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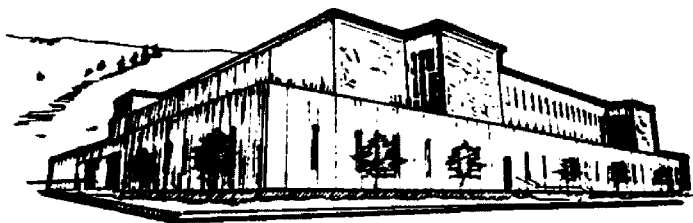
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University of
Montana

AN ASSIGNED RISK PLAN:
WHAT WILL IT MEAN FOR THE STATE OF MONTANA?

By

Deslie Gianchetta

B.S. University of Montana, Business Administration, 1971

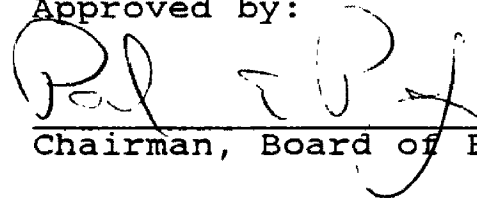
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CHAPTER I
PURPOSE AND ORGANIZATION

Problem Statement

Montana law requires all employers to provide workers' compensation insurance. Employers have three options: they may self insure; they may purchase insurance from private carriers; or they may purchase insurance from a state insurance fund. In Montana and elsewhere, the state funds are insurers of last resort for employers; they provide insurance for employers who cannot procure insurance through the private market.

The state fund approach is not the only method to guarantee availability of workers' compensation insurance to all employers; there is also the state Assigned Risk Plan (ARP) approach. The ARP mandates that all insurers of workers compensation participate equitably in insuring "poor risks." A common formula for participation is based on the total percentage of voluntary premiums a firm writes. For example, if an insurance carrier writes 15% of the workers' compensation voluntary premiums in a state for a year, the insurance carrier would participate in 15% of the gains or losses of the "poor risks" who are insured through the ARP.

Thirty-five states use an ARP mechanism to provide workers' compensation insurance to employers who cannot purchase insurance in the voluntary market.

In 1989 the Montana Legislature through Senate Bill 428 authorized the establishment of an assigned risk program for the state of Montana. The primary question is, "How big will this assigned risk category be?" The answer to this question is the focus of this paper.

The primary objectives of this research are to: 1) describe the existing elements of ARPs, 2) review states which use an ARP and 3) analyze published data from these states with existing ARPs to verify factors which could explain the size of their assigned risk pool.

CHAPTER 2

THE ASSIGNED RISK PLAN OR RESIDUAL MARKET COMPONENTS

Definition of Residual Market

State laws mandate employers, henceforth called insureds or risks, to provide workers' compensation insurance. To guarantee coverage, workers' compensation has an insurance market of last resort known as a residual market. The residual market is an involuntary market for risks who are unable to purchase workers' compensation in the voluntary market. Coverage becomes difficult because of the nature of their business or loss experience. The residual market is a solution to availability and affordability problems which plague other commercial insurance lines. (Huber 1986). The workers' compensation voluntary insurance market consists of private insurance companies and competitive state funds.

The two primary mechanisms for providing a residual workers' compensation market are the state Assigned Risk Plan (ARP) and the state fund approach. The most common approach, the state ARP, is commonly referred to as the Workers' Compensation Insurance Plan ("WCIP" or "Plans").

Thirty-five states and the District of Columbia utilize the WCIP approach. The WCIPs are similar but not uniform among the states. WCIPs or ARPs require each insurer to accept a number of "bad risks" proportional to the volume of workers' compensation business transacted in the voluntary market in a given state.

The National Council on Compensation Insurance (NCCI) whose primary function is the rate-making body for the workers' compensation industry is the principal administrator of WCIPs. Table 1 outlines the breakdown of states utilizing the WCIP or ARP approach.

Table 1

**Summary of State Assigned Risk Plans or
Workers' Compensation Insurance Plans (WCIP)**

NCCI-Initiated Plans*

Alabama	Kentucky	Rhode Island
Arizona	Louisiana	South Dakota
Connecticut	Maine	South Carolina
Florida	Mississippi	Tennessee
Georgia	Missouri	Vermont
Iowa	Nebraska	Dist. of Columbia
Kansas	New Hampshire	

Statutory Plans, Administered by the NCCI

Alaska	Illinois
Arkansas	New Mexico

Independent Plans Following NCCI Plan Procedures*

Delaware	Massachusetts	North Carolina
Hawaii	Michigan	Oregon
Indiana	New Jersey	Virginia

Independent Statutory Plans

Minnesota	Texas	Wisconsin
-----------	-------	-----------

*Indicates plans reinsured by the National Pool

Source: Compiled by National Council on Compensation Insurance (NCCI)
Workers' Compensation Insurance Plans and Reinsurance Pools
-- an overview.

In 1970, NCCI sponsored the formation of the National Workers' Compensation Reinsurance Pool (NWCRP, "National Pool" or "Pool") which reinsures and administers the WCIPs

(Eisenberg & Vieweg, 1987). The concept of reinsurance is used by insurers to share equitably in the pool's gains or losses in a given year. Reinsurance shifts part or all of the insurance written by one insurer to another insurer or members of a pool (Rejda, 1986). The pool is backed by the full financial resources of the entire industry. The pool guarantees that a distressed buyer can comply with the law. The pool offers state workers' compensation insurance regulators insurance availability, quality reinsurance, and uninterrupted benefits for the injured worker (Huber 86).

State funds originated as insurers of last resort. Twelve states have competitive state funds, however three of these states also have WCIPs. Competitive state funds compete with insurance companies in the voluntary market and serve as the insurer of last resort for employers unable to obtain coverage in the voluntary market (Eisenber & Vieweg, 1987). The residual market is handled through the competitive state fund, except for the three states, Arizona, Michigan, and Oregon, where the state fund shares the "bad risks" through an ARP. Six states utilize a monopolistic state fund. A monopolistic state fund writes all the workers' compensation for the state. Table 2 outlines states utilizing competitive and monopolistic funds.

Administration of Assigned Risk Plans through NCCI

Because NCCI directly administers 24 of the 35 state ARPs and nine independent state plans follow the NCCI plan procedures, the ARP components will be examined through NCCI procedures.

Table 2

Summary of Competitive and Monopolistic Funds

Competitive State Funds

<u>Arizona</u>	Maryland	Oklahoma
California	<u>Michigan</u>	<u>Oregon</u>
Colorado	Montana	Pennsylvania
Idaho	New York	Utah

Monopolistic Funds

Nevada	Ohio	West Virginia
North Dakota	Washington	Wyoming

Note: Underlined states also have WCIPs

Source: NCCI Workers' Compensation Insurance Plans and Reinsurance Pools--an Overview.

The ARP is administered through the NCCI National Pool. Each state's ARP is independent, and gains and losses for a particular state are prorated among the workers' compensation insurers operating in that state (Gustavson & Trieschmann, 1985). Membership in the state's ARP is mandated by individual state plans. The membership in the National Pool is voluntary. The National Pool operates as a

non-profit, unincorporated association of insurers licensed to write workers' compensation. Members of the National Pool limit their liability of assigned risks by sharing costs of assigned risk's expenses, losses, and gains (Eisenber & Vieweg, 1987).

Assigned Risk Insurer's Compensation

The actual policies for employers insured by ARPs are processed by a servicing carrier. Under the ARP arrangement, the National Pool chooses between five and 12 members to act as servicing carriers in the state. The servicing carrier is allotted an administrative expense (usually 30 percent of the premium). The carrier's administrative allowance is based on total written premiums, including surcharges less the producer's fee. ARPs offer a variety of producer fee schedules for agent's commissions. Agents' commissions vary between a flat percentage approach and a graduated scale. The small number of servicing carriers streamlines assignments and simplifies management for ARPs. Each servicing carrier remits the total premiums on all risks assigned to the National Pool. The servicing carrier pays all losses and reports all claims to the National Pool. The servicing carrier is reimbursed loss payments quarterly. The Pool shares operating results (gains and losses) of the assigned risks in proportion to its participation to direct premiums written in the voluntary workers' compensation market of that state

(Eisenber & Vieweg, 1987, and Gustavson & Trieschmann, 1985). If the National Pool membership represents carriers who write 90% of the voluntary workers' compensation premium dollars in a given state, the Pool will share in 90% of the gains or losses from the ARP. The distribution of the gains and losses will be proportional to the carrier's market share in the voluntary market for that state. Carriers who are not members of the Pool are obligated to their portion of gains and losses under the ARP. The Pool is simply a reinsurance provider for insurers of workers' compensation.

Eligibility for Assigned Risk Plan

Eligibility for an assigned risk pool is made after the employer has demonstrated an inability to obtain coverage in the voluntary market. The number of rejections required for eligibility varies. Most states require two rejections, however rejection minimums range from non specific to four.

Coverage

To determine when coverage begins, states use two basic approaches. In one approach the ARP area office must receive a completed application before assignment of a servicing carrier is made. Coverage will typically bind at 12:01 a.m. on the first day following the postmark time and date on the envelope of the application. In the second approach the binding coverage goes into effect no earlier than 12:01 of the first day following receipt of the premium deposit made with the servicing carrier. This approach

produces a later effective date. Most states bind coverage with the application receipt to the ARP area office.

Coverage for Owners, Partners, and Officers

The rules governing availability of workers' compensation coverage for owners and corporate officers are different between states. Most states (78%) allow owners and partners elective coverage or coverage which may be rejected. Few states (19-22%) disallow owner/officer coverage. Table 3 outlines coverage requirements for proprietors, partners and officers by state (Gustavson & Trieschmann, 1985).

Table 3

Coverage for Proprietors, Partners and Executives

I. Proprietors and Partners

<u>Not covered but May elect coverage</u>		<u>Not covered and may not elect coverage</u>	<u>Covered but may reject</u>
Alabama	Minnesota*	Alaska	Louisiana
Arizona (prtnrs)	Mississippi	Dist. of Columbia	
Arkansas	Missouri	Iowa	
Connecticut	Nebraska	Massachusetts	
Delaware	New Hampshire	Michigan (sole prop)	
Florida	New Mexico	New Jersey	
Georgia*	North Carolina	Rhode Island	
Hawaii	Oregon	Vermont	
Illinois	South Carolina		
Indiana	South Dakota		
Kansas	Tennessee		
Kentucky	Texas*		
Maine	Virginia*		
Michigan (ptnrs & spouses)	Wisconsin		

II. Corporate Officers

<u>Covered but may reject</u>		<u>Covered and may not reject</u>	<u>Not covered but may elect</u>
Alabama	Maine*	Dist. of Columbia	Oregon
Alaska*	Michigan*	Delaware	Texas
Arizona	Mississippi	Indiana	
Arkansas	Nebraska	Massachusetts	
Connecticut	New Mexico	Minnesota*	
Florida	North Carolina	New Hampshire (if more than 3 executives)	
Georgia	Rhode Island	New Jersey	
Hawaii	South Carolina		
Illinois*	South Dakota*		
Iowa	Tennessee		
Kansas*	Vermont		
Kentucky	Virginia*		
Louisiana*	Wisconsin		

*Certain exceptions exist

Source: CPCU Journal, March 1985, p. 28.

Cancellation Notice

If an employer is no longer entitled to insurance, does not comply with reasonable safety requirements, or violates policy terms, the insurance agent must have prior knowledge of policy cancellation procedures and effective dates. Cancellation notice requirements vary between 10-day and 30-day notification periods. Servicing carriers must also give notice and reasons for cancellation to the appropriate state agency in the state in which the cancellation is to take effect (Gustavson & Trieschmann, 1985).

Size of Residual Market and Profile of Participants

Since 1984 the residual market in workers' compensation has increased six fold. White, Eisenberg, and Vieweg contend that the assigned risk population is an indicator of the inadequacy of the rates for workers' compensation coverage. The 1989 Issues Report predicts when 1988 data is finalized, the residual market will reach an all-time high of 19.3 percent of the total workers' compensation market for 1988. Table 4 recaps the residual market share from 1974 through 1988. Preliminary 1988 data in the 1989 Issues Report show total premium amounts in the residual market has grown 549 percent from 1984 through 1988. According to White, Eisenberg, and Vieweg, this signals the residual market line is in trouble and must look to pricing mechanisms to regain market sufficiency to drive the

residual market share down. The residual market is no longer serving exclusively as a market of last resort.

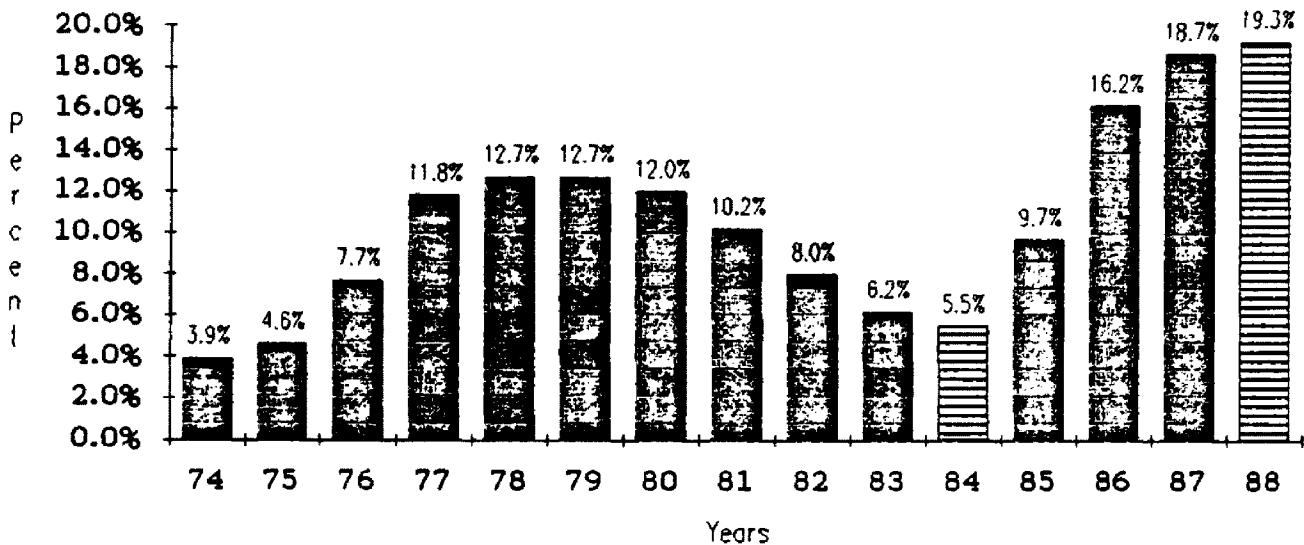
The typical profile for an insured of the ARP represents one of the three following business environments:

1) A business with a disproportionate administrative workers' compensation expense associated with small premiums. (Typical businesses include Professional & Clerical, Barber Shops.)

2) A business with high hazards associated with small premiums. (A unique business such as chemical labs, toxic waste, asbestos.)

3) A business with a high frequency of losses or accidents. (Restaurant and Nursing Homes employees have a high frequency of back related injuries (Huber, 1986.))

Table 4
RESIDUAL MARKET SHARE POOL PREMIUM AS A PERCENTAGE OF DIRECT WRITTEN PREMIUM



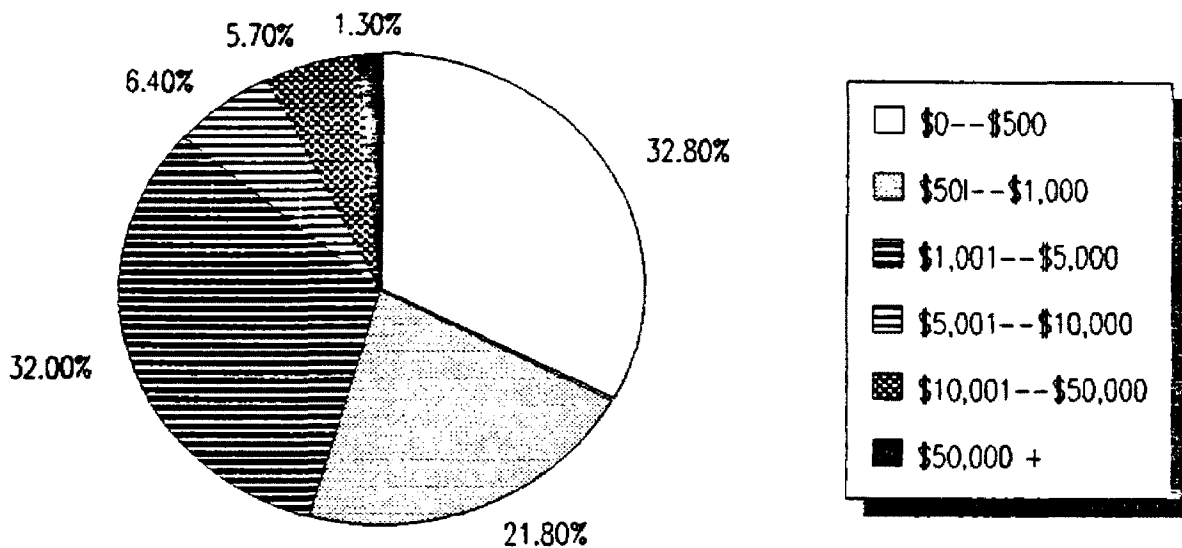
Source: NCCI Digest July 1988, Volume III, Issue II

Because there has been only modest growth in the number of employers/employees in the work environment, the huge growth in the residual market represents a massive transfer of the voluntary market to the involuntary market. The swelling ARP and Pools characterize an insurance industry effort to protect individual carriers through pooled reinsurance arrangements to limit soaring workers' compensation costs (Huber 86). Currently, the residual market is the single largest provider of workers' compensation insurance, with approximately 20% of total market (White, 1988).

The makeup of the residual market is no longer small insureds who cannot afford to purchase coverage. Two-thirds of the residual market risks have premiums of over \$500 annually. Thirteen percent of these employers pay premiums in excess of \$5,000 annually. Seventy five percent of the residual market premiums are \$5000 or more annually. Tables 5 and 6 detail the residual market makeup by number of risks in differing premium categories and premium dollars in differing premium categories. The inflow of new ARP applicants continues at an increasing rate.

Table 5

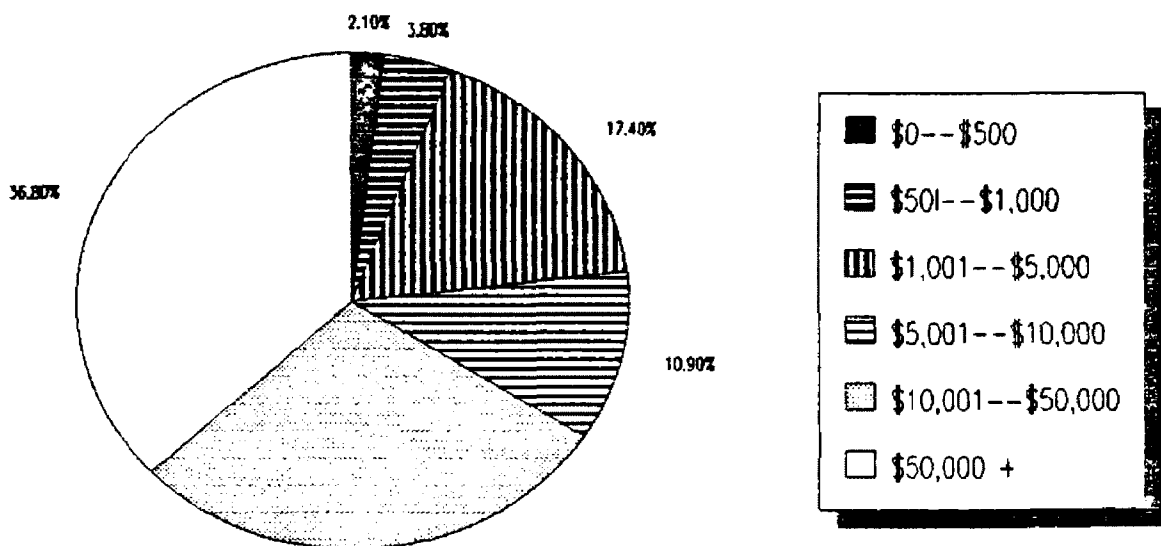
PREMIUM SIZE PROFILE--1987 DISTRIBUTION OF NUMBER OF RISKS



Source: NCCI Digest July 1988, Volume III, Issue II

Table 6

PREMIUM SIZE PROFILE--1987 DISTRIBUTION OF TOTAL PREMIUM



Source: NCCI Digest July 1988, Volume III, Issue II

Most disturbing is the growth in the residual market since 1984. In 1984 the residual market share was 5 1/2%. In 1988, four years later, few states have percentages that low (White, 1988). The national average among states for residual market is approximately 20%. Table 7 lists individual state's residual market shares which have WCIPs or ARPs.

Based on written premiums, the five largest categories of insureds in the residual market are:

7219	Trucking and Drivers
9079	Restaurant
8829	Convalescent or Nursing Home
5645	Carpentry--Detached private residence
2702	Logging or Lumbering & Drivers

(Source: Management Summary Report, 1987, p. 18)

Table 7

**Percentage of Pools' Reinsured Premiums to
NCCI-Reported Direct Workers Compensation Premiums
Written Residual Market Share**

State	1987	1986	1985	1984
Alabama	21.6%	18.4%	10.8%	5.9%
Alaska	13.9%	15.9%	8.0%	4.0%
Arizona	2.4%	2.2%	0.7%	0.3%
Arkansas	26.5%	24.4%	11.6%	3.4%
Connecticut	12.0%	9.8%	5.3%	3.4%
Delaware	6.7%	5.5%	2.7%	1.8%
District of Columbia	10.1%	9.8%	6.8%	3.6%
Florida	22.2%	17.7%	10.4%	6.2%
Georgia	19.5%	16.7%	8.3%	3.0%
Hawaii	8.9%	7.8%	5.7%	3.6%
Illinois	17.8%	17.4%	11.6%	5.3%
Indiana	22.6%	20.0%	9.9%	4.8%
Iowa	16.5%	14.5%	8.6%	2.7%
Kansas	24.5%	21.7%	12.9%	7.1%
Kentucky	20.9%	15.4%	10.7%	8.1%
Louisiana	36.5%	33.2%	16.4%	8.0%
Maine	61.1%	54.6%	30.2%	20.4%
Massachusetts	25.0%	20.4%	14.7%	10.4%
Michigan	11.7%	10.5%	6.8%	3.5%
Mississippi	25.7%	18.3%	10.5%	5.5%
Missouri	25.1%	23.9%	15.1%	7.6%
Nebraska	17.2%	16.0%	7.6%	2.7%
New Hampshire	30.3%	24.6%	14.9%	12.2%
New Jersey	9.2%	8.1%	4.0%	2.0%
New Mexico	30.2%	20.1%	7.3%	2.0%
North Carolina	15.4%	12.6%	8.1%	5.0%
Oregon	3.4%	3.6%	2.0%	0.5%
Rhode Island	44.4%	36.8%	22.8%	14.4%
South Carolina	19.2%	16.5%	8.7%	5.7%
South Dakota	25.2%	28.0%	11.0%	4.8%
Tennessee	22.2%	19.2%	11.0%	5.7%
Vermont	29.8%	26.8%	17.3%	14.8%
Virginia	11.6%	9.6%	4.8%	3.7%
Totals	18.9%	16.3%	9.7%	5.5%

Source: NCCI, Management Summary
1987

Reasons for Growth of Residual Markets

According to Huber, growth in the residual market is the consequence of inadequate rates. State regulatory agencies regulate the rate process for workers' compensation to protect against massive workers' compensation rate adjustments. Rate changes are subject to rate filings from the NCCI or other rating bureaus. Approval of rate filings must come from the state's administered pricing process. This process tends to eliminate violent swings in the product price (Huber, 1986).

Workers' compensation is in an adverse position. The cost of expected losses is hard to predict because of the uncertainty of dollar losses related to:

- 1) stress related emotional injuries
- 2) magnitude of occupational disease
- 3) erosion of exclusive remedy
- 4) ongoing liberalization of the definition of compensable injuries and diseases (Huber, 1986).

ARPs increase underwriting losses. The plans remove the problem of insurance availability (McIntyre, 1987).

Residual markets, without rate differentials from the voluntary market, do not provide incentives for employers to develop and improve the workplace or frequency of losses. Risks are not moving from the involuntary market to the voluntary market (McIntyre, 1987). The lack of movement puts the residual market in competition with the voluntary market and undermines pricing (McIntyre, 1987 and Huber, 1986). Huber noted efforts to obtain regulatory approval

for rate differential in the residual market and the voluntary market have been generally unsuccessful.

Risks in the residual market receive discounts or manual premiums prices without regard for the experience rated system. Experience rating is part of the overall workers' compensation insurance pricing program. Under an experience rated plan, the manual rate is adjusted upward or downward based on past loss experience (Rejda, 1986). Combining the experience rated system with discounts or manual premiums in the residual market renders the experience rated plan pointless (Huber, 1986).

The growth in the residual markets and National Pool is a result of rate inadequacies, a decline in interest rates, and the reluctance of carriers to assume workers' compensation risks (Eisenberg and Vieweg, 1987). Workers' compensation costs rise annually as the system is asked to compensate for more injuries because courts expand the definition of compensable injuries. Increasing medical costs account for 40% of the claim dollar (Cain, 1987). The state of Maine exemplifies a high benefit system with inadequate rates. Eighty-five percent of the employers in Maine purchase insurance from the ARP. Maine has the highest residual market share in the United States (Cain, 1987). The 1988 NCCI data for Maine shows more than 80% of the workers' compensation premium dollars are written in the residual market.

Residual Market Costs

Workers' compensation insurance rates are based on insurers' total underwriting experience, including ARPs. Total premiums are expected to be adequate to cover all losses in the voluntary and involuntary markets (McIntyre, 1987). The 1987 residual market burden is at 12%. For every dollar written in the voluntary market twelve cents goes to assist the residual market operating loss. This residual market burden has increased from 3.7% in 1979 to 7% in 1984 to the recent high of 12% in 1987 (White, 1988). The 1989 NCCI Issues Report documents operating losses in the residual market in excess of \$4.4 billion for the years 1984 through 1988. These losses must be borne by the voluntary market.

The residual market burden varies by state. The burden (percentage support of the voluntary market premiums) ranges from more than 20% in Maine, Rhode Island, and Louisiana to less than 10% in Oregon, Arizona, and Delaware (White, 1988). Insurers pass the cost of the residual market losses onto other policyholders in the voluntary market in the form of higher premiums. The large increase in the WCIPs or ARPs results in increased losses and uncollected accounts. These losses are transferred to the voluntary market. The residual market rate is effectively the maximum price rate in the voluntary market. If assigned risk rates are set too low, the voluntary market will never cover the cost of

benefits under workers' compensation programs (Eisenberg and Vieweg, 1987 and McIntyre, 1987).

Kevin M. Ryan, President of NCCI in New York does not see workers' compensation insurance as a profitable line in the near future. He feels loss reserves are understated and rates are inadequate. Until workers' compensation becomes profitable, new insurers will not enter the market to write the line and ARP will continue to grow, thus increasing the residual market burden (McIntyre, 1987). Workers' compensation is becoming crippled with a shrinking number of insurance carriers willing to write workers' compensation. Many carriers stay in the workers' compensation line because of national accounts which demand broad based insurance coverage of many lines, workers' compensation being one of the lines. A withdrawal of workers' compensation may risk the loss of a national account. Insurance companies continue writing unprofitable workers' compensation to be competitive as a multi-line insurance provider (Cain, 1986).

Insurance companies demonstrate good business behavior by extending coverage only to profitable risks. Viability of both the voluntary and residual markets become threatened due to rate inadequacy. Competitive pressures force insurers out of the workers' compensation line of business and out of states which do not provide adequate returns (Eisenberg and Vieweg, 1987). Subsidizing the residual market through the voluntary market will only add to the

decay of the workers' compensation line of business (Huber, 1986).

Control Mechanisms for Residual Markets

The strength of the residual market mechanism rests in its ability to adjust to the volatile voluntary market. The mechanism can work only if rate adequacy is achieved and if there is a restoration of rate differentials. The rate differentials must reflect the residual character of the business and remove the ARP from competition with the voluntary market (Huber, 1986).

A number of states are attempting to obtain regulatory approval for rate differentials between the voluntary and residual markets. Some states want to change the rating system used by ARPs. The changes would provide incentives for the insureds in the residual market to aggressively pursue loss control efforts to secure coverage in the voluntary market (Eisenber and Vieweg, 1987 and White, 1988). Changes suggested include: 1) use of a surcharge on premiums based on ARP experience, 2) removal of premium discounts offered to larger premium assigned risks and 3) establishing retrospective rated plans (Eisenber and Vieweg, 1987, McIntyre, 1987 and White, 1988). Under a retrospective rating plan, the insured's loss experience during a current policy period determines the actual premium to be paid for the period. The insured is charged a minimum or maximum premium. If actual losses are small, a minimum

premium is paid; if losses are large, maximum premium is paid (Rejda, 1986).

According to Zinkewicz, six states subjected their residual market to large premium increases in 1987 and expect to see a decline in their assigned risk population. Residual market premium increases include:

Oregon:	464%	Illinois:	213%
New Mexico:	350%	Arizona:	178%
Georgia:	263%	Iowa:	243%

Individual state residual market share percentages are shown for 1985 through 1987 in Table 7.

Summary of Residual Market Literature

Information regarding the residual market of workers' compensation is generated primarily from one source. The source is the National Council of Compensation Insurance (NCCI), the primary rate setting association for workers' compensation insurance.

Availability of workers' compensation insurance is guaranteed by either a workers' compensation insurance plan (WCIP)/Assigned Risk Plan or a state fund approach. NCCI manages or administers 67% of the 36 ARPs and another 25% of the ARPs are modeled after NCCI plans. The current literature available regarding workers' compensation residual markets is either published by NCCI, or authors have referenced sources from NCCI.

The residual market documented by ARP states has been growing since 1984 at a rapid rate. The residual market is

presently the largest insurer of workers' compensation and represents approximately 20% of the premium dollars written in ARP states. In 1984 the residual market share represented 5.5% of the total premium dollars written in ARP states. Literature was unavailable to document the state fund residual market mechanism. Concern for the workers' compensation industry centers on rate inadequacy and the burden the rate inadequacy creates. Both the voluntary market and the insurance companies have been absorbing the high costs of the residual market.

Rate differentials have been proposed and enacted by some states in an attempt to shift the burden of "poor experience" onto the risks responsible for the losses. Rate differentials encourage residual market risks, through higher premiums, to enact and control loss experiences to qualify for insurance in the voluntary market. Rate differentials will eliminate competition with the voluntary market. Huber contends the short-term remedy for availability of competitive private insurers must consist of rate increases. Affordability may be sacrificed. Huber suggests the long-term remedies for the troubled industry include limitations on attorneys' fees, coverage amounts, exposures, coverage interpretations, policy aggregates, and loss reporting.

CHAPTER III
DATA COLLECTION AND FINAL MODEL

Data Collection

The National Council on Compensation Insurance (NCCI) is the rate-making body for the workers' compensation for individual states and the primary administrator of Assigned Risk Plans (ARPs). NCCI administers 24 of the 35 state ARPs, and 9 other states follow NCCI plan procedures. Thus, NCCI became the major supplier of information for the statistical model.

Analysis of competitive state fund states which did not have an ARP was also attempted. California, New York, and Pennsylvania were contacted to obtain information similar to data requested with the APR states administered by NCCI. These state compensation funds and rating bureaus were helpful; however, it became impossible to quantify an involuntary or residual market (RM) in those states due to the basic characteristic of a state fund. This characteristic, being an insurer of last resort, provides no mechanism for tracking businesses who have had insurance refused in the private sector.

NCCI provided secondary data from published reports and computerized data banks. The statistical model was built using 1988 NCCI data.

Variable Selection

Review of the published material from NCCI revealed the following factors expected to affect the size of the ARP market or residual market.

<u>Variable Name</u>	<u>Variable Definition</u>
# of risks in RM	The number of employers (risks) which make up the residual market or involuntary market.
Prem. \$/Rate 9079	The premium dollars and manual rates per hundred for the 1988 governing class code 9079 restaurant for the residual market.
Prem. \$/Rate 7219	The premium dollars and manual rates per hundred for the 1988 governing class code 7219 trucking for the residual market.
Prem. \$/Rate 8829	The premium dollars and manual rates per hundred for the 1988 governing class code 8829 nursing home for the residual market
Prem. \$/Rate 5645	The premium dollars and manual rates per hundred for the 1988 governing class code 5645 carpentry for the residual market.
Prem. \$/Rate 8833	The premium dollars and manual rates per hundred for the 1988 governing class code 8833 hospital for the residual market.
Prem. \$/Rate 2702	The premium dollars and manual rates per hundred for the 1988

	governing class code 2702 logging for the residual market.
Surcharge	The rate differentials in the ARP states.
Inc. C.C. Prem.	The class codes which showed significant premium dollar changes in the residual market.
# of Carriers	The number of insurance carriers writing workers compensation in assigned risk states.
# of Servicing Carriers	The number of servicing carriers used to write insurance for the state ARP.
Loss Ratio	The ratio of premiums written to incurred losses in the residual market for assigned risk states.
Change in risks	The change in the number of risks in the residual market from 1987 to 1988 in assigned risk states.
Underwriting +/-	The amount of underwriting gain (loss) in the residual market of ARP states.

The variables were selected because:

1) # of risks in the residual market - The research literature documented a growth in the residual market by the premium "size of businesses" who comprise the RM. In 1987 over 45% of the RM for assigned risk states was comprised of businesses with yearly premiums over \$1000. Residual market risks are no longer just the small business owner.

2) Premium \$/Rate - This represents the six major class codes in the RM of ARP states. These class codes of restaurant, trucking, nursing home, carpentry, hospital, and logging represent significant industries in Montana. These variables were tested using both total premiums in the RM and the premium rates per hundred.

3) Surcharge - The research literature found that escalating market premiums were resulting because of lack of rate differentials. Without rate differentials there is no incentive for the risks to move from the involuntary or RM to the voluntary market.

4) Increase in Class Code Premiums - This variable was considered because state agencies regulate class code premiums. It was hypothesized that class codes which showed significant premium dollar changes were potential class codes with rates which were too low. The assumption was, the maximum rate increase requested by the rating bureau is never adopted by the regulatory agency.

5) # of Carriers - This variable appeared relevant to investigate if greater numbers of insurance providers affect the size of the residual market.

6) # of Servicing Carriers - This variable was considered because of the relatively few insurance carriers writing significant premium levels of workers' compensation insurance in Montana. Most ARP states have hundreds of carriers with six or fewer designated as servicing carriers. Would all major carriers have to be servicing carriers and would the carriers agree to this?

7) Loss Ratio - This ratio tests to see if the size of the RM is related to the profitability of this market.

8) Change in risks - This variable looks at the percentage change in number of risks in the RM from one year to the next. The literature suggests that it is difficult for firms to move from the RM to the voluntary market.

(9) Underwriting +/- - The variable was similar to the loss ratio but the dollar +/- figure gave an absolute specific cost figure.

The Model

The size of the residual market in Montana was examined by: 1) first estimating the relationship between the RM and the above factors in 31 states with existing ARPs and 2) then assuming this same relationship exists in Montana.

The relationship was estimated using regression analysis. The relative size of the residual market is the dependent variable, the phenomenon to be explained. The factors or independent variables explain the size of the RM. Regression analysis is used to derive the exact equation between the independent and dependent variables. The final form of this regression model was determined using a backward step procedure. That is, the initial nine independent variables described and detailed in Table 10 were reduced to four by sequentially eliminating the variable with the least statistical significance.

The backward step regression procedure is illustrated in Table 8. The variable with the least statistical significance (the lowest "t" statistic) is eliminated at each step, and the regression is recalculated. High "t" statistics are associated with independent variables which make a significant contribution to the model. The backward step procedure chooses the subset of independent variable that can "explain" most of the variation in the dependent variable. The final model is shown in step 6; it contains four independent variables, each significant at the .10 level ("t" statistic). The final model has two very significant independent variables contributing to the prediction of the size of the residual market. They are hospital class code rates ($t = -2.86$) and underwriting gain/loss ($t = -4.21$). The "t" statistics for logging class

codes and percentage of increase/decrease in risks are slightly lower, at 1.8 and 1.6 respectively. The backward step procedure reduced the number of independent variables from nine to four with less than a .05 reduction in the R^2 (.532 - .486 = .46).

Table 8

Backward Step Regression Process for Final Model

Elimination of Lowest T Statistic

<u>Variable</u>	<u>Step 1 T-Stat</u>	<u>Step 2 T-Stat</u>	<u>Step 3 T-Stat</u>	<u>Step 4 T-Stat</u>	<u>Step 5 T-Stat</u>	<u>Step 6 T-Stat</u>
Restrnt	-0.32*					
Truck	0.72	0.78	0.64*			
Nur.Home	0.85	0.80	0.80	0.92*		
Carpentry	-1.24	-1.41	-1.35	-1.23	-0.83*	
Hospital	-1.18	-1.44	-1.44	-1.32	-1.15	-2.86
Logging	1.85	1.87	1.97	2.06	1.85	1.83
+/-Risks	1.37	1.52	1.48	1.41	1.28	1.63
Surcharge	-0.37	-0.48*				
+/- Undrwrtg	-3.65	-3.97	-4.01	-4.11	-4.16	-4.21
R^2 per step	.532	.529	.525	.516	.499	.486

*Variable being eliminated

The regression coefficients for the final model are detailed in Exhibit 9. Beneath each regression coefficient is the standard error and the "t" ratio.

Table 9

Estimated Regression Coefficients for the Final Model

<u>Constant</u>	<u>Hospital</u>	<u>Logging</u>	<u>Inc/Dec Risks</u>	<u>Undr G/L</u>	<u>R² Sqrd</u>
.194	-0.0988	0.0022	0.4750	-.14x10	.4856
(.116)	(.0346)	(.0012)	(.2907)	(.0000)	
	-2.8578	1.8308	1.6339	-4.2094	

Note: Below each coefficient is the standard error and "t" ratio.

The regression coefficient is the change in the dependent variable associated with a one unit change in the independent variable. The sign of the coefficient indicates a positive (direct) or negative (inverse) relationship between the independent and dependent variable.

The final model has three of the four independent variables with hypothesized coefficient signs. Signs which denoted the appropriate relationship between the independent variable and the dependent variable. Logging (+) positive coefficient implies that high manual rates are associated with larger RM premium dollars. The underwriting (-) negative coefficient sign implies that significant losses in the RM are also associated with larger increases to the size of the RM. The percentage of risks increase/decrease (+) coefficient sign means, as the number of risks entering the RM increases, so does the share of the RM. The hospital

independent variable coefficient sign was negative. This suggests that higher rates for this category were associated with smaller values for the size of the RM. The hospital class code negative coefficient gave evidence to multicollinearity in the model, a sign that correlation does exist between the independent variables.

CHAPTER IV
IMPLICATIONS, CONCERNS AND SUMMARY

Implications of Model Results for Montana

The statistical model produced four variables which explained 49% of the variation in the RM of 31 Assigned Risk Plan (ARP) states. The model is a tool to aid in the understanding of factors which can significantly influence the size of a residual market. Two of the four variables, hospital and logging manual rates per hundred, are of special consequence to Montana. Logging and hospitals represent two major industries in Montana. It is important to note that logging rates in Montana may have been held down by past lobbying efforts at the legislative level by the logging industry.

Inadequate rates cause continued losses. The residual market grows by the inability of businesses to purchase insurance in the voluntary market. Inadequate minimum premiums cause businesses to be routinely serviced through ARPs. The residual market grows by the inability of the risks in the ARP to exit to the voluntary workers' compensation market. The model denotes the significance of

inadequate rates by the variable underwriting losses. Significant losses in the residual market are associated with larger increases to the size of the residual market when applied to the model. Literature suggests that ARPs must apply rate differentials in the form of surcharges which are an additional 10-50% above the manual rate. Rate differentials are necessary to motivate risks to move from the residual market to the voluntary market by improved loss control measures. The variable which measures increase or decrease in percentage change of risks in the residual market verifies the significance of ARP risks being able to move to the voluntary market. The model denotes as more risks enter the residual market, the size of the residual market grows by the new entrants and the inability of existing risks to leave.

Concerns and Summary

How big will the assigned risk category be for Montana in terms of total premium dollars? The model can be used to predict the size of the RM if the four independent variables are defined for Montana. The rate per hundred for the governing class codes of logging and hospitals are easily obtained. The last two variables require a definition of premium dollar gains/losses and number of risks in Montana's RM. Because the last two independent variables require assumptions, it becomes difficult to use the model as a predictor of potential RM size for an ARP.

The model is an excellent assessment of variables which have significant impact on the movement or size of the RM. The statistical model, using four independent variables, explained 49% of the movement or size of the RM in the 31 ARP states. In this capacity, the model justifies attention to rates in the hospital and logging industry. The model warrants attention to the underwriting experience of the RM and the number of risks in the RM. These two independent variables, underwriting experience and number of risks, support the concerns in the RM literature for adequate rate differentials to encourage businesses to exit the RM through improved loss control measures. In conclusion, the model defines four independent variables or areas for concern that are worthy of attention in Montana.

The ARP mechanism must be carefully evaluated for its intent. If the purpose is to spread the "poor risks" because of rate inadequacy and liberal state statutes, then the problem has not been solved but simply passed to all insurers of workers compensation and thus passed to all insureds in the voluntary market. If the intent is to subsidize affordability and guarantee availability of workers' compensation through a mechanism which impacts all workers' compensation carriers and risks, the ARP represents an excellent vehicle. However, is the price of affordability and availability giving the employee a safe working environment? Workers' compensation insurance was

created to guarantee employee's medical and wage loss benefits in exchange for protection against employer liability and tort. Insurance premiums were to act as the motivator for safe working environments. A question for further study should be "What are the motivators for business to provide safe work environments?"

TABLE 10
Multiple Regression Model

ARP States	Res. Mrk. 1988	9079 Rstnt	7219 Truck	8829 Nurs.Hm.	5645 Carpentry	8833 Hospital	2702 Logging	Underwriting Gain/Loss 1988	% Inc/De No. Risk	Sur-Charge States
Alabama	22.4%	3.45	10.38	5.27	10.99	1.37	27.93	(\$37,725,128)	3.87%	0
Alaska	15.1%	4.69	20.02	8.33	17.16	2.19	45.58	\$5,661,854	15.10%	1
Arizona	1.7%	4.22	13.97	9.04	16.37	2.95	19.60	(\$1,907,647)	28.27%	1
Arkansas	22.5%	2.54	11.00	4.80	10.19	1.29	37.12	(\$19,459,540)	1.35%	0
Conncticut	11.1%	2.56	11.73	5.71	9.35	1.47	41.01	(\$22,073,997)	10.85%	0
Dist. of Col.	9.7%	3.06	15.13	4.88	11.95	1.57	66.72	(\$862,599)	-2.52%	1
Florida	21.0%	5.84	17.43	9.46	18.56	2.85	20.81	(\$228,703,669)	7.40%	1
Georgia	16.2%	4.46	9.70	6.87	12.96	1.40	29.19	(\$50,908,983)	-2.86%	1
Hawaii	9.5%	4.59	16.68	6.20	21.01	3.42	129.41	\$721,706	8.20%	0
Illinois	15.2%	2.96	13.57	4.62	11.36	1.24	30.32	(\$67,703,746)	6.99%	1
Indiana	20.3%	1.41	4.16	2.18	5.03	0.34	13.30	(\$28,486,333)	6.07%	0
Iowa	17.2%	1.78	9.87	2.99	6.71	0.74	28.43	(\$19,155,760)	9.41%	1
Kansas	21.7%	2.22	9.33	3.28	9.08	0.91	19.37	(\$13,061,771)	-3.93%	0
Kentucky	21.1%	2.56	11.73	5.71	9.35	1.47	41.01	(\$2,458,648)	3.51%	1
Louisiana	43.3%	4.04	10.65	6.27	9.93	1.05	42.29	(\$201,803,701)	9.85%	1
Maine	82.2%	2.38	12.43	4.05	8.63	1.22	35.52	(\$181,834,283)	11.29%	1
Massachusetts	29.5%	3.17	11.60	4.99	12.98	2.00	29.98	(\$220,717,169)	13.78%	0
Mississippi	28.2%	3.00	8.47	4.15	8.16	0.94	30.50	(\$28,288,484)	9.18%	0
Missouri	25.2%	2.73	9.14	4.06	6.38	1.12	27.73	(\$42,546,564)	5.14%	0
Nebraska	17.9%	1.50	6.60	2.44	5.77	0.74	14.48	(\$10,794,828)	17.47%	1
New Hampshi	26.4%	2.02	12.55	4.87	10.48	1.41	29.23	(\$10,104,285)	5.96%	0
New Jersey	9.6%	2.86	9.03	3.57	7.08	1.47	25.22	(\$29,942,370)	-3.88%	0
New Mexico	31.1%	4.78	16.53	5.61	14.37	2.59	41.88	(\$39,174,428)	15.43%	1
North Carolina	16.2%	1.79	6.06	2.26	6.00	0.79	17.08	(\$19,234,867)	1.94%	1
Oregon	3.3%	6.83	23.46	16.78	32.07	2.77	44.49	(\$8,904,952)	-3.26%	0
Rhode Island	51.5%	3.34	8.41	5.28	10.63	1.71	62.83	(\$62,393,234)	20.46%	0
South Carolin	20.8%	2.50	8.61	2.97	14.24	0.89	46.12	(\$21,669,977)	13.84%	0
South Dakota	27.4%	1.89	10.17	3.37	7.07	0.94	30.32	(\$5,645,834)	8.19%	1
Tennessee	23.3%	2.77	5.49	5.57	8.37	1.00	26.22	(\$42,106,608)	6.04%	0
Vermont	27.4%	1.87	6.10	4.05	7.52	1.55	19.23	(\$1,974,943)	12.18%	0
Virginia	12.4%	1.86	7.00	2.44	7.17	0.68	18.63	(\$20,280,415)	14.75%	0
Regression Output:										
Constant		0.185992								
Std Err of Y Est		0.123498								
R Squared		0.532137								
No. of Observations		31								
Degrees of Freedom		21								
X Coefficient(s)		Restrnt.	Trucking	Nurs.Hm	Carpentry	Hospital	Logging	Underwriting	Risks +/-	Surcharge
Std Err of Coef.		0.01680	0.009131	0.019833	-0.01674	-0.07971	0.002740	-0.000000014	0.477794	-0.02069
T Statistic		-0.32	0.72	0.85	-1.24	-1.18	1.85	-3.65	1.37	-0.37

TABLE 11
Optimum Model
Multiple Regression Model

ARP States	1988	8833 Hospital	2702 Logging	%Inc/Dc No.Risk	Underwriting Gain/Loss 1988
Alabama	22.4%	1.37	27.93	3.87%	(\$37,725,128)
Alaska	15.1%	2.19	45.58	15.10%	\$5,661,854
Arizona	1.7%	2.95	19.60	28.27%	(\$1,907,647)
Arkansas	22.5%	1.29	37.12	1.35%	(\$19,459,540)
Conneticut	11.1%	1.47	41.01	10.85%	(\$22,073,997)
Dist. of Col.	9.7%	1.57	66.72	-2.52%	(\$862,599)
Florida	21.0%	2.85	20.81	7.40%	(\$228,703,669)
Georgia	16.2%	1.40	29.19	-2.86%	(\$50,908,983)
Hawaii	9.5%	3.42	129.41	8.20%	\$721,706
Illinois	15.2%	1.24	30.32	6.99%	(\$67,703,746)
Indiana	20.3%	0.34	13.30	6.07%	(\$28,486,333)
Iowa	17.2%	0.74	28.43	9.41%	(\$19,155,760)
Kansas	21.7%	0.91	19.37	-3.93%	(\$13,061,771)
Kentucky	21.1%	1.47	41.01	3.51%	(\$2,458,648)
Louisiana	43.3%	1.05	42.29	9.85%	(\$201,803,701)
Maine	82.2%	1.22	35.52	11.29%	(\$181,834,283)
Massachusetts	29.5%	2.00	29.98	13.78%	(\$220,717,169)
Mississippi	28.2%	0.94	30.50	9.18%	(\$28,288,484)
Missouri	25.2%	1.12	27.73	5.14%	(\$42,546,564)
Nebraska	17.9%	0.74	14.48	17.47%	(\$10,794,828)
New Hampshire	26.4%	1.41	29.23	5.96%	(\$10,104,285)
New Jersey	9.6%	1.47	25.22	-3.88%	(\$29,942,370)
New Mexico	31.1%	2.59	41.88	15.43%	(\$39,174,428)
North Carolina	16.2%	0.79	17.08	1.94%	(\$19,234,867)
Oregon	3.3%	2.77	44.49	-3.26%	(\$8,904,952)
Rhode Island	51.5%	1.71	62.83	20.46%	(\$62,393,234)
South Carolina	20.8%	0.89	46.12	13.84%	(\$21,669,977)
South Dakota	27.4%	0.94	30.32	8.19%	(\$5,645,834)
Tennessee	23.3%	1.00	26.22	6.04%	(\$42,106,608)
Vermont	27.4%	1.55	19.23	12.18%	(\$1,974,943)
Virginia	12.4%	0.68	18.63	14.75%	(\$20,280,415)

Regression Output:

Constant			0.194033		
Std Err of Y Est			0.116382		
R Squared			0.485576		
No. of Observations			31		
Degrees of Freedom			26		
X Coefficient(s)	Hospital	Logging	Risks +/-	Underwriting	
Std Err of Coef.	-0.09878	0.002164	0.47504839	-0.0000000014	
T Statistic	0.03456513	0.001182	0.29073445	0.0000000003	
	-2.8578714	1.830813	1.63395974	-4.2093819752	

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