreted as causal effects of community rating regulations.

A similar pattern of decline and recovery is apparent in this second group of comprehensive-regulation states. Notably, there appears to have been a decline in coverage prior to the adoption of community rating. This decline is driven primarily by New Jersey, where insurance markets were being strained by the state's system for financing uncompensated hospital care.[12] New Jersey altered its financing of uncompensated care

[12]Regulations explicitly required that uncompensated care costs be financed through surcharges on payments from insurers to hospitals. This surcharge spiked when, in 1988, the federal government canceled a waiver through which New Jersey hospitals had formerly been generously subsidized relative to hospitals elsewhere in the country (Siegel, Weiss, and Lynch, 1990). The resulting increase in private payers' costs resulted in significant premium increases and thus declines in coverage. Coverage declines

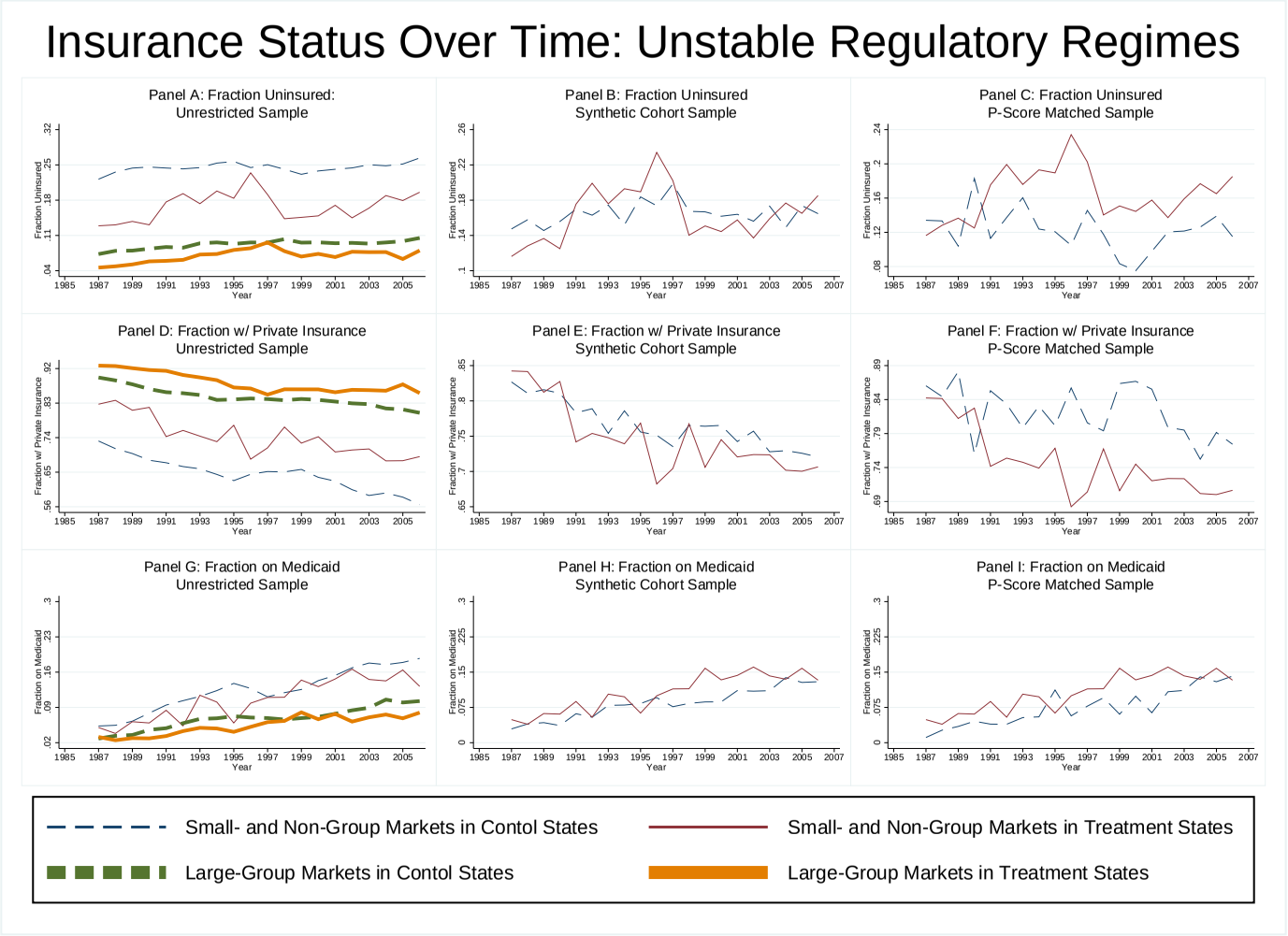

Figure 2: **Insurance Status Over Time: Households with Children.** The figure contains tabulations constructed using the March Demographic Supplement of the Current Population Survey (CPS). All samples consist of the adults and children (aged 18 and lower) in households with at least one child and at least one full-time working adult. The samples in Panels B, E, and H are restricted to matched pairs, constructed as described in the text. The samples in Panels C, F, and I are further restricted to exclude individuals in households with incomes less than 133% of the poverty line or headed by single mothers. The treatment states in all panels include New Jersey, New Hampshire, Kentucky, and Massachusetts, which were the four states to conduct staggered implementation of their comprehensive regulatory regimes between 1992 and 1997. In Panels A, D, and G, which display coverage rates in states' large-group markets as well as in their non- and small-group markets, individuals are defined as having access to the large-group market if at least one adult in the household is employed at a firm with more than 100 employees (and to the non- and small-group markets otherwise). Insurance status is taken directly from the Minnesota Population Center's Summary Health Insurance variables, which are imputed using the CPS. CPS person weights are applied in tabulations involving the unrestricted samples (Panels A, D, and G), while observations are equally weighted in panels using observations selected through the matching procedure (Panels B, C, E, F, H, and I).

along with the wave of reforms that ushered in community rating regulations. Terminating its uncompensated care arrangement should, all else equal, have improved New Jersey's coverage rates. Establishing an appropriate counterfactual is thus quite difficult. The institutional background suggests that averaging 1988-1992 as a "pre" regulation period is a more reasonable approach to the data than one might conclude from the figure. That said, it seems prudent to place more weight on the evidence associated with the states that adopted relatively stable regulatory regimes.

7 Regression Analysis of Coverage Rates

This section presents estimates of equations (3) and (4). I first estimate the medium-run declines in coverage experienced by the comprehensively regulated markets relative to other markets. I do this by estimating equations (3) and (4) on samples in which 1988-1992 constitute the pre-regulation period and 1996-1997 capture the low point following the adoption of community rating regulations. I then present estimates of coverage recoveries from the low point of 1996-1997 through an end period covering 2003-2006.

Table 4 presents the estimates of equations (3) and (4). The results in Panels A (difference-in-differences specifications) and B (triple-difference specifications) show that community rating resulted in substantial coverage declines. In states that adopted relatively stable regulatory regimes (columns 1 and 3) private coverage declined by around 10 percentage points. In states that adopted less stable regulatory regimes (columns 2 and 4) coverage declined by between 5 and 8 percentage points.

The results in Panels C and D show the evolution of coverage from the lows of 1996-1997 through the period covering 2003-2006. In states with stable regulatory regimes, both private coverage and the fraction uninsured recovered essentially all of the losses

increased the ranks of the uninsured and thus the cost of uncompensated care, resulting in additional surcharge increases. New Jersey was thus experiencing an "uncompensated care spiral."

Table 4: Coverage Changes in Regulated Markets: Private Coverage and the Fraction Uninsured

Dependent Variable: Coverage Status	(1) Private	(2) Private	(3) Uninsured	(4) Uninsured
Panel A:	Effects of Adopting Regulations			
Small Firm x Comm. Rating State x Post Regulation	-0.111***	-0.0757**	0.104***	0.0839
	(0.0238)	(0.0353)	(0.0382)	(0.0618)
Sample of States	Stable Regs	Unstable Regs	Stable Regs	Unstable Regs
Estimation Framework	D-in-D	D-in-D	D-in-D	D-in-D
Observations	135,941	134,921	135,941	134,921
Panel B:	Effects of Adopting Regulations			
Small Firm x Comm. Rating State x Post Regulation	-0.0970***	-0.0548**	0.0917***	0.0628
	(0.0172)	(0.0267)	(0.0292)	(0.0583)
Sample of States	Stable Regs	Unstable Regs	Stable Regs	Unstable Regs
Estimation Framework	D-in-D-in-D	D-in-D-in-D	D-in-D-in-D	D-in-D-in-D
Observations	520,783	524,971	520,783	524,971
Panel C:	Post-1997 Recoveries of Regulated Markets			
Small Firm x Comm. Rating State x Post 1997	0.0894	0.0426**	-0.111**	-0.0226
	(0.0541)	(0.0192)	(0.0415)	(0.0191)
Sample of States	Stable Regs	Unstable Regs	Stable Regs	Unstable Regs
Estimation Framework	D-in-D	D-in-D	D-in-D	D-in-D
Observations	155,495	153,069	155,495	153,069
Panel D:	Post-1997 Recoveries of Regulated Markets			
Small Firm x Comm. Rating State x Post 2002	0.0783***	0.0287	-0.0831***	-0.0120
	(0.0272)	(0.0211)	(0.0304)	(0.0153)
Sample of States	Stable Regs	Unstable Regs	Stable Regs	Unstable Regs
Estimation Framework	D-in-D-in-D	D-in-D-in-D	D-in-D-in-D	D-in-D-in-D
Observations	548,145	547,714	548,145	547,714

***, **, and * indicate statistical significance at the .01, .05, and .10 levels respectively. Standard errors, reported beneath each point estimate, were calculated using a block bootstrap approach with clusters drawn at the state level. The samples in Panels A and B consist of individuals in households with at least one child and one full-time employed adult from the March Current Population Survey (CPS) in years 1987-1992 and 1996-1997. The samples in Panels C and D consist of similarly situated households from 1996-1997 and 2003-2006. CPS person weights are applied. Panels A and C report point estimates of β_1 from equation (3). Panels B and D report point estimates of β_1 from equation (4). In all cases the vector X includes a set of 2-digit occupation dummy variables, region dummy variables interacted with family income as a percent of the poverty line, an indicator for having a single mother as the household's head, and an indicator for being black, additional indicators for having two full time workers in the household and for the education levels of household adults, an indicator for home ownership, and age group indicators. In columns 1 and 3 the treatment states are Maine, New York, and Vermont, while in columns 2 and 4 they are Kentucky, Massachusettes, New Hampshire, and New Jersey.

experienced during the earlier period. The states with less stable regulatory regimes recovered little if at all. This paper's remaining analysis attempts to understand both across- and within-group variation in the long run performance of community-rated markets.

8 Evidence on the Interplay between Public Insurance and Community Rating

This section empirically assesses the link between the performance of community-rated markets and the structure and size of states' Medicaid programs. As emphasized in Section 2, Medicaid expansions can improve the performance of community-rated markets if they draw high cost types out of the pool of potential private market participants. I first proceed by documenting characteristics of states' Medicaid expansions, with an emphasis on channels through which Medicaid can be targeted at high cost populations. I then use the CPS to gauge the extent to which states' Medicaid coverage was, in practice, taken up disproportionately by relatively unhealthy adults. Finally, I relate this variation in coverage of unhealthy adults to the evolution of private coverage rates.

8.1 Characterizing Medicaid Expansions in Comprehensively Regulated States

Table 5 presents characteristics of states' Medicaid programs as they pertained to the coverage of adults. Columns 1 and 2 indicate whether and when states acquired what are known as Section 1115 coverage expansion waivers. These waivers were necessary to

obtain federal financing for coverage of groups not traditionally eligible for Medicaid.[13] Column 1 shows that the comprehensive-regulation states were disproportionately likely to obtain waivers for this purpose.

Columns 3 and 4 show the extent to which Medicaid eligibility comes through the "Medically Needy" income concept. This pathway to eligibility was available in all 7 of the comprehensive-regulation states as compared with two-thirds of all states. The degree of reliance on this form of eligibility varies substantially within the set of comprehensive-regulation states, with New York and Vermont substantially above the national average and the remaining states around or below the national average.

Columns 5 and 6 show that the comprehensive-regulation states had relatively generous Medicaid eligibility thresholds for adults with children. Throughout the sample period, most states maintained the very low eligibility thresholds associated with Medicaid's historical linkage to receipt of cash welfare assistance. For jobless parents, the median across all states was just 37 percent of the federal poverty line. All 5 of the states that maintained their comprehensive regulations had pushed their eligibility thresholds to or above 133 percent of the poverty line.

Turning to CPS data, Figure 3 displays the fraction of low-income adults on Medicaid both in total (Panels A and B) and by health status (Panels C and D). Although the comprehensively regulated states had more extensive adult Medicaid coverage throughout the sample period, coverage rates moved on roughly parallel trends during the first half of the sample. Medicaid coverage rates diverge just before 2000. Between 1999 and 2006, coverage rates for adults with incomes less than 300% of the poverty line rose by 17 percentage points in Maine, New York, and Vermont and by 6 percentage points elsewhere (Panel A).

[13]Since waivers were required to pass an *ex ante* test of federal budget neutrality, coverage expansions were typically linked to cost-saving efforts elsewhere in the Medicaid program. Shifts from traditional Medicaid towards Medicaid Managed Care were often credited as sources of substantial savings.

Table 5: Features of Medicaid Expansions for Adults in Comprehensively-Regulated States

State	Pre-2007 Coverage Expansion Waiver*		Medically Needy Program (2009)**		Eligibility Thresholds for Low-Income Parents During ACA Transition (Percent of Poverty Line)***	
	In Effect?	Year Initiated	In Effect?	Percent of Total Enrollment	Jobless Parents	Low-Income Working Parents
Panel A: States That Maintained Comprehensive Regulations						
Maine	Yes	2002	Yes	1.7	200	200
Massachusetts	Yes	1995	Yes	2.3	133	133
New Jersey	No	n/a	Yes	0.6	200	200
New York	Yes	1997	Yes	14.9	150	150
Vermont	Yes	2005	Yes	9.4	185	191
Panel B: States That Repealed Comprehensive Regulations						
Kentucky	Yes	1993	Yes	3.1	33	57
New Hampshire	No	n/a	Yes	5.8	38	47
Panel C: U.S. Averages						
U.S. Median	No	n/a	Yes	n/a	37	64
U.S. Mean	0.35	n/a	0.67	4.5	73	88

Notes:

*Defined Using Appendix Table A of Kaiser (2011). States are counted as having implemented such expansions if they fall under any of the tables panels but the "Other" panel and if the table indicates that the relevant expansion was implemented prior to 2007 and was thus in place during this paper's sample period. Many early Medicaid expansion waivers were linked to the adoption of Medicaid Managed Care because savings credited to Medicaid Managed Care proposals enabled the waivers to satisfy the criterion of federal budgetary neutrality while still expanding coverage.

**Taken from Table 3 of Kaiser (2012).

*** Taken from Kaiser (2013)

Figure 3's Panels C and D present Medicaid coverage separately for unhealthy adults and healthy adults. I define unhealthy adults as those with a work-limiting disability or with self-reported health status worse than "very good." This definition of unhealthy accounts for the bottom third of the self-reported health distribution. I find that Medicaid expansions in control states covered similar fractions of the healthy and unhealthy adult populations. In Maine, New York, and Vermont, coverage of unhealthy adults with low incomes rose by 25 percentage points while coverage of healthy adults with low incomes rose by roughly 12 percentage points.

8.2 Framework for Relating Public and Private Coverage

The data allow me to take an additional step towards linking public and private coverage in community-rated markets. I use the following specification to descriptively estimate the relationship between private coverage and public coverage for unhealthy adults:

$$\begin{aligned} COV_{i,s,t} = {} & \beta_1 UnhealthyFracMcaid_{s,t} \times \text{Reg. State}_s \\ & + \beta_2 UnhealthyFracMcaid_{s,t} \\ & + \beta_3 HealthyFracMcaid_{s,t} \times \text{Reg. State}_s \\ & + \beta_4 HealthyFracMcaid_{s,t} \\ & + \beta_{5_s} State_s + \beta_{6_t} Year_t + \beta_{7_t} \text{Reg. State}_s \times Year_t + X_i\gamma + \varepsilon_{i,s,t}. \end{aligned} \tag{5}$$

The last row of equation (5) contains the components of a standard difference-in-differences framework, where the coefficients of interest would be the β_{7_t}. In estimating equation (5), I think of the set of Reg. State$_s \times Year_t$ indicators as controls for changes common to the set of regulated markets. Their inclusion allows me to estimate the relationship between Medicaid and private coverage *within* this set of com-

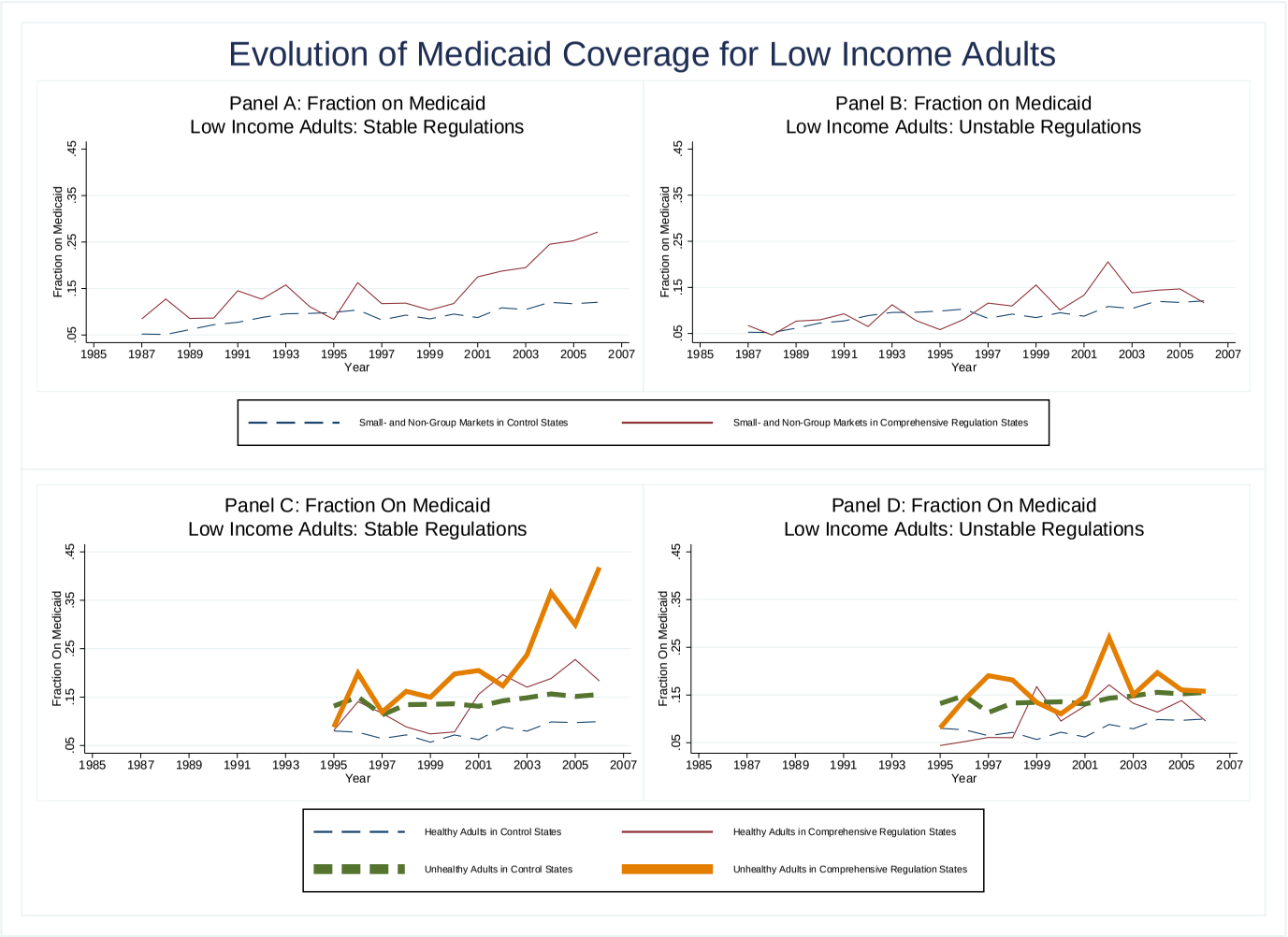

Figure 3: **Evolution of Medicaid Coverage for Adults.** The figure contains tabulations constructed using the March Demographic Supplement of the Current Population Survey (CPS). All samples consist solely of adults (aged 21 and higher) in households with at least one child and at least one full-time working adult, but with no adults working at a firm with more than 100 employees. All samples are further restricted to adults in households with income less than 300% of the federal poverty line. The treatment states in panels A and C include New York, Maine, and Vermont, while the treatment states in Panels B and D include Kentucky, Massachusetts, New Hampshire, and New Jersey. Healthy adults are defined as those with self-reported health status of Excellent or Very Good and with no self-reported work disability. Unhealthy adults are the complement to the sample of healthy adults, which accounts for roughly one third of the sample population. Insurance status is taken directly from the Minnesota Population Center's Summary Health Insurance variables, which are imputed using the CPS.

prehensively regulated markets. The principal coefficient of interest is β_1, which describes the relationship between private coverage and Medicaid's coverage of unhealthy adults ($UnhealthyFracMcaid = \frac{\text{\# of Unhealthy Adults on Medicaid}}{\text{\# of Adults in the Population}}$) in a comprehensively regulated state relative to other states.

β_1 should be given a predictive, rather than causal, interpretation because variation in $UnhealthyFracMcaid$ may be correlated with the error term. Equation (5) provides suggestive evidence of the proposed mechanism's plausibility. Absent a partial correlation between private coverage and Medicaid's coverage of unhealthy adults, it would be difficult to argue that Medicaid shapes the performance of community-rated markets. Notably, a positive correlation must overcome the most obvious sources of bias, which produce negative correlations between private coverage and Medicaid coverage of any kind.[14]

I also estimate the relationship between private coverage and the extent to which states' Medicaid programs target unhealthy adults as follows:

$$\begin{aligned} COV_{i,s,t} = {} & \beta_1 \rho_{s,t} \times \text{Reg. State}_s + \beta_2 \rho_{s,t} \\ & + \beta_3 TotFracMcaid_{s,t} \times \text{Reg. State}_s + \beta_4 TotFracMcaid_{s,t} \\ & + \beta_{5_s} State_s + \beta_{6_t} Year_t + \beta_{7_t} \text{Reg. State}_s \times Year_t + X_i \gamma + \varepsilon_{i,s,t}. \end{aligned} \tag{6}$$

I construct the primary variable of interest as $\rho_{s,t} = \frac{\text{UnhealthyFracMcaid}_{s,t}}{\text{TotFracMcaid}_{s,t}}$, with $TotFracMcaid_{s,t} = \frac{\text{\# of Adults on Medicaid}}{\text{\# of Adults in the Population}}$. The variable $\rho_{s,t}$ quantifies the fraction of a state's adult Medicaid population that is unhealthy. Although we must again give β_1 a predictive rather than causal interpretation, potential sources of bias are less obvious

[14] I do not pursue a "simulated instruments" approach (Currie and Gruber, 1996; Cutler and Gruber, 1996) because Medicaid coverage less tightly tracks changes in eligibility rules during this period than during earlier periods.

here than in estimating equation (5).[15] The test that $\beta_1 > 0$ is this paper's most direct test for the relevance of the mechanisms described in Section 2. I estimate equation (6) with and without controlling directly for $TotFracMcaid_{s,t}$ and its interaction with the Reg. State$_s$ indicator.

8.3 The Relationship between Medicaid Expansions and the Performance of Community-Rated Markets

I conclude the analysis with estimates of equations (5) and (6). Since the primary explanatory variables of interest are new to these specifications, I present summary statistics characterizing their state-level variation in Table 6. The means in Table 6 confirm the nature of the Medicaid expansions shown in Figure 3; comprehensive-regulation states expanded their Medicaid programs to a greater degree than other states and their expansions disproportionately swept up unhealthy individuals. Magnitudes are smaller than those seen in Figure 3 because the samples used to construct the figure were restricted to adults in households with incomes less than 300 percent of the poverty line. The standard deviations of the changes in $\rho_{s,t} = \frac{\text{UnhealthyFracMcaid}_{s,t}}{\text{TotFracMcaid}_{s,t}}$ and in Medicaid's coverage of unhealthy adults reveal substantial variation in both the size and composition of adult Medicaid expansions.

Table 7 presents estimates of equations (5) and (6). Public coverage of unhealthy adults has a significant, positive partial correlation with private coverage in community-rated markets. Columns 1 and 2 show that a 7 percentage point expansion in public coverage of unhealthy adults, roughly the size of the expansion in New York, is associ-

[15]There are standard reasons to worry that the fraction of the population on Medicaid is driven by unobservable economic factors. It is also possible that unobservable factors would be correlated with the fraction of Medicaid beneficiaries who are unhealthy. There are no obvious reasons, however, to expect such unobservables to differ systematically across states that did and did not adopt comprehensive regulations.

Table 6: Insurance Coverage Rates (Standard Deviations): 1995-1997 Levels and Changes from 1995-1997 to 2003-2006

Variable	(1) States with Comp. Regs.	(2) Control States	(3) Difference	(4) States with Comp. Regs.	(5) Control States	(6) Difference
	Levels from 1995-1997			*Changes from 1995-1997 to 2003-2006*		
HealthyFracMcaid =	0.045	0.033	0.012	0.021	0.008	0.013
# of Healthy Adults on Medicaid /# of Adults	(0.024)	(0.016)		(0.02)	(0.016)	
UnhealthyFracMcaid =	0.050	0.040	0.010	0.032	0.005	0.027
# of Unhealthy Adults on Medicaid /# of Adults	(0.032)	(0.016)		(0.033)	(0.018)	
TotMcaid =	0.090	0.070	0.020	0.051	0.015	0.036
# of Adults on Medicaid /# of Adults	(0.041)	(0.028)		(0.04)	(0.027)	
UnhealthyShare = UnhealthyFracMcaid/TotMcaid	0.585	0.573	0.012	0.006	-0.035	0.041
	(0.193)	(0.136)		(0.186)	(0.166)	
# of Privately Covered Adults/# of Adults	0.645	0.645	0.000	-0.001	-0.053	0.052
	(0.071)	(0.102)		(0.051)	(0.04)	
# of Uninsured Adults/# of Adults	0.268	0.286	-0.018	-0.041	0.04	-0.081
	(0.06)	(0.098)		(0.06)	(0.043)	
Observations	7	44		7	44	

Sources: Summary statistics were calculated by the author using data from the March Economic and Demographic Supplement to the Current Population Survey (CPS) for years 1995-1997 and 2003-2006.

Note: Samples consist of adults in households with at least one child and one full-time working adult, but with no adults working at a firm that has more than 100 employees. CPS person weights were applied in estimating all numbers reported in the table. The Comprehensive Regulation states are Kentucky, Maine, Massachusetts, New Hampshire, New Jersey, New York, and Vermont. The "Control" states in Column 2 include all other states. Table values include means and standard deviations taken across the states within each group and were constructed using the person-specific weights provided by the CPS. Individuals are defined as being unhealthy if they have a self-reported health status of "Good," "Fair," or "Poor," or if they report a work-limiting disability. Individuals not meeting these criteria are defined as healthy. Across the full sample, roughly 35 percent of adults are classified as unhealthy.

ated with a 5 percentage point improvement in private coverage. Coverage of unhealthy adults has a weakly negative association with private coverage in experience-rated markets. Coverage of healthy adults has a negative, statistically significant relationship with private coverage rates in both market types.

Columns 4 through 6 report estimates of equation (6), in which the explanatory variable of interest is $\rho_{s,t} = \frac{\text{UnhealthyFracMcaid}_{s,t}}{\text{TotFracMcaid}_{s,t}}$. While there is no partial correlation between $\rho_{s,t}$ and private coverage rates in experience-rated markets, there is a strong, positive partial correlation between $\rho_{s,t}$ and private coverage in the community-rated markets. Controlling for the total fraction of the population receiving coverage through Medicaid has little effect on this result.

In columns 3 and 6 I restrict the sample to the years 2000 through 2006 and exclude the states that repealed their regulations before the end of the sample, namely Kentucky and New Hampshire. The estimates are thus produced using a sample of comprehensively regulated states that maintained their regulations for the duration of the sample. The sample begins in 2000 so that comprehensive regulations had been in place for at least 3 years in all states. This restriction helps to ensure that the estimates characterize the relationship between Medicaid and the long run performance of the community-rated markets. The estimate of equation (6) is unaffected by these sample restrictions. The primary coefficient of interest in the estimate of equation (5) is moderately strengthened .

8.4 A Check on the Plausibility of the Estimates

To assess the plausibility of the estimated effects, Appendix 6 presents a calibration, conducted using data from the Medical Expenditure Panel Survey (MEPS), of the potential effect of public insurance expansions on premiums in community-rated markets. The calibration shows that post-1993 public insurance expansions had the potential to

Table 7: Impact of Medicaid Expansions for Unhealthy Adults (1995-2006)

Dependent Variable: Private Coverage	(1)	(2)	(3)	(4)	(5)	(6)
UnhealthyShare x Comp. Regulation State				0.150***	0.149***	0.165***
				(0.233)	(0.0307)	(0.0483)
UnhealthyShare				-0.00675	-0.00246	-0.0215
				(0.0114)	(0.0120)	(0.0179)
TotMcaid x Comp. Regulation State					0.317*	0.570***
					(0.166)	(0.180)
TotMcaid					-0.229**	-0.241**
					(0.0910)	(0.0969)
UnhealthyFracMcaid x Comp. Reg. State	0.744**	0.695**	1.120***			
	(0.286)	(0.299)	(0.274)			
UnhealthyFracMcaid	-0.164	-0.174	-0.282**			
	(0.122)	(0.123)	(0.139)			
HealthyFracMcaid x Comp. Reg. State	-0.220	-0.0189	-0.231			
	(0.254)	(0.300)	(0.377)			
HealthyFracMcaid	-0.323**	-0.328**	-0.231			
	(0.136)	(0.137)	(0.162)			
State Fixed Effects and Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects x Comprehensive Regulations	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
Children?	Yes	No	Yes	Yes	Yes	Yes
New Hampshire and Kentucky?/1990s?	Yes/Yes	Yes/Yes	No/No	Yes/Yes	Yes/Yes	No/No
Observations	319,981	153,503	225786	319,981	319,981	225786

***, **, and * indicate statistical significance at the .01, .05, and .10 levels respectively. Standard errors, reported beneath each point estimate, were calculated using a block bootstrap approach with clusters drawn at the state level. In columns 1 through 3, the reported estimates are of the β_1 through β_4 from equation (5). In columns 4 through 6, the reported estimates are of the β_1 through β_4 from equation (6). Samples were taken from the March Economic and Demographic Supplement to the Current Population Survey (CPS) for years 1995-2006. They consist of members of households with at least one child and one full-time working adult, but with no adults working at a firm that has more than 100 employees. The samples in Columns 1, 3 and 4 through 6 include all members of these households while the sample in column 2 excludes children. The results are from OLS regressions that include controls for state and year fixed effects, a set of 2-digit occupation dummy variables, region dummy variables interacted with family income as a percent of the poverty line, an indicator for having a single mother as the household's head, and an indicator for being black, additional indicators for having two full time workers in the household and for the education levels of household adults, an indicator for home ownership, and age group indicators. The variables reported in the table are defined and described in Table 6.

hold community-rated premiums down by around $1,700 for a family of 4, with most of this impact coming from coverage of unhealthy adults.

This premium impact can be translated into a coverage change by expressing it as a percent of the relevant premiums and multiplying by the extensive-margin elasticity of demand for insurance. Bernard and Banthin (2008) estimate that, in 2002, the average non-group premium for families was around $4,400 while the average small group premium was $8,500. $1,700 is roughly 25 percent of the average family premium in the non- and small-group markets. Chernew, Cutler, and Keenan (2005) estimate that the elasticity of insurance take-up with respect to premiums is approximately -0.1, while Marquis and Long (1995) estimate an elasticity of -0.4. Elasticities inferred from survey data by Krueger and Kuziemko (2011) are closer to -1. With an elasticity on the order of -0.4, the Medicaid expansions of comprehensive-regulation states could explain increases in private coverage of roughly 7 percentage points on a baseline coverage rate of around 70 percent.

9 Conclusion

This paper studies the relationship between two instruments of health-based redistribution: tax-financed public insurance and premium regulations that generate within-market transfers. The economic incidence of these policies is tightly intertwined. Community rating regulations risk substantial adverse selection when large numbers of unhealthy individuals remain on the private market. When targeted at the unhealthy, Medicaid expansions can relieve this adverse selection. Public coverage of the unhealthy can thus reduce the size of the subsidies and/or tax penalties required to stabilize community-rated insurance markets (Hackmann, Kolstad, and Kowalski, 2012). It can similarly be viewed as a complement to risk adjustment programs.

The 2010 Patient Protection and Affordable Care Act (PPACA) contains regulatory measures including community rating rules, guaranteed issue requirements, and an individual mandate to purchase insurance. Three of PPACA's features are designed to go farther than previous regulations to induce pooling of the healthy and sick.[16] First, it taxes healthy individuals who forego insurance. Second, it limits adjustment along the intensive margin of insurance generosity. Specifically, it expands minimum coverage requirements and tightens limits on out-of-pocket spending. Third, its guaranteed issue requirements are more stringent than those typically in place across the states.

PPACA's regulations may result in significant pressure to shift the cost of unhealthy individuals out of the insurance exchanges. The law would generously finance such efforts, as the federal government will reimburse more than 90 percent of the cost of its associated Medicaid expansions.[17] Both the implementation of these expansions and their impact on states' insurance markets remain uncertain. These issues will be ripe for study as PPACA's implementation unfolds.

References

Baicker, K., J. Clemens, and M. Singhal (2012): "The rise of the states: U.S. fiscal decentralization in the postwar period," *Journal of Public Economics*, 96(11 - 12), 1079 – 1091.

Bernard, D., and J. Banthin (2008): "Premiums in the Individual Health Insurance Market for Policyholders under Age 65: 2002 and 2005," Discussion Paper 202, Agency for Healthcare Research and Quality, Rockville, MD.

[16]See Kaiser (2010) for a detailed summary of the PPACA's provisions.

[17]The federal government's use of these levers provides a prominent example of the state-federal interactions driving the rise of state spending on redistributive programs over the last half century (Baicker, Clemens, and Singhal, 2012).

Bertrand, M., E. Duflo, and S. Mullainathan (2004): "How much should we trust differences-in-differences estimates?," *The Quarterly Journal of Economics*, 119(1), 249–275.

Buchmueller, T., and J. DiNardo (2002): "Did community rating induce an adverse selection death spiral? Evidence from New York, Pennsylvania, and Connecticut," *American Economic Review*, 92(1), 280–294.

Buchmueller, T. C., and S. Liu (2005): "Health insurance reform and HMO penetration in the small group market," *Inquiry*, 42(4).

Chernew, M., D. M. Cutler, and P. S. Keenan (2005): "Increasing health insurance costs and the decline in insurance coverage," *Health Services Research*, 40(4), 1021–1039.

Clemens, J., and J. Gottlieb (2013): "Bargaining in the Shadow of a Giant: Medicare's Influence on Private Payment Systems," NBER Working Papers 19503, National Bureau of Economic Research, Inc.

Currie, J., and J. Gruber (1996): "Health insurance eligibility, utilization of medical care, and child health," *Quarterly Journal of Economics*, 111(2), 431–466.

Cutler, D. M., A. Finkelstein, and K. McGarry (2008): "Preference Heterogeneity and Insurance Markets: Explaining a Puzzle of Insurance," *The American Economic Review*, 98(2), 157–62.

Cutler, D. M., and J. Gruber (1996): "Does public insurance crowd out private insurance," *Quarterly Journal of Economics*, 111(2), 391–430.

Cutler, D. M., and S. J. Reber (1998): "Paying for Health Insurance: The Trade-Off between Competition and Adverse Selection*," *Quarterly Journal of Economics*, 113(2), 433–466.

Davidoff, A., L. Blumberg, and L. Nichols (2005): "State health insurance market reforms and access to insurance for high-risk employees," *Journal of Health Economics*, 24(4), 725–750.

Einav, L., and A. Finkelstein (2010): "Selection in insurance markets: theory and empirics in pictures.," *The journal of economic perspectives: a journal of the American Economic Association*, 25(1), 115–138.

Einav, L., A. Finkelstein, and S. P. Ryan (2013): "Selection on Moral Hazard in Health Insurance," *American Economic Review*, 103(1), 178–219.

Ericson, K. M. M., and A. Starc (2012): "Pricing Regulation and Imperfect Competition on the Massachusetts Health Insurance Exchange," Discussion paper, National Bureau of Economic Research.

GAO (2003): "Federal and State Requirements Affecting Coverage Offered by Small Businesses," Discussion Paper GAO-03-1133, Government Accountability Office.

Gruber, J., and K. Simon (2008): "Crowd-out 10 years later: Have recent public insurance expansions crowded out private health insurance?," *Journal of Health Economics*, 27(2), 201–217.

Hackmann, M. B., J. T. Kolstad, and A. E. Kowalski (2012): "Health Reform, Health Insurance, and Selection: Estimating Selection into Health Insurance Using the Massachusetts Health Reform," Discussion paper, National Bureau of Economic Research.

Handel, B., I. Hendel, and M. D. Whinston (2013): "Equilibria in Health Exchanges: Adverse Selection vs. Reclassification Risk," .

Herring, B., and M. Pauly (2006): "The Effect of State Community Rating Regulations

on Premiums and Coverage in the Individual Health Insurance Market," *NBER Working Paper 12504*.

Herz, E., C. Peterson, and E. Baumrucker (2008): "State Childrens Health Insurance Program (SCHIP): A Brief Overview," *State Children's Health Insurance Program (SCHIP)*, p. 99.

Kaiser (2010): "Summary of New Health Reform Law," Discussion Paper 8061, The Henry J. Kaiser Family Foundation, Menlo Park, CA.

——— (2011): "FIVE KEY QUESTIONS AND ANSWERS ABOUT SECTION 1115 MEDICAID DEMONSTRATION WAIVERS," Discussion Paper 8196, The Henry J. Kaiser Family Foundation, Menlo Park, CA.

——— (2012): "The Medicaid Medically Needy Program: Spending and Enrollment Update," Discussion Paper 4096, The Henry J. Kaiser Family Foundation, Menlo Park, CA.

Krueger, A., and I. Kuziemko (2011): "The demand for health insurance among uninsured Americans: Results of a survey experiment and implications for policy," Discussion paper, National Bureau of Economic Research.

LoSasso, A. T., and I. Z. Lurie (2009): "Community rating and the market for private non-group health insurance," *Journal of Public Economics*, 93(1-2), 264–279.

Marquis, M. S., and S. H. Long (1995): "Worker demand for health insurance in the non-group market," *Journal of Health Economics*, 14(1), 47–63.

Monheit, A., and B. Schone (2004): "How has small group market reform affected employee health insurance coverage?," *Journal of Public Economics*, 88(1-2), 237–254.

Rothschild, M., and J. Stiglitz (1976): "Equilibrium in competitive insurance markets: An essay on the economics of imperfect information," *Quarterly Journal of Economics*, 90(4), 629–649.

Siegel, B., A. Weiss, and D. Lynch (1990): "Setting New Jersey hospital rates: a regulatory system under stress," *U. Puget Sound L. Rev.*, 14, 601.

Simon, K. (2005): "Adverse selection in health insurance markets? Evidence from state small-group health insurance reforms," *Journal of Public Economics*, 89(9-10), 1865–1877.

Sloan, F. A., and C. J. Conover (1998): "Effects of state reforms on health insurance coverage of adults," *Inquiry*, 35(3), 280–293.

Wachenheim, L., and H. Leida (2007): "The impact of guaranteed issue and community rating reforms on individual insurance markets," .

Zuckerman, S., J. McFeeters, P. Cunningham, and L. Nichols (2004): "Trends: Changes In Medicaid Physician Fees, 1998-2003: Implications For Physician Participation," *Health Affairs*.

Zuckerman, S., and S. Rajan (1999): "An alternative approach to measuring the effects of insurance market reforms," *Inquiry*, 36(1), 44–56.

Appendix (For Online Publication)

A.1: Alternative Selection of Control and Treatment States

Tables A1 and A2 explore the results obtained when estimating equations (3) and (4) on samples using alternative criteria for the selection of the sample of either the treatment or control states. Table A1 focuses on the initial effect of implementing regulations (following Panels A and B from Table 4) while Table A2 focuses on the recovery of regulated markets during the early 2000s (following Panels C and D from Table 4).

The first rows of Tables A1 and A2 display results that involve pooling the full set of community-rating states and using alternative criteria for restricting the sample of control states. When no states are excluded from the analysis, the estimated decline in coverage is 8 percentage points, consistent with results reported in Table 4. Restricting the control group to the non-regulated states that voted for Al Gore in the 2000 Presidential election has little impact on the results. The same can be said for 4 samples selected using estimates of each state's propensity to adopt comprehensive regulations; point estimates average roughly -8.5 percentage points across these specifications. Propensity score 1 was estimated on the basis of state-level economic and demographic characteristics and an indicator for whether or not the state voted for Al Gore. Propensity score 2 is based solely on state-level economic and demographic characteristics. Propensity scores 3 and 4 are equivalent to 1 and 2, but are based on the economic and demographic characteristics of households on the non- and small-group insurance markets (as opposed to the entire state population). The difference-in-differences methodology tends to yield larger estimates (averaging -10 percentage points) than the triple-difference methodology. Estimates of the post-1997 recoveries range from 7 percentage points to just over 9 percentage points.

The next rows of Tables A1 and A2 investigate the results' sensitivity to excluding

Table A1: Effects of Adopting Comprehensive Regulations on Private Insurance Coverage: Robustness Across Alternative Samples of Control and Treatment States

	All	Gore	P-score1	P-score2	P-score3	P-score4	
Triple-Differences	-0.0817***	-0.0876***	-0.0818***	-0.0870***	-0.0731***	-0.0750***	
	(0.0130)	(0.0128)	(0.0151)	(0.0139)	(0.0131)	(0.0126)	
N	571,357	266,371	326,207	325,528	388,075	391,790	
Double-Differences	-0.0978***	-0.107***	-0.0970***	-0.100***	-0.0921***	-0.0927***	
	(0.0140)	(0.0137)	(0.0156)	(0.0150)	(0.0142)	(0.0137)	
N	147,920	70,352	86,441	86,088	101,215	103,334	
	No NY	No NJ	No ME	No VT	No MA	No NH	No KY
Triple-Differences	-0.0602***	-0.0872***	-0.0803***	-0.0826***	-0.0820***	-0.0860***	-0.0829***
	(0.0124)	(0.0124)	(0.0139)	(0.0128)	(0.0130)	(0.0113)	(0.0133)
N	535,564	549,596	565,743	566,378	553,542	566,471	565,245
Double-Differences	-0.0737***	-0.102***	-0.0993***	-0.0988***	-0.0984***	-0.103***	-0.0973***
	(0.0143)	(0.0147)	(0.0139)	(0.0138)	(0.0142)	(0.0118)	(0.0151)
N	138,269	142,676	146,216	146,276	144,055	146,559	146,411
	Reg. Keepers	Stable Regs	Strictest Regs	Looser Regs			
Triple-Differences	-0.0876***	-0.0878***	-0.0957***	-0.0302			
	(0.0115)	(0.0116)	(0.00729)	(0.0227)			
N	560,359	542,544	515,169	571,381			
Double-Differences	-0.103***	-0.103***	-0.114***	-0.0449*			
	(0.0125)	(0.0127)	(0.00795)	(0.0252)			
N	145,050	141,185	134,237	147,952			

***, **, and * indicate statistical significance at the .01, .05, and .10 levels respectively. Standard errors, reported beneath each point estimate, allow for clusters at the state level. The reported estimates are the β_1 from equations (3) and (4). The sample consists of members of households from the March Current Population Survey in years 1987-1992 and 1996-1997 that have at least one child aged 18 and lower at least one full-time working adult. In these and all other specifications that do not restrict samples on the basis of matching criteria, CPS person weights are applied. Each reported coefficient comes from a separate OLS regression. Specifications marked "Gore" were estimated using the sample of non-comprehensive regulation states that voted for Al Gore in the 2000 presidential election as the set of control states. Headings P-score1 through P-score2 refer to specifications in which the sample of states has been restricted on the basis of estimates of states' propensities to adopt comprehensive regulations. P-scores 1 and 2 use demographic information for the entire state while P-scores 3 and 4 use demographic information specific to participants of each state's non- and small-group insurance markets. P-scores 2 and 4 base the propensity score estimate on the economic and demographic variables listed in Table 2. P-scores 1 and 3 add an indicator for voting for Gore to the economic and demographic variables for estimation of the propensity score. Control states were selected on the basis of propensity-score cutoffs, which were chosen to keep the number of control states in the neighborhood of 15-20. States coded as "Reg. Keepers" include MA, ME, NY, NJ and VT. "Stable Regs" include ME, NY and VT and "Strictest Regs" include NY and VT. The treatment states in the "Looser Regs" specification include all of the states listed in Table 1.

Table A2: Post-SCHIP Recoveries of Comprehensively Regulated Markets: Robustness Across Alternative Samples of Control and Treatment States

	All	Gore	P-score1	P-score2	P-score3	P-score4	
Triple-Differences	0.0547**	0.0596*	0.0620**	0.0673**	0.0451*	0.0475**	
	(0.0212)	(0.0283)	(0.0256)	(0.0261)	(0.0221)	(0.0219)	
N	591,779	269,071	342,790	339,293	394,792	405,062	
Double-Differences	0.0672***	0.0745**	0.0684***	0.0710***	0.0587**	0.0618***	
	(0.0219)	(0.0287)	(0.0244)	(0.0247)	(0.0225)	(0.0224)	
N	167,060	77,340	97,119	95,667	111,708	116,282	
	No NY	No NJ	No Me	No VT	No MA	No NH	No KY
Triple-Differences	0.0278	0.0700***	0.0561**	0.0552**	0.0537**	0.0547**	0.0559**
	(0.0187)	(0.0137)	(0.0215)	(0.0214)	(0.0245)	(0.0217)	(0.0226)
N	564,259	576,687	582,995	584,018	581,531	581,147	584,117
Double-Differences	0.0351**	0.0798***	0.0708***	0.0691***	0.0703***	0.0681***	0.0653***
	(0.0154)	(0.0179)	(0.0214)	(0.0217)	(0.0241)	(0.0222)	(0.0242)
N	158,573	163,011	164,299	164,317	164,213	164,219	165,232
	Reg. Keepers	Stable Regs	Strictest Regs	Looser Regs			
Triple-Differences	0.0559**	0.0550*	0.0827***	0.0069			
	(0.0233)	(0.0276)	(0.00977)	(0.0249)			
N	573,485	563,237	539,361	591,648			
Double-Differences	0.0662***	0.0696**	0.0977***	0.00146			
	(0.0246)	(0.0276)	(0.0104)	(0.0275)			
N	162,391	159,544	152,734	166,970			

***, **, and * indicate statistical significance at the .01, .05, and .10 levels respectively. Standard errors, reported beneath each point estimate, allow for clusters at the state level. The reported estimates are the β_1 from equations (3) and (4). The sample consists of members of households from the March Current Population Survey in years 1996-1997 and 2003-2006 that have at least one child aged 18 and lower at least one full-time working adult. In these and all other specifications that do not restrict samples on the basis of matching criteria, CPS person weights are applied. Each reported coefficient comes from a separate OLS regression. Specifications marked "Gore" were estimated using the sample of non-comprehensive regulation states that voted for Al Gore in the 2000 presidential election as the set of control states. Headings P-score1 through P-score2 refer to specifications in which the sample of states has been restricted on the basis of estimates of states' propensities to adopt comprehensive regulations. P-scores 1 and 2 use demographic information for the entire state while P-scores 3 and 4 use demographic information specific to participants of each state's non- and small-group insurance markets. P-scores 2 and 4 base the propensity score estimate on the economic and demographic variables listed in Table 2. P-scores 1 and 3 add an indicator for voting for Gore to the economic and demographic variables for estimation of the propensity score. Control states were selected on the basis of propensity-score cutoffs, which were chosen to keep the number of control states in the neighborhood of 15-20. States coded as "Reg. Keepers" include MA, ME, NY, NJ and VT. Stable Regs" include ME, NY and VT and "Strictest Regs" include NY and VT. The treatment states in the "Looser Regs" specification include all of the states listed in Table 1.

any one of the treated states from the sample. New York emerges as an important driver of the magnitudes of the results in both tables. Estimates of both the initial coverage declines and later coverage recoveries decline by 2-3 percentage points when New York is excluded from the sample. New Jersey pushes the estimated size of the recovery down by roughly 1 percentage point. The New York and New Jersey outcomes are important drivers of the results presented in Table 7. New York was the most aggressive of the comprehensive regulation states in its expansion of Medicaid for unhealthy adults, while New Jersey was the least.

The final rows of Tables A1 and A2 explore differences in the effects of regulations across groups of states that may objectively be expected to have different experiences. The first column excludes states that abandoned their regulations during the sample (i.e., New Hampshire and Kentucky). As a check on the plausibility of the public insurance mechanism, it is essential that these states do not drive the results, and indeed they do not. The second column restricts the treatment group to states that adopted regulations in 1993 (namely Maine, Vermont, and New York). Estimated effects are modestly larger when focusing on these states, as would be expected. Similar results are obtained when restricting the treatment group to New York and Vermont, which were the only states to implement pure (as opposed to modified) community rating laws in both their non- and small-group markets.

Finally, I consider the effect of adding less-strictly regulated states to the treatment group. Specifically, I define the treatment group to include all states described in Table 1; this includes 6 additional states which either had weak guaranteed issue requirements or which enforced community rating in their small-group markets, but not in their non-group markets. The addition of these less-comprehensively regulated states significantly reduces the estimated effects of regulations. In all cases the estimates become statistically insignificant, suggesting that comprehensive regulations cause much more significant

coverage disruptions than relatively modest regulations.

These last results suggest that regulating both of the markets to which households have access has much greater effects than regulating one of them. It is also relevant that 4 of the 6 less tightly regulated states utilized high risk pools during the 1990s. High risk pools provide subsidized coverage for high cost types who would otherwise put upward pressure on community-rated premiums. None of the comprehensively regulated states made use of such pools as means to limit adverse selection pressures during the sample-period.

A.2: Presentation of State-Level Variation

Appendix Figure A.1 presents state-level, regression adjusted changes in insurance coverage. These state-level observations display variation at the level at which observations were re-sampled for purposes of block-bootstrap estimation of the standard errors. The variation displayed is thus the variation underlying the estimates reported in Table 4, Table A.1, and Table A.2.

Panel B of Figure A.1 shows changes in private coverage across the set of community-rating states from the base period of 1988-1992 through 1996-1997. Each of the early-adopting states with stable regulatory regimes, namely Maine, New York, and Vermont, experienced declines well in excess of the average change experienced by other states. The point estimate associated with this group is little affected by excluding any one of them. The similarity of the experience of these states underlies the relatively small block-bootstrapped standard errors reported in column 1 of Table 4's Panels A and B.

Because coverage in Maine and Vermont is estimated using smaller numbers of underlying observations, year-by-year tabulations of coverage are, of course, noisier for these states than for New York. New York is unique in that there is sufficient data

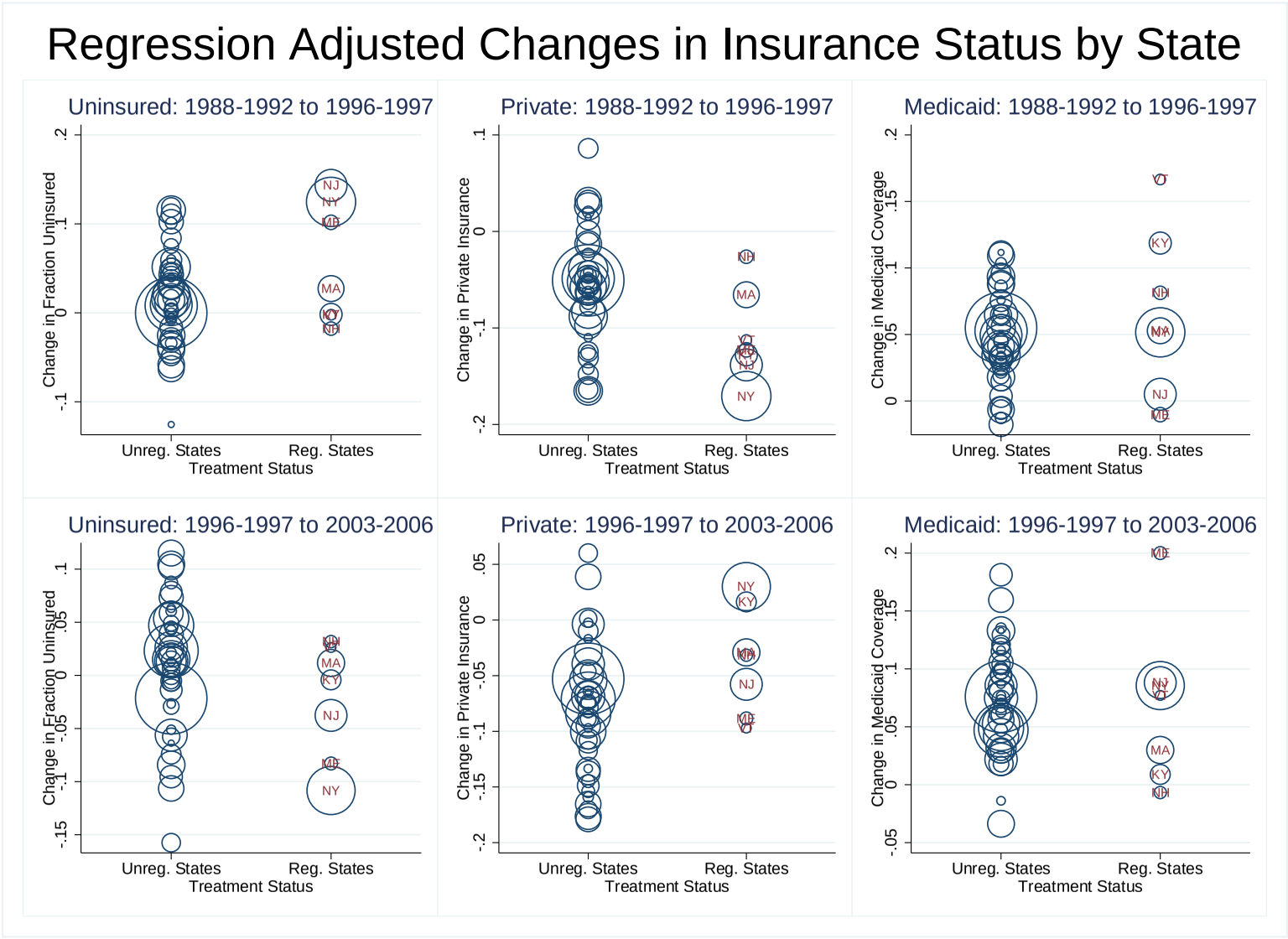

Figure A.1: **Regression Adjusted Changes in Insurance Status by State.** The figures contains the state level, regression adjusted changes in insurance status that underly the estimates presented in Table 4. Marker size reflects the sum of the CPS sample weights associated with the observations used to produce each state's estimate.

for estimates of its annual coverage rates to move smoothly. Following are the number of observations associated with each of the comprehensive regulation states for 1996 and 1997: New York, 7,872; Maine, 1,128; Vermont, 1,258; New Hampshire, 1,227; New Jersey, 3,867; Massachusetts, 2,576; Kentucky, 1,517. When restricted to the non- and small-group market samples, the numbers of observations are: New York, 2,224; Maine, 337; Vermont, 389; New Hampshire, 265; New Jersey, 947; Massachusetts, 597; Kentucky, 332.

Among the states with relatively staggered adoption of their community rating rules, New Jersey and Kentucky experienced substantial coverage declines. It is perhaps not surprising that Massachusetts had not experienced a decline by 1996-1997 since it did not enact community rating in its non-group market until 1997 (its small group market had been regulated since 1992). New Hampshire was, similarly, not one of the earliest movers.

The lower panels of the figure show the state-level, regression adjusted recoveries experienced from 1996-1997 through 2003-2006. This period's coverage changes vary significantly across the set of comprehensive regulation states. Over this period, New York performed much better than Maine and Vermont. New York thus drives what we see in the coverage tabulations presented in Panels D, E, and F of Figure 2. The variation within this group is reflected in the relatively large standard error associated with column 1 in Panel D in Table 4. The variation presented in Panels D and E of Figure A.1 is precisely the variation found to be strongly correlated with changes in Medicaid's coverage of relatively unhealthy adults in Section 8.

A.3: Robustness to Supplementing Controls with State Economic Aggregates

Appendix Tables A.3 and A.4 explore the robustness of the baseline difference-in-differences estimates to controlling for economic aggregates and growth in state-level health expenditures. Table A.3 reports the robustness of the estimates of initial coverage declines. Table A.4 reports the robustness of the estimates of subsequent coverage recoveries.

Controlling directly for economic aggregates (specifically the employment to population ratio and income per capita) has essentially no impact on the results. The estimated coefficients on these variables are statistically indistinguishable from 0. I take this as evidence that the individual- and household-level economic and demographic controls proved sufficient as controls for the state of the economy. This was not guaranteed; aggregate economic activity could very well influence insurance offerings for reasons beyond its implications for household-level economic conditions. In practice, however, this does not appear to be the case.

State health spending emerges as a strong predictor of private coverage changes during the latter sample (i.e., the "subsequent coverage recoveries" sample). Growth in health spending per capita is negatively related to coverage in all specifications, and the relationship is strongly statistically distinguishable from 0 for the latter period. Including this control results in moderate increases in the estimated size of the recoveries in the comprehensive-regulation states. This reflects the fact that the comprehensive regulation states were states in which health expenditures grew relatively rapidly.

Table A3: Robustness of Baseline on Implementation to Inclusion of State Economic Aggregates

Dep. Variable: Private Coverage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Small Firm x Comm. Rating State x Post 2002	-0.111***	-0.109***	-0.110***	-0.105***	-0.0757***	-0.0726***	-0.0708***	-0.0718***
	(0.00984)	(0.0164)	(0.0111)	(0.0102)	(0.0159)	(0.0173)	(0.0183)	(0.0158)
Health Spending Per cap. (1000s)		-0.00538				-0.0130		
		(0.0233)				(0.0211)		
Income Per cap. (1000s)			-0.00241				-0.00446	
			(0.00601)				(0.00520)	
Employment to Population				0.171				0.188
				(0.205)				(0.191)
Observations	135,941	135,941	135,941	135,941	134,921	134,921	134,921	134,921

***, **, and * indicate statistical significance at the .01, .05, and .10 levels respectively. Standard errors, reported beneath each point estimate, were clustered at the state level. Column 1 replicates column 1 of Panel B in Table 4. Column 5 replicates column 2 of Panel B in Table 4. As indicated, additional specifications contain controls for state level health spending per capita (in 1000s of dollars), income per capita (in 1000s of dollars), and the employment to population ratio. State health spending was taken from the National Health Expenditure Accounts, while state personal income, employment, and population were taken from the Bureau of Economic Analysis.

Table A4: Robustness of Baseline on Coverage Recoveries to Inclusion of State Economic Aggregates

Dep. Variable: Private Coverage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Small Firm x Comm. Rating State x Post 2002	0.0894***	0.135***	0.0903***	0.0965***	0.0426**	0.0700***	0.0465**	0.0485***
	(0.0169)	(0.0170)	(0.0178)	(0.0168)	(0.0163)	(0.0247)	(0.0191)	(0.0143)
Health Spending Per cap. (1000s)		-0.0678***				-0.0610***		
		(0.0156)				(0.0153)		
Income Per cap. (1000s)			-0.000720				-0.00182	
			(0.00344)				(0.00350)	
Employment to Population				-0.402				-0.509
				(0.401)				(0.401)
Observations	155,495	155,495	155,495	155,495	153,069	153,069	153,069	153,069

***, **, and * indicate statistical significance at the .01, .05, and .10 levels respectively. Standard errors, reported beneath each point estimate, were clustered at the state level. Column 1 replicates column 1 of Panel D in Table 4. Column 5 replicates column 2 of Panel D in Table 4. As indicated, additional specifications contain controls for state level health spending per capita (in 1000s of dollars), income per capita (in 1000s of dollars), and the employment to population ratio. State health spending was taken from the National Health Expenditure Accounts, while state personal income, employment, and population were taken from the Bureau of Economic Analysis.

A.4: Age Composition of Coverage Movements

If community-rating regulations induce adverse selection, one would expect to observe a shift in the composition of the covered towards populations with relatively high expected health spending. Unfortunately the CPS contains no information on health status until 1995, which comes two years after the implementation of community rating in Maine, New York, and Vermont. Nonetheless, expected health spending is positively correlated with age. Appendix Figure A.2 thus presents a breakdown of the evolution of private coverage rates by age group.

The year community rating went into place, namely 1993, saw a divergence in coverage rates for adults aged 21 to 45 relative to adults aged 46 to 60. In that year the coverage rate rose by around 8 percentage points for those aged 46 to 60 and declined by around 5 percentage points for those aged 21 to 45. Coverage declines between 1994 and 1997, as estimated in the main text, were of similar size for both groups. For those aged 45 to 60, the net coverage change was from just over 70 percentage points to just under 70 percentage points. For younger adults, the coverage rate declined from 73 percentage points in 1991 to a 1997 low of 56 percentage points. While sub-group tabulations are somewhat noisy, in particular for the 46 to 60 group during the pre-regulation period, the data appear consistent with adverse selection along the age margin.

A.5: Coverage Movements with Alternative Sample Inclusion Criteria

The analysis in the main text focuses on households with at least one child and one full time employed adult. Appendix Figures A3 and A4 present tabulations of the samples that include childless households (A3) or households in which all adults are

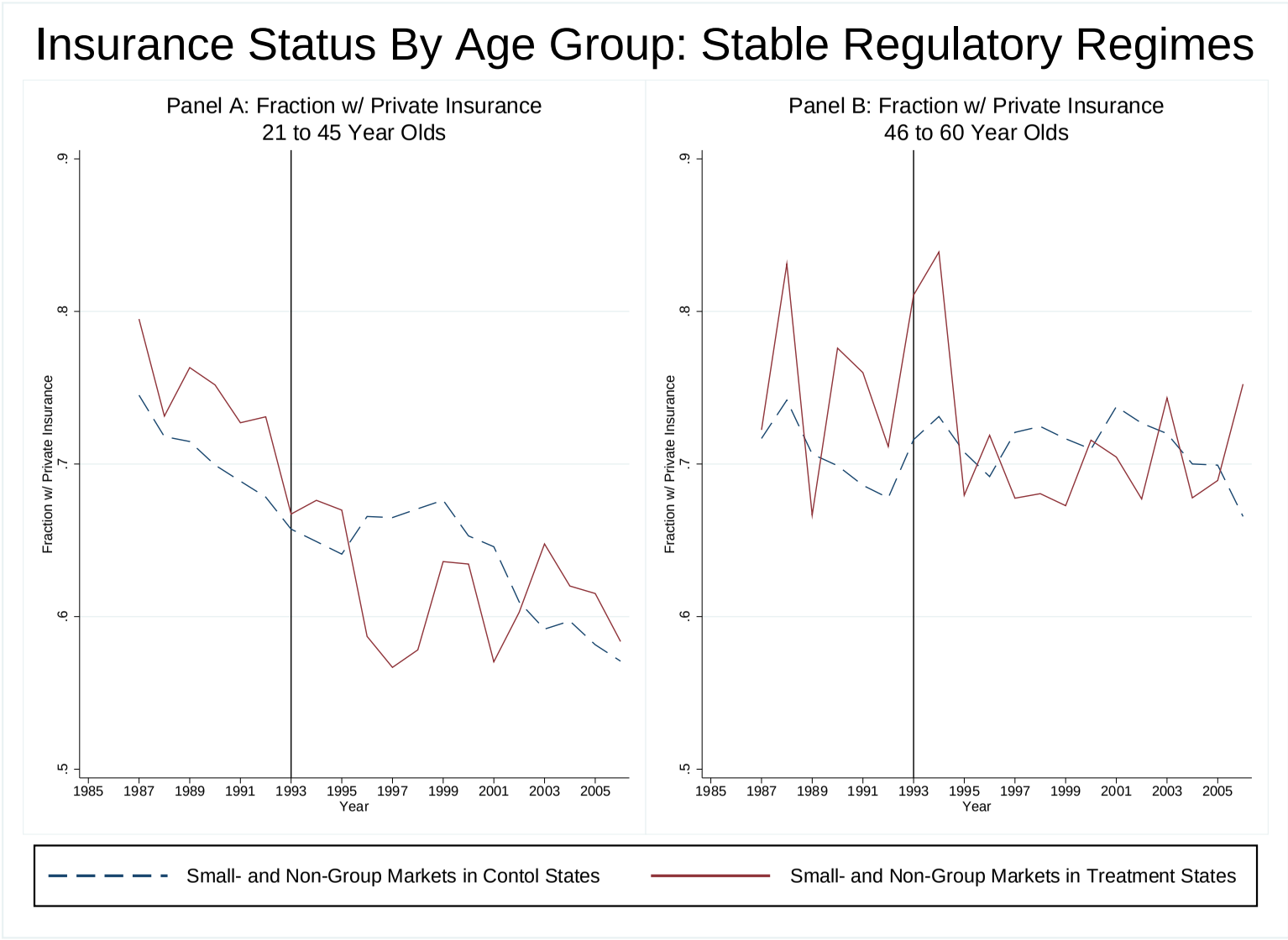

Figure A.2: **Insurance Status by Age Group: Stable Regulatory Regimes.** The figure contains tabulations constructed using the March Demographic Supplement of the Current Population Survey (CPS). The sample in panel A contains adults aged 21 through 45, while the sample in panel B contains adults aged 45 through 60. The Treatment States include Maine, New York, and Vermont.

unemployed (A4). As can be seen in Figure A3, inclusion of childless households has very little impact on the core features of the evolution of coverage. The data suggest that coverage rates in markets for "singles" coverage were relatively stable over the full sample period. This may be because the market for singles coverage was relatively adversely selected to begin with. This market segment is home to the "young invincibles" whose coverage decisions are much discussed in the context of the Affordable Care Act (ACA).

Figure A4 presents tabulations of coverage for samples augmented to include households in which no adult is employed. A household with children and no employed adults will almost invariably be eligible for Medicaid at some point during the calendar year. Unsurprisingly, inclusion of this group significantly shifts up the Medicaid coverage rates associated with in-sample households. Medicaid's counter-cyclicality (with respect to the business cycle) is also readily apparent. The insurance status of the unemployed tells us little about the effects of community rating regulations because these households are unlikely participants in private markets. Their inclusion in the sample serves primarily to compress realized fluctuations in the fraction uninsured (see Panel A).

A.6: Calibration of the Potential Effect of Public Insurance Expansions on Premiums in Regulated Markets

The potential effect of public insurance expansions on community-rated premiums can be approximated using the observed expenditures and health status of those who are newly eligible for, and participating in, public insurance.[18] Table A3 calibrates the

[18]Two important caveats arise in this context. Health spending will reflect the reimbursement rates offered to providers by public programs, which are typically lower than those offered by private insurers. The calibration accounts for this using an estimate from Zuckerman, McFeeters, Cunningham, and Nichols (2004) that Medicaid reimbursement rates are roughly 30 percent lower than reimbursement rates that

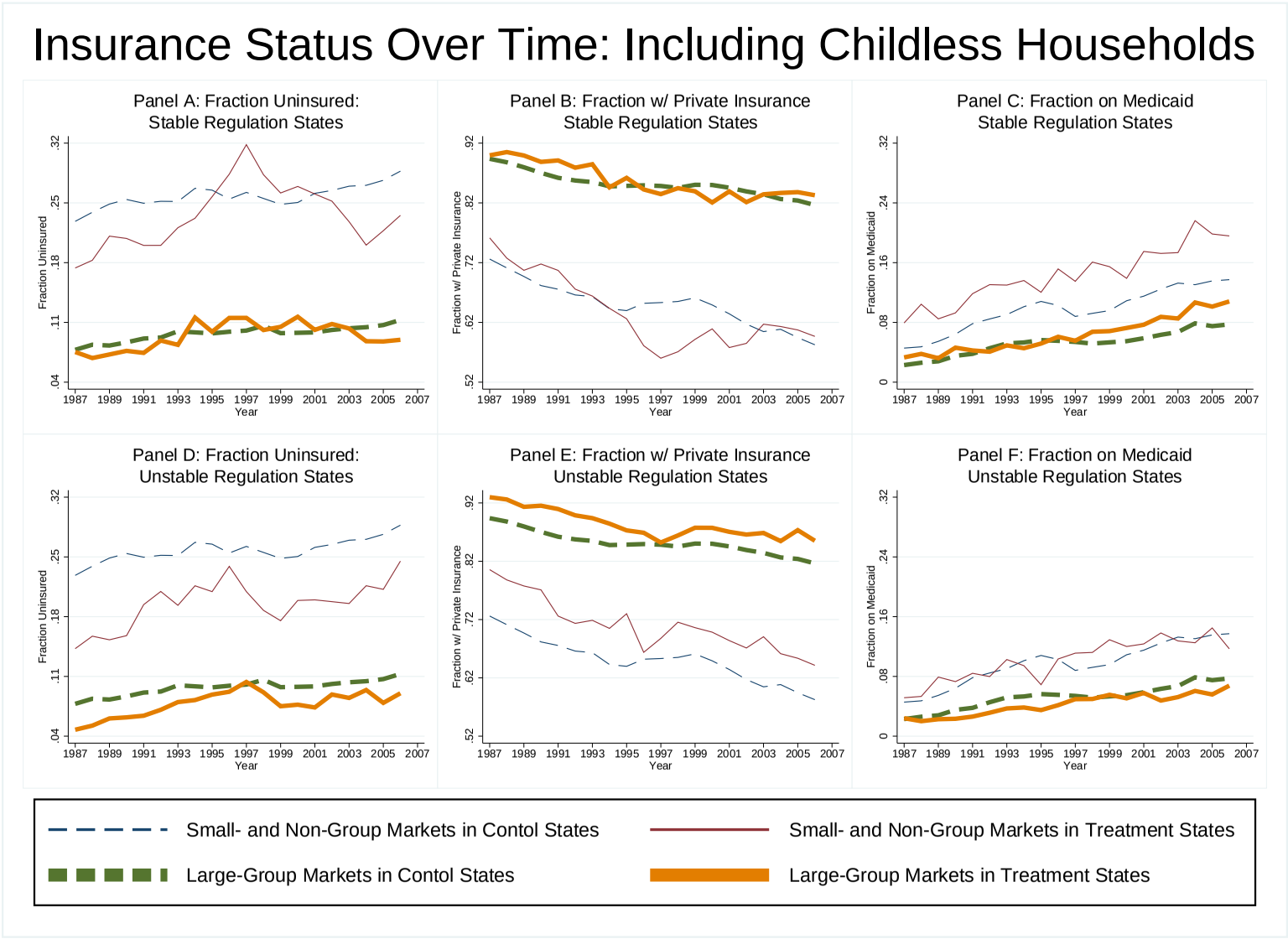

Figure A.3: **Insurance Status Over Time: Including Childless Households.** The figure contains tabulations constructed using the March Demographic Supplement of the Current Population Survey (CPS). All samples consist of the adults and children (aged 18 and lower) in households with at least one full-time working adult. In Panels A, B, and C, the Treatment States include Maine, New York, and Vermont. In Panels D, E, and F, the Treatment States include Kentucky, Massachusetts, New Hampshire, and New Jersey. Individuals are defined as having access to the large-group market if at least one adult in the household is employed at a firm with more than 100 employees (and to the non- and small-group markets otherwise). Insurance status is taken directly from the Minnesota Population Center's Summary Health Insurance variables, which are imputed using the CPS.

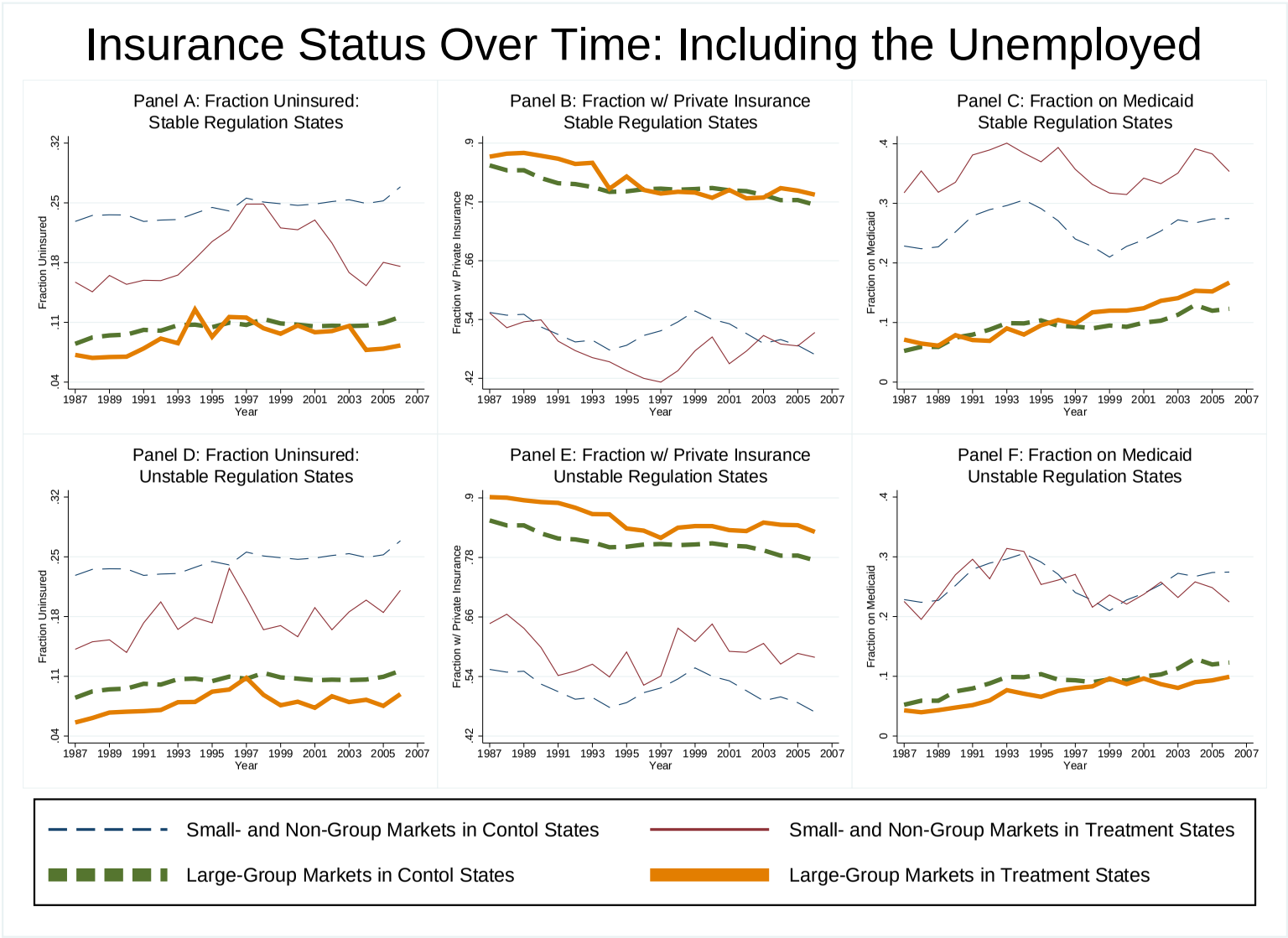

Figure A.4: **Insurance Status Over Time: Including the Unemployed.** The figure contains tabulations constructed using the March Demographic Supplement of the Current Population Survey (CPS). All samples consist of the adults and children (aged 18 and lower) in households with at least one child. In Panels A, B, and C, the Treatment States include Maine, New York, and Vermont. In Panels D, E, and F, the Treatment States include Kentucky, Massachusetts, New Hampshire, and New Jersey. Individuals are defined as having access to the large-group market if at least one adult in the household is employed at a firm with more than 100 employees (and to the non- and small-group markets otherwise). Insurance status is taken directly from the Minnesota Population Center's Summary Health Insurance variables, which are imputed using the CPS.

effect of all post-1993 public insurance expansions on the community-rated premium of a family with 2 adults and 2 children. From 1993 to 2004, the number of Medicaid (or SCHIP) beneficiaries expanded by around 10 million children, 5 million non-disabled adults, and 3 million disabled persons. States with comprehensive regulations accounted for roughly 1 million of these children, 1.1 million non-disabled adults, and 500,000 disabled persons while accounting for roughly 11 percent of the nation's population. The vast majority of the expanded coverage of unhealthy adults and the disabled (roughly four fifths) drew from the pool of non- and small-group market participants.[19]

I examine the expenditures of newly eligible individuals using health spending data from the 2004 Medical Expenditure Panel Survey (MEPS). To proxy for newly-eligible status, I use household employment information. Specifically, I focus attention on those who are in households with at least one full-time employed adult. The vast majority of those eligible for Medicaid prior to the 1990s expansions were in households in which there were no full-time employed adults. These expansions were designed to target the working poor, i.e., low income households in which at least one family member works regularly. In this sample, the typical non-disabled, publicly insured adult spends roughly $1,325 (standard error of $611) more per year than the typical privately insured adult. The typical publicly insured disabled individual spends roughly $8,000 (standard error of $671) more than the typical adult. Finally, I estimate that, if privately insured,

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prevail under Medicare (for comparable services). Large employer plan typically pay 40 percent more than Medicare's rates Clemens and Gottlieb (2013). Non- and small-group plans likely pay rates between those of Medicare and large-employer plans. Spending on Medicaid beneficiaries will also reflect difficulties in obtaining care due to physician (un)willingness to see Medicaid patients. Pregnant women and the disabled were explicitly covered by Medicaid on account of their high health expenditures. The Medical Expenditure Panel Survey (MEPS) confirms that (non-disabled) adults on public insurance have higher health expenditures than the typical adult on private coverage. (It may still be the case, of course, that observed differences understate real differences in what the publicly insured would spend if they were on private insurance.) Children, however, were not made eligible on account of their health.

[19]This result does not stem directly from evidence presented earlier in the paper, but can be seen quite readily in the data when comparing Medicaid coverage of unhealthy adults with and without access to insurance through the large group market.

Table A5: Calibration of Potential Impact of Public Insurance Expansions on Community Rated Premiums

Coverage Group	New Beneficiaries in Comprehensive Regulation States (millions)	Assumed from Non- and Small-Group (millions)	Average Costs in Excess of Privately Covered Individuals	Excess Costs Per Privately Insured Individual	Excess Costs Covered by Private Insurance	Excess Costs Accounting for Lower Medicaid Reimbursement Rates
Children	1	0.5	$100	$25	$17	$17
Non-Disabled Adults	1.1	0.88	$1,325	$233	$156	$223
Disabled Adults	0.5	0.4	$8,000	$640	$429	$613
Total Excess Costs for Family with 2 Adults and 2 Children						$1,706

Sources: Calculations use data from the Center for Medicare and Medicaid Services (CMS), March Demographic Supplements to the Current Population Survey (CPS), and the 2004 Medical Expenditure Survey as described in the note below.

Notes: Numbers of new beneficiaries come from CMS administrative data. The fraction of new beneficiaries coming from the non- and small-group markets is estimated on the basis of differences in eligibility and participation between these groups and those in large-group markets as observed in the CPS. Average costs of publicly insured individuals in excess of privately insured individuals were estimated using data from the 2004 Medical Expenditure Panel Survey (MEPS). The MEPS sample was restricted to individuals in households with an employed adult in order to focus on newly eligible recipients of public insurance. Excess spending for publicly insured adults is roughly similar whether the comparison sample includes all other adults or only adults with private insurance. The excess spending for the disabled is the reported $8000 when the sample includes all other adults, and rises to $14,000 when the sample is restricted to only include those with private insurance. Excess costs were converted into costs per privately insured individual by multiplying average excess costs by the ratio of new beneficiaries from the non- and small-group markets to the baseline number of private insurance holders. Although not all new public insurance recipients would have been on private insurance, individuals with the highest costs would have been likely to obtain private coverage in the comprehensively regulated markets since they stood to benefit the most from community rated premiums. For example, even if only 0.5 of the 1.1 million adults had previously held private coverage, these would likely have been relatively high cost adults, making the above conversion into excess costs per privately insured individual appropriate. Total excess costs were converted into excess costs covered by private insurance by multiplying by two-thirds. Two-thirds is the typical share of health expenditures covered by private insurance among non- and small-group policy holders in the MEPS. The final adjustment accounts for the fact that Medicaid reimbursement rates are lower than private reimbursement rates. Estimates for non-disabled adults and disabled adults, which are based on the actual expenditures of publicly insured inviduals, will understate the expenditures that would be incurred under private insurance unless an appropriate adjustment is made. Work by Zuckerman et al. (2004) suggests that Medicaid reimbursement rates are, on average, 30% lower than reimbursement rates that prevail elsewhere.

newly eligible children would have spent roughly $100 more than the typical privately insured child.

The potential premium impacts of expanded coverage for adults and the disabled are much larger than that associated with children. There were approximately 5 million adults with private insurance in the non- and small-group markets of the comprehensively regulated states in 2004. I assume that four-fifths, or 880 thousand, of the newly covered, non-disabled adults came from the non- and small-group markets.[20] Their excess spending of $1,325 per person thus amounts to roughly $233 per adult still on these markets. The excess spending of the newly-covered disabled population amounts to $640 per adult on these markets. If two-thirds of these expenditures would have been covered by private insurance (a typical share for the privately insured on the non- and small-group markets), the premium impact would amount to nearly $585 per adult. A final adjustment, to account for Medicaid's relatively low reimbursement rates (which will depress observed spending by those on public insurance relative to what they would spend were they on private insurance), raises this estimate to $836 (see Zuckerman, McFeeters, Cunningham, and Nichols (2004)). Similar calculations for expanded children's coverage yields an estimate of roughly $17 per child. The post-1993 public insurance expansions may thus have held down community-rated premiums by around $1,700 for a family of 4.

[20]This assumption is driven by CPS data suggesting that roughly one-fifth of new beneficiaries came from families whose alternative source of insurance would have come through the large group insurance market.

A.7: The Evolution of Health Maintenance Organizations in Comprehensive-Regulation States

The analysis in this paper's main text focuses on the extensive margin of the insurance purchasing decision. Adverse selection can also occur along the intensive margin of insurance generosity. As discussed in the main text, past work estimated relatively small impacts of community rating regulations on the extensive margin. Buchmueller and DiNardo (2002) hypothesize that these markets may have arrived at separating equilibria in the spirit of Rothschild and Stiglitz (1976). In support of this view, Buchmueller and DiNardo (2002) and Buchmueller and Liu (2005) find evidence that the market share of Health Maintenance Organizations (HMOs) increased significantly in community-rated markets relative to other markets.

In contrast with past work, this paper finds that community rating regulations caused extensive margin declines in private coverage rates. In some states coverage subsequently rebounded. By way of explanation, this paper advances a hypothesis involving the interplay between community rating regulations and public insurance programs. A natural alternative hypothesis, considered below, involves the separating equilibria proposed by past work. Specifically, coverage may have recovered because of separating equilibria made possible by adjustments on the supply side of the insurance market.

To assess this alternative hypothesis, I assembled data on the evolution of HMO penetration rates over the course of my sample period. These data are reported annually in the Statistical Abstract of the United States for 1995 through 2006, and in five year increments from 1980 through 1995. Table A.6 displays the evolution of HMO penetration rates for the individual comprehensive-regulation states and for the United States as a whole. As with the main text's analysis of coverage rates, I separately present initial changes from the pre-regulation period through 1997 as well as the subsequent evolution

from 1997 through 2005.

Consistent with Buchmueller and DiNardo (2002) and Buchmueller and Liu (2005), I find that HMO penetration rates increased disproportionately in the comprehensive-regulation states relative to other states during the mid-1990s. From 1990 to 1997, the average change in HMO penetration was roughly 9 percentage points for the United States as a whole and roughly 18 percentage points among the comprehensive-regulation states. Combined with the results from the main text, this suggests that comprehensively-regulated markets experienced significant coverage declines on both the extensive margin and the intensive margin of coverage generosity.

I next consider how intensive margin adjustments relate to the pattern of coverage recoveries shown in Panel E of Figure A2. The evidence suggests that intensive-margin adjustments cannot explain the observed recoveries. Note first that both the comprehensive-regulation states and the U.S. as a whole experienced little change in HMO penetration rates from 1997 to 2005. As proxied by HMO penetration, there is no evidence of differential changes in coverage generosity over this time period.

Second, I examine the variation in HMO coverage changes within the set of comprehensive-regulation states. This variation appears unable to explain variation in the size of the coverage recoveries. The last column of Table A6 reveals significant variation in the changes in HMO coverage rates within the set of comprehensive-regulation states. Notably, HMO coverage declined in New York, while increasing in Maine and Vermont. As shown in Panel E of Figure A2, New York experienced a substantial extensive margin recovery over this time period, while Maine and Vermont lagged the performance of other comprehensive-regulation states. This is inconsistent with the view that HMO penetration enabled coverage to recover. If anything, the evidence suggests a positive correlation between intensive and extensive margin recoveries.

Table A6: HMO Penetration Rates

State	1990	1997	2005	Change from 1990 to 1997	Change from 1997 to 2005
Panel A: States That Maintained Comprehensive Regulations					
Maine	2.6	15.9	25.9	13.3	10.0
Massachusetts	26.5	44.6	37.4	18.1	-7.2
New Jersey	12.3	27.5	25.0	15.2	-2.5
New York	15.1	35.7	24.0	20.6	-11.7
Vermont	6.4	0.0	16.1	-6.4	16.1
Group Mean	12.6	24.7	25.7	12.2	0.9
Panel B: States That Repealed Comprehensive Regulations					
Kentucky	5.7	27.4	10.2	21.7	-17.2
New Hampshire	9.6	23.9	21.9	14.3	-2.0
Group Mean	7.7	25.7	16.1	18.0	-9.6
Panel C: U.S. Averages					
U.S. Median	8.5	17.1	16.4	8.6	-0.7
U.S. Mean	10.3	19.9	17.9	9.5	-2.0

Source: HMO penetration rates for 2007 were taken directly from the statistical abstract of the United States. HMO penetration rates for 1990 and 1997 were gathered from historical issues of the Statistical Abstract by Facster (http://www.facster.com/Persons_Enrolled_Health_Maintenance_Organizations_State.aspx?t=997. Website accessed 1/19/2014).