

**Do Health Insurance Mergers Hurt Consumers?
Firm-Level Evidence from U.S. Insurance Companies**

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1. Introduction

The U.S. health care market has been a key subject of economic research for many years. Early research focused on the availability of health care services and the quality of health care outcomes. As total spending on health care began to rise dramatically in the 1970s, research began to address the problems with indemnity-based health insurance, the growth of managed care, the application of managed care mechanisms, and the consequential effects of these developments on the organization of provider networks and incentives to encourage cost control. More recently, there has been growing interest among economists in the industrial organization of health care markets in general and health insurance markets in particular (Gaynor, Ho, and Town, 2014).

The U.S. health insurance industry has been dramatically transformed since the 1970s. The market that was once dominated by life and health insurers providing indemnity coverage is now characterized by a fairly large, and largely different, group of insurers offering managed care plans. Health insurers continue to provide health insurance coverage primarily through employer arrangements, but few provide the traditional indemnity coverage. In the past few decades we have seen several periods of growth and consolidation, and several studies have evaluated the consequences of these changes on insurance premiums. Findings suggest that entry into the market may reduce premiums for insurance (Wholey, Feldman and Christianson, 1995) and, on the other hand, consolidations result in increased premiums (Dafny, Duggan, and Ramanarayanan, 2009).

The health insurance market is now experiencing a new period of consolidation, as three large mergers were announced between (1) Aetna and Humana, (2) Anthem and Cigna Health, and (3) Centene/Health Net. Arguments for these mergers include the desire to achieve

economies of scale, increase diversification, and to improve negotiating power with health care providers. While several studies have evaluated past mergers among HMOs, there is only weak evidence that mergers have resulted in economies of scale (Engberg, Wholey, Feldman, and Christianson, 2004). This is largely because the merging organizations are already so large, and any administrative savings are small in comparison to premiums.

The goal of this research is to examine whether health insurance mergers increase market power and, subsequently, whether this activity may benefit or hurt consumers through changes in prices for coverage. We further question whether mergers are rather motivated by firms' desire to achieve economies of scale.

The paper proceeds as follows. In the next section, we provide a brief overview of previous studies and highlight the areas in which our research extends the prior work. In the third section, we discuss our hypotheses and in the fourth we describe the data for our empirical analysis. A fifth section describes the results and a final section concludes.

2. Background

We draw from several different streams of literature. First, we have explored the literature that addresses the theoretical reasons for mergers and those that describe, empirically, the consequences of mergers on the merging organizations.¹ We focus, more specifically, on studies that have evaluated the structure, conduct, and performance of the U.S. health insurance market. One stream of this literature addresses changes in health insurance industry competition. For example, Gaynor and Vogt (2000) provide an examination of antitrust and competition in health insurance markets. The authors note how the health insurance market differs from other markets, which may have different implications for optimal competitiveness. While a number of

¹ We will provide a complete review of this work in the paper before the ARIA conference.

studies that we recognize here focus on mergers and consolidation in the health insurance market, one recent study notes that the average number of health insurers operating in a state has actually increased between 2002 and 2010 (Cole, He, and Karl, 2014). Interestingly, few health insurers keep a top market share rank in an MSA over multiple years (Santerre and Bates, 2015), so the market seems to be competitive despite high levels of concentration measure with a HHI.

Another stream of recent literature addresses consequences of changing market structure and argues that health insurers have market power, which they maintain through agreements with employers, who are the largest buyers of health insurance coverage, and negotiated contracts with networks of providers. One study finds that the percentage of insured individuals with private health insurance is inversely related to the HHI as a measure of concentration (Bates, Hilliard, and Santerre, 2012). The authors interpret these findings as evidence of market power. Dafny (2010) examines group health insurance plans and documents that health insurers charge higher premiums to more profitable firms; she interprets this finding as evidence of market power.

Consolidation in U.S. health insurance industry has been shown to result in higher employer-sponsored insurance premiums (Dafny, Duggan, and Ramanarayanan, 2009), suggesting that consolidations increase the market power of remaining insurers, through reduced competition. More recently, further evidence of health insurance market power is provided by Cabral, Geruso, and Mahoney (2014), who document that the premium pass-through rate of payments per plan participant is 13% in the least competitive markets and 74% in the most competitive markets. Finally, we note a recent study of eleven health insurance mergers, finds that these mergers led to an increase in premiums for Medicare Part D plans, but that the increase

was outweighed by a reduction in plan premiums after a consolidation of offered plans (Chorniy, Miller and Tang, 2014).

Not surprisingly, then, competition in health marketplaces (number of plans offered) has been shown to reduce premiums (Dafny, Gruber, and Ody, 2015; Jacobs, Banthin and Trachtman, 2015). The number of plans offered and, consequently, the price of coverage, also depends on the size of the coverage regions (Dickstein et al., 2015).

One of the drawbacks of the previous literature is that they all use the premium volume as a proxy for price. Premium volume captures the price for insurance as a risk financing mechanism as well as the price for providing medical services. The latter dimension is the outcome of price negotiations with health care providers and the concentration of health care providers and the relative bargaining power of insurance companies and health care providers is also an important point to consider (Ho and Lee, 2013; Trish and Herring, 2015). So, the results alluding to “insurer market power” in the literature may be capturing the market power or bargaining power of health care providers.

Our firm-level analysis allows us to control for health care costs. We use the inverse of the loss ratio as price only measures price of providing insurance, controlling for health care costs (losses incurred). We look at changes in market structure due to mergers and acquisitions to examine the effect on prices. We also examine the effect of mergers and acquisitions on firm’s profitability. If firms engage in mergers to achieve economies of scale then the resulting firms should be more efficient and more profitable without raising prices (see, Choi and Weiss, 2005; Weiss and Choi, 2008).

3. Hypotheses

Using the prior studies as a guide, we propose that the price of insurance coverage will be affected by the merger of two health insurers. Theoretically, the price of coverage could decline if the merged organization does, in fact, achieve economies of scale, is able to exercise stronger negotiating power in a way to reduce payments to providers, or if the merger provides additional diversification benefits, e.g., lower overall risk. We propose our first two hypothesis, noting first a short term effect, and then a longer term effect, which requires that efficiency gains prevail over market power.

H1. Prices for health insurance coverage will increase in the short run following a merger.

H2. Prices for health insurance coverage will decline in the completion period.

Our second hypothesis is derived from the studies that suggest a merger may not achieve the benefits noted above or, that these benefits are achieved, but the “savings” are not passed through to consumers. We propose to test:

H3. Insurer profitability increases following a merger.

We provide more detail on the measures used to test these relationships to be tested in the next section.

4. Data and Methodology

For our analysis, we use the financial statement data for all U.S. health insurers provided by the NAIC for the years 2002-2011. Our initial sample consists of all health insurers which we subsequently limit for a variety of reasons. First, we exclude all insurers with negative premium income, losses, total assets, prices, asset risk and administrative expenses. We exclude all insurers with less than 50 percent of net premiums written in one state. These restrictions leave

us with 7,210 observations. Since we use 1-year lagged versions of insurers' firm characteristics to avoid simultaneity, we exclude firm-year observations for which the preceding year of data is not available. This results in a sample of 6,094 insurer-year observations from 2003 through 2011. Table 1 provides a description of our variables, and Table 2 provides summary statistics for the sample we use for analysis. We identified 88 mergers during our time period using various sources, including AM Best's Corporate Changes publication. The number of mergers for each year in our sample are shown in Table 3.

Following a research design similar to the one used by Focarelli and Panetta (2003), we investigate whether in-market mergers produce an increase or a decrease in the price of insurance coverage of the merging insurer relative to the control sample. We analyze two sub-periods: a transition period and a completion period. The transition period covers the year of the merger and the following year, while the completion period covers the years two to four after the merger took place.

To test our first two hypotheses, we estimate the following fixed-effects regression:

$$p_{i,s,t} = \alpha + \beta_{0-1}TRANS_{i,s,t}^{0-1} + \beta_{2-4}COMPL_{i,s,t}^{2-4} + \gamma INS_{i,t} + \delta STATE_{s,t} + u_s + \varepsilon_{i,s,t} \quad (1)$$

where $p_{i,s,t}$ is the price of insurance coverage in year t by insurer i in state s . $TRANS_{i,s,t}^{0-1}$ is a dummy for the transition period variable that is equal to 1 if in year t or in the previous year insurer i merged with a target that, prior to the consolidation, was already operating in state s . $COMPL_{i,s,t}^{2-4}$ is a dummy for the completion period that is equal to 1 if the merger took place two to four years before. $INS_{i,t}$ and $STATE_{s,t}$ are, respectively, a vector of time-varying insurer- and state-specific control variables. u_s is a state-specific fixed effect, and $\varepsilon_{i,s,t}$ is a zero-mean random error.

The hypothesis that in the short run mergers increase the market value power implies $\beta_{0-1} > 0$. The hypothesis that in the completion period the efficiency gains prevail over the increase in market power implies $\beta_{2-4} < 0$, while a positive value would indicate that the market power effect outweighs the efficiency gain. We include a full set of state dummies in consideration of the significant differences among the prices between different geographic areas.

We include a set of variables to control for other insurer characteristics that may relate to prices. We include size (the log of total assets) and proxies for asset risk (e.g., the sum of stocks plus real estate divided by in subtotals, cash and invested assets) and efficiency (the cost-income ratio). We also control for state-specific variables. First, we include the HHI of the states, a standard proxy of the degree of market power. To avoid simultaneity, all variables are lagged one year. Finally, to capture the increase in competition prompted by the geographical expansion of insurers, we include a dummy to control for insurer entry into local markets. Finally, we include the state per capita GDP.

In addition to the specification described above, and for robustness, we also estimate equation 1 using dummy variables for each year of the merger (0-4) instead of the grouped “transition” and “completion” period dummies. This allows us to confirm that our results do not depend on our definitions of the transitions and completion periods. Then, we estimate the same model, but replace our measure of price with the change in price as our dependent variable.

To test our third hypothesis, we re-estimate equation 1 but replace the dependent variable with two measures of insurer profitability: the insurer’s return on assets and the return on equity. This equation is also estimated with the individual year dummies and the “transition” and “completion” period dummies.

5. Results

Table 4 shows the results of estimating equation 1 with price, or the change in price, as our dependent variable.² In all but one equation, we find no significant relationship between prices and merger activity. This is consistent with much of the prior literature that finds little or no effect of mergers on prices. We are unable to find support for our first two hypotheses.

Table 5 shows the results when we estimate the model with profitability as our dependent variable. Here, we find that profitability is significantly improved for the surviving firm following a merger. These results provide some preliminary evidence to support our third hypothesis.

6. Conclusion

Our analysis is preliminary, but we show some interesting results with respect to the effect of mergers on health insurer profitability. As we are currently facing the possibility of some of the largest health insurance mergers yet, this analysis may shed some light on what we might expect from such mergers in the coming years.

We have assembled a large sample of health insurers, and have identified 88 mergers during our time period. Our research emphasis, going forward, is on clarifying *how* a merger results in higher profitability, and to further explore whether the beneficial effect that we estimate, on average, is a uniform finding across firms with different characteristics. This will involve some exploration of the pre-merger firm characteristics (e.g., prices, profitability, and diversification).

² Variables are described further in the notes to the tables. We will expand the discussion of our results before the ARIA meeting.

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Table 1: Variable Definitions

Variable	Definition
Price	Net premium income plus change in UPR divided by losses incurred
ROA	Net income divided by total assets
ROE	Net income divided by total capital and surplus
Transition period (years 0-1)	Dummy equal to 1 if in year t or in the previous year insurer i merged with a target
Year 0	Dummy equal to 1 if in year t insurer i merged with a target
Year 1	Dummy equal to 1 if in the previous year insurer i merged with a target
Completion period (years 2-4)	Dummy equal to 1 if the merger took place two or more years before
Year 2	Dummy equal to 1 if in two years ago insurer i merged with a target
Year 3	Dummy equal to 1 if in three years ago insurer i merged with a target
Year 4	Dummy equal to 1 if in four years ago insurer i merged with a target
Size (log value)	Ln(total assets)
Asset risk	Stocks plus real estate divided by in subtotals, cash and invested assets
Cost-income ratio	General administrative expenses divided by net premium income
Market concentration	Herfindahl Hirschman Index by state
New insurer	Dummy equal to 1 when an insurer enters a local market
GDP per capita (log value)	Ln(GDP per capita by state)

Note: This table reports the definition of variables used in the subsequent analysis.

Table 2: Summary Statistics

Variable	N	Mean	SD	Min	Max
Price	7,186	1.47	16.42	0.00	1,378.32
Price change	6,128	0.08	3.52	-0.99	266.02
ROA	7,210	2.89	2.57	0.00	118.45
ROE	7,201	6.70	32.13	-1,432.63	1,478.57
Transition period (years 0-1)	7,210	0.02	0.13	0.00	1.00
Year 0	7,210	0.01	0.09	0.00	1.00
Year 1	7,210	0.01	0.10	0.00	1.00
Completion period (years 2-4)	7,210	0.03	0.16	0.00	1.00
Year 2	7,210	0.01	0.10	0.00	1.00
Year 3	7,210	0.01	0.10	0.00	1.00
Year 4	7,210	0.01	0.09	0.00	1.00
Size (log value)	7,210	17.12	2.15	7.14	23.08
Asset risk	7,210	0.09	0.18	0.00	1.20
Cost-income ratio	7,174	0.43	7.49	0.00	430.80
Market concentration	7,210	0.24	0.18	0.06	1.00
New insurer	7,210	0.02	0.14	0.00	1.00
GDP per capita (log value)	7,210	10.69	0.19	10.10	12.07

Note: This table reports summary statistics of variables used in the subsequent analysis. *Price* is net premium income plus change in UPR divided by losses incurred. *Price change* is the change of the price from one year to another. *ROA* is net premium income divided by total assets. *ROE* is net premium income divided by total capital and surplus. *Transition period* is a dummy equal to 1 if in year *t* or in the previous year insurer *i* merged with a target. *Year 0* is a dummy equal to 1 if in year *t* insurer *i* merged with a target. *Year 1* is a dummy equal to 1 if in the previous year insurer *i* merged with a target. *Completion period* is a dummy equal to 1 if the merger took place two or more years before. *Year 2* is a dummy equal to 1 if in two years ago insurer *i* merged with a target. *Year 3* is a dummy equal to 1 if in three years ago insurer *i* merged with a target. *Year 4* is a dummy equal to 1 if in four years ago insurer *i* merged with a target. *Size* is the natural logarithm of total assets. *Asset risk* is the sum of stocks plus real estate divided by in subtotals, cash and invested assets. *Cost-income ratio* is the ratio of general administrative expenses and net premium income. *Market concentration* is the Herfindahl Hirschman Index calculated by state. *New insurer* is a dummy equal to 1 when an insurer enters a local market. *GDP per capita* is the natural logarithm of GDP per capita by state.

Table 3: Number of Mergers by Year

Year	Number of Merger	Number of Observation
1998	1	691
1999	3	691
2000	13	691
2001	18	691
2002	8	691
2003	4	682
2004	4	673
2005	5	707
2006	8	746
2007	8	752
2008	0	763
2009	3	746
2010	7	729
2011	6	721

Note: This table reports the number of observations and the number of mergers in the used sample. While the analysis start with data from year 2002, also the mergers that happed in prior years are important for the post-merger analysis.

Table 4: Fixed-Effects Regressions of Price and Price Change on M&A Indicators and Controls

	Model A - Price	Model B - Price	Model C - Price change	Model D - Price change
Transition period (years 0-1)	0.0095 (0.859)		-0.0035 (0.673)	
Year 0		-0.1032 (0.265)		-0.0213* (0.099)
Year 1		0.1023 (0.376)		0.0140 (0.300)
Completion period (years 2-4)	0.0353 (0.538)		-0.0007 (0.907)	
Year 2		0.0340 (0.591)		-0.0023 (0.751)
Year 3		0.0145 (0.753)		-0.0033 (0.682)
Year 4		0.0449 (0.412)		0.0064 (0.423)
L.Size (log value)	-0.6576 (0.264)	-0.6589 (0.264)	0.0085 (0.767)	0.0082 (0.774)
L.Asset risk	0.1399 (0.412)	0.1446 (0.404)	-0.0487 (0.609)	-0.0478 (0.615)
L.Cost-income ratio	-0.0057 (0.300)	-0.0057 (0.300)	0.1422*** (0.000)	0.1422*** (0.000)
Market concentration	-0.1637 (0.751)	-0.1624 (0.754)	-0.0281 (0.701)	-0.0281 (0.702)
New insurer	-1.8712 (0.231)	-1.8748 (0.231)	0.1077 (0.161)	0.1070 (0.164)
GDP per capita (log value)	0.6045 (0.354)	0.6072 (0.354)	0.0032 (0.966)	0.0038 (0.960)
Constant	6.3406* (0.067)	6.3348* (0.067)	-0.1854 (0.715)	-0.1875 (0.713)
Observations	6,094	6,094	6,092	6,092
R ²	0.3190	0.3190	0.7560	0.7560
Adjusted R ²	0.1916	0.1911	0.7104	0.7102

Note: This table reports estimated coefficients from fixed-effects regression models. All independent variables are measured as of the end of the prior year. The insurers' firm characteristics are lagged one year to avoid simultaneity. Standard errors are robust to arbitrary heteroscedasticity and adjusted for clustering at the insurer level. The F-Test of joint significance is significant at the 1% level. *, ** and *** denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Price is net premium income plus change in UPR divided by losses incurred. *Price change* is the change of the price from one year to another. *ROA* is net premium income divided by total assets. *ROE* is net premium income divided by total capital and surplus. *Transition period* is a dummy equal to 1 if in year t or in the previous year insurer i merged with a target. *Year 0* is a dummy equal to 1 if in year t insurer i merged with a target. *Year 1* is a dummy equal to 1 if in the previous year insurer i merged with a target. *Completion period* is a dummy equal to 1 if the merger took place two or more years before. *Year 2* is a dummy equal to 1 if in two years ago insurer i merged with a target. *Year 3* is a dummy equal to 1 if in three years ago insurer i merged with a target. *Year 4* is a dummy equal to 1 if in four years ago insurer i merged with a target. *Size* is the natural logarithm of total assets. *Asset risk* is the sum of stocks plus real estate divided by in subtotals, cash and invested assets. *Cost-income ratio* is the ratio of general administrative expenses and net premium income. *Market concentration* is the Herfindahl Hirschman Index calculated by state. *New insurer* is a dummy equal to 1 when an insurer enters a local market. *GDP per capita* is the natural logarithm of GDP per capita by state.

Table 5: Fixed-Effects Regressions of ROA and ROE on M&A Indicators and Controls

	Model A - ROA	Model B - ROA	Model C - ROE	Model D - ROE
Transition period (years 0-1)	0.0281 (0.846)		1.0504 (0.203)	
Year 0		-0.0553 (0.685)		1.0347 (0.257)
Year 1		0.1226 (0.482)		1.6039 (0.186)
Completion period (years 2-4)	0.2268*** (0.004)		1.6604*** (0.009)	
Year 2		0.1777* (0.054)		1.8008** (0.029)
Year 3		0.1997** (0.013)		1.8444*** (0.008)
Year 4		0.2745*** (0.001)		1.3953** (0.013)
L.Size (log value)	0.1427* (0.075)	0.1418* (0.078)	1.2486 (0.205)	1.2446 (0.207)
L.Asset Risk	-0.1278 (0.619)	-0.1226 (0.634)	-0.8015 (0.832)	-0.7810 (0.836)
L.Cost-income ratio	-0.0115*** (0.000)	-0.0115*** (0.000)	-0.0339*** (0.001)	-0.0339*** (0.001)
Market concentration	-0.8529* (0.085)	-0.8477* (0.087)	-1.1621 (0.697)	-1.1378 (0.702)
New insurer	0.1966 (0.355)	0.1941 (0.362)	8.4982*** (0.001)	8.4876*** (0.001)
GDP per capita (log value)	-1.5845*** (0.000)	-1.5855*** (0.000)	-2.5103 (0.596)	-2.4598 (0.604)
Constant	17.6468*** (0.000)	17.6712*** (0.000)	12.3910 (0.792)	11.9027 (0.800)
Observations	6,099	6,099	6,092	6,092
R ²	0.8112	0.8113	0.2903	0.2903
Adjusted R ²	0.7759	0.7758	0.1575	0.1570

Note: This table reports estimated coefficients from fixed-effects regression models. All independent variables are measured as of the end of the prior year. The insurers' firm characteristics are lagged one year to avoid simultaneity. Standard errors are robust to arbitrary heteroscedasticity and adjusted for clustering at the insurer level. The F-Test of joint significance is significant at the 1% level. *, ** and *** denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Price is net premium income plus change in UPR divided by losses incurred. *Price change* is the change of the price from one year to another. *ROA* is net premium income divided by total assets. *ROE* is net premium income divided by total capital and surplus. *Transition period* is a dummy equal to 1 if in year t or in the previous year insurer i merged with a target. *Year 0* is a dummy equal to 1 if in year t insurer i merged with a target. *Year 1* is a dummy equal to 1 if in the previous year insurer i merged with a target. *Completion period* is a dummy equal to 1 if the merger took place two or more years before. *Year 2* is a dummy equal to 1 if in two years ago insurer i merged with a target. *Year 3* is a dummy equal to 1 if in three years ago insurer i merged with a target. *Year 4* is a dummy equal to 1 if in four years ago insurer i merged with a target. *Size* is the natural logarithm of total assets. *Asset risk* is the sum of stocks plus real estate divided by in subtotals, cash and invested assets. *Cost-income ratio* is the ratio of general administrative expenses and net premium income. *Market concentration* is the Herfindahl Hirschman Index calculated by state. *New insurer* is a dummy equal to 1 when an insurer enters a local market. *GDP per capita* is the natural logarithm of GDP per capita by state.