The Distribution Side of Insurance Markets

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Outline

Household Financial Investment in China

Figure: Chinese Household Financial Investment in 2018

- Aggregate Chinese household financial investment was 140T RMB
- Bank deposits accounted for 52%, wealth management products 15%
- Stocks, fixed income products and mutual funds: 15-20%
- Life insurance and annuities: 10%

Insurance Markets

- Households search from a large menu of financial products including the insurances
  - relying on the advice of intermediaries
- Interactions between households and their advisors (financial intermediaries) may not act in the best interest of their clients.
  - price/fee: higher sales commissions (Hortacsu and Syverson, 2004)
  - investors have ex-ante preferences on the type of products: search cost story
- Would sales or distribution channels affect the **types** of financial products acquired by households?
  - investors may not have ex-ante preferences on the type of products: welfare impact
  - annuity v.s. life insurance: duration and mortality investment (delta)

Our Empirical Setting

- Main challenges with this question
  - pin down the fair price of each product
  - solve a difficult matching problem between households and products to establish causality.
- We exploit a unique dataset provided by one of the largest life insurers in China that includes
  - a 10% random sample of all contracts signed in 9 large cities in China for the period 2009-2016
  - observe the contractual documents
  - policy details – product types, contract length, etc.
  - investor characteristics – age, gender, income, etc.
  - sales channels – bank branches or personal agents (other distribution channels are negligible)

Growth of Annuity Sales

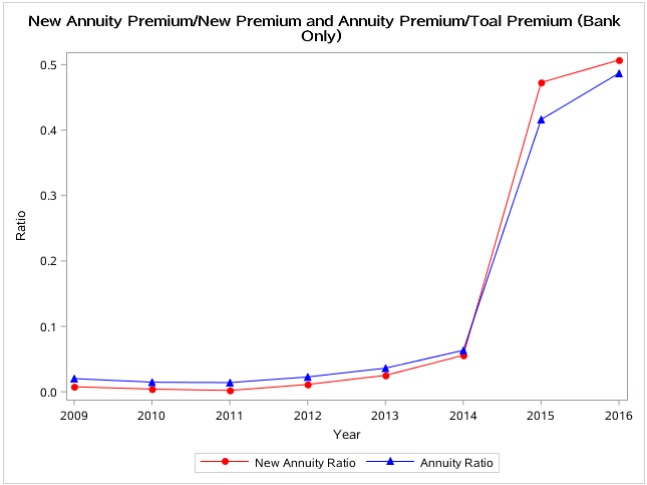

Figure: Growth of Annuity Sales through Bank Branches

Our Identification Strategy

- China insurance firms used to engage much in short-term financing
  - CBRC issued a new mandate to regulate the bank sales channel - to reduce short-term financing by the insurance sector
- The regulatory reform in China
  - in Q1 2014, stricter restrictions on the bank channel
  - bank-insurance sales channel to focus on long-term products, which include health, accident and long-term life and annuities
  - specifically, 20% or more of the quarterly premium must be coming from 'qualified' long-term insurance products
  - constraint binding at the quarter-bank-province level
- We use our granular data around the regulation change to study the strategic behavior of the distribution channel

Time-Series Impact of the Regulation Change

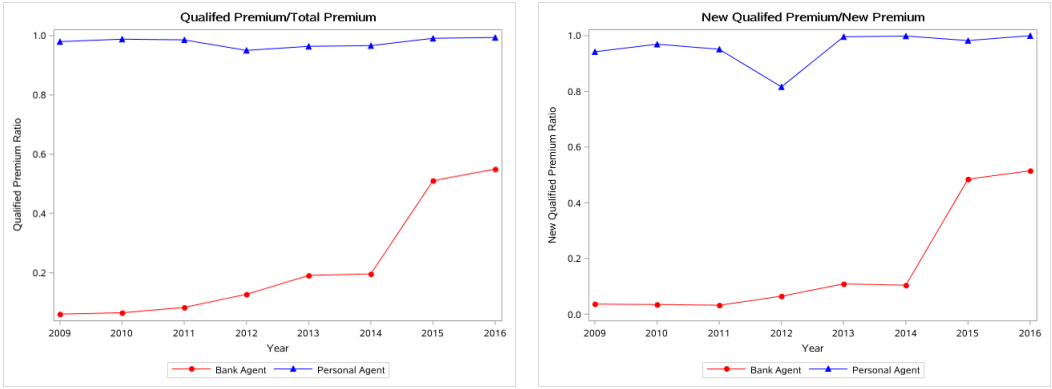

Figure: Qualified Ratio of Different Sales Channels

Time-Series Impact of the Regulation Change

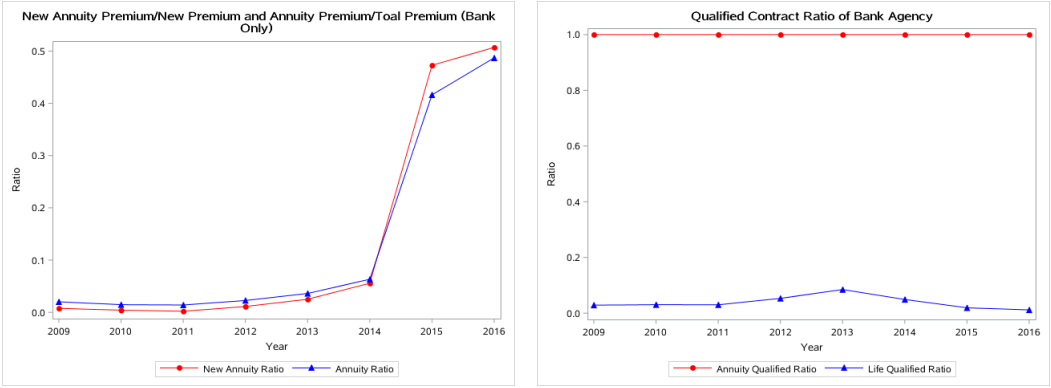

Figure: Composition of Insurance Products Sold by Bank Agents

Outline

Our Sample

- A 10% random sample of all insurance policies sold in 9 cities
  - Beijing, Shanghai, Guangzhou, Chengdu, Nanjing, Wuhan, Lanzhou, Zhengzhou, and Shenyang
  - the total insurance premium in our sample was over 3B RMB in 2016
- We observe detailed information on
  - policy types: life insurance (mostly are short-term, $<$ 5yrs); annuities (virtually all are long-term, $>$ 10yrs)
  - contract duration, payment information (both pay-ins and pay-outs), and lapsation dates (if any)
  - policy holders' demographic characteristics, including age, gender and annual income
  - sales channels: bank branch ID, personal agent ID

Summary Statistics

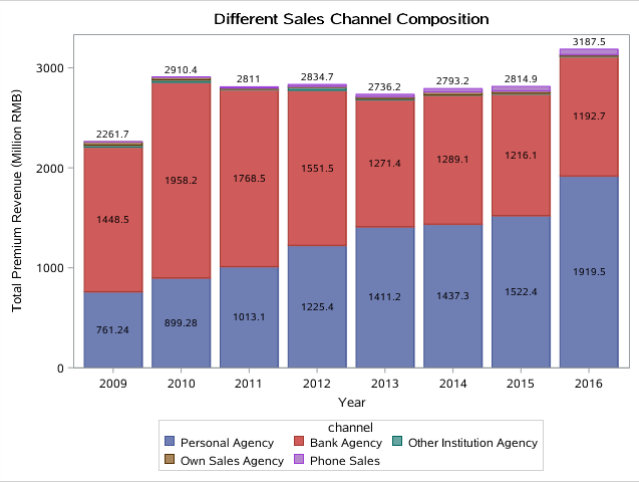

Figure: Premia from Different Sales Channels

Summary Statistics

Table 1: Summary Statistics

(a) All Salesman (Branch) ID-Month Obs

Year	N	Contracts	Total	New	Annuity	Life
2009	129928	102357	2.165	1.657	0.380	0.371
2010	167979	155808	2.806	2.127	0.401	0.494
2011	176301	68576	2.650	1.630	0.412	0.533
2012	187554	65846	2.667	1.349	0.531	0.597
2013	189814	53837	2.457	1.037	0.567	0.757
2014	196789	64381	2.610	1.229	0.653	0.716
2015	207858	61752	2.637	1.358	1.277	0.556
2016	236691	87179	3.020	1.542	1.781	0.466

(b) Branch ID-Month Obs. (Bank Agency)

Variable	Obs	Mean	Std. Dev.	p5	Median	p95
Ln(Total New Premium+1)	96567	10.38	1.63	8.01	10.46	12.64
Ln(Annuity New Premium+1)	96567	0.82	2.82	0.00	0.00	9.89
Ln(Life New Premium+1)	96567	9.56	3.30	0.00	10.31	12.61
Lapsation Rate	96567	0.01	0.09	0.00	0.00	0.00

(c) Contract-Month Obs. (Bank Agency)

Variable	Obs	Mean	Std. Dev.	p5	Median	p95
Markup	146310	1.09	0.12	0.94	1.09	1.22
Residual Markup	146310	0.00	0.04	-0.06	0.00	0.05
Male Ratio	146310	0.38	0.49	0.00	0.00	1.00
Buyer Age	146310	48.72	13.56	26.00	49.00	70.00
Ln(Buyer Income+1)	146310	10.94	0.58	10.31	10.82	11.92
Delta/Value	141513	0.18	0.20	0.04	0.10	0.56

Identification Strategy

- Regulatory constraint is binding at the bank-quarter-province level
  - observe sales by each bank branch (and personal agent) with anonymous IDs
  - do not have information on the bank identity (e.g., CCB)
- We argue that each branch has a target qualified ratio
  - proxied by their average qualified ratio in the previous year
  - if a branch is below its historical average in the first two months of a quarter, it has a strong incentive to make up for the shortfall in the third month
  - if above the historical average, no incentive to change behavior

Identification Strategy

$$
\begin{aligned}
y_{i,t} &= \beta_1 D_{QR^{L2}_{i,t} < C_{i,t}} \times (QR^{L2}_{i,t} - C_{i,t}) \\
&+ \beta_2 D_{2014} \times D_{QR^{L2}_{i,t} < C_{i,t}} \times (QR^{L2}_{i,t} - C_{i,t}) \\
&+ \sum \gamma_{1t} \times (QR^{L2}_{i,t} - C_{i,t}) + \sum \gamma_{2t} \times D_{QR^{L2}_{i,t} < C_{i,t}} \\
&+ \theta_t + \eta_i + \epsilon_{i,t}
\end{aligned}
$$

- $QR^{L2}_{i,t}$: qualified ratio in the previous two months
- $C_{i,t}$: branch-specific threshold – the average qualified ratio in the previous four quarters
- D_{2014}: a dummy for the post-2014 period

Identification Strategy

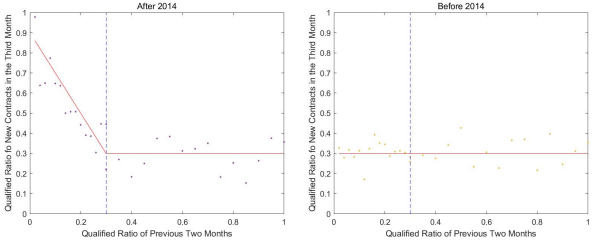

Figure: Conceptual Framework After and Before 2014

- We are testing for a kink in the response function
- $\beta_1 \approx 0$ and $\beta_2 < 0$, for quarter end months (event sample)
- Both β_1 and β_2 are zero for non-quarter-end months (placebo sample)

Outline

Premium from New Contracts

Table 2: New Contracts

(a) Dependent Variable:Qualified Ratio from New contracts - Last Four Qtrs' New Ratio

	Sample Months	Placebo Months	Diff.
β_1	0.082	-0.172	0.254
	(0.48)	(-1.47)	(1.25)
β_2	**-0.528****	**0.206**	**-0.735*****
	(-2.42)	**(1.20)**	**(-2.71)**
Obs.	6117	14740	20857
R^2	0.43	0.337	0.368

(b) Dependent Variable: (New Qualified Life/Total New Premium) - New Qualified Life Ratio Cutoff

	Sample Months	Placebo Months	Diff.
β_1	-0.019	-0.084	0.066
	(-0.12)	(-0.70)	(0.35)
β_2	**0.174**	**0.175**	**-0.001**
	(0.81)	**(1.19)**	**(-0.01)**
Obs.	5807	14425	20232
R^2	0.362	0.314	0.329

(c) Dependent Variable: (New Qualified Annuity/Total New Premium) - New Qualified Annuity Ratio Cutoff

	Sample Months	Placebo Months	Diff.
β_1	0.07	-0.062	0.133
	(0.66)	(-1.07)	(1.17)
β_2	**-0.700*****	**0.011**	**-0.711*****
	(-4.17)	**(0.09)**	**(-3.56)**
Obs.	5807	14425	20232
R^2	0.483	0.343	0.393

Premium from All Contracts (New and Existing)

Table 3: All Contracts

(a) Dependent Variable:Qualified Ratio - Last Four Qtrs' Ratio

	Sample Months	Placebo Months	Diff.
β_1	0.086	-0.061	0.147
	(0.92)	(-0.80)	(1.24)
β_2	**-0.520*** **	**-0.065**	**-0.455*** **
	(-4.28)	**(-0.58)**	**(-2.79)**
Obs.	15075	31923	46998
R^2	0.453	0.317	0.362

(b) Dependent Variable: (Qualified Life/Total Premium) - Qualified Life Ratio Cutoff

	Sample Months	Placebo Months	Diff.
β_1	0.075	-0.017	0.091
	(0.87)	(-0.21)	(0.79)
β_2	**-0.238***	**-0.09**	**-0.148**
	(-2.01)	**(-0.85)**	**(-0.95)**
Obs.	14688	31629	46317
R^2	0.373	0.265	0.3

(c) Dependent Variable: (Qualified Annuity/Total Premium) - Qualified Annuity Ratio Cutoff

	Sample Months	Placebo Months	Diff.
β_1	-0.011	-0.058	0.047
	(-0.21)	(-1.19)	(0.67)
β_2	**-0.286*** **	**0.043**	**-0.329*** **
	(-4.80)	**(0.60)**	**(-3.64)**
Obs.	14688	31629	46317
R^2	0.336	0.249	0.279

Payments on Existing Policies

- Bank branches can also achieve a higher qualified ratio by manipulating ongoing payments from existing policies
- For example, to delay payments from unqualified policies

Table 5: Cosmetic Change in Old Contracts

	Sample Months	Placebo Months	Diff.
β_1	0.238*	0.224***	0.014
	(1.78)	(3.01)	(0.09)
β_2	**-0.440****	**-0.153**	**-0.287**
	(-2.74)	**(-1.38)**	**(-1.47)**
Obs.	5615	11762	17377
R^2	0.355	0.241	0.278

Random Thresholds

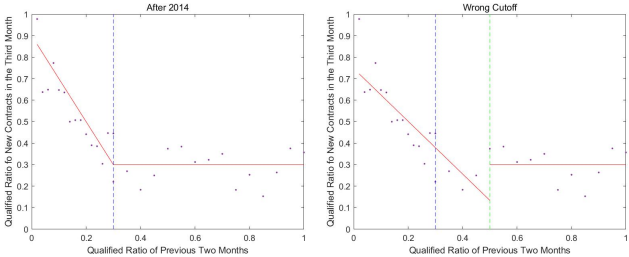

Figure: Random Thresholds

- The correct threshold should produce the largest kink in slopes

Random Thresholds

(a) Adding Noise to the Constructed $C_{i,t}$

$\sigma =$	0.1	0.2	0.3
	Diff. (=Sample Months - Placebo Months)		
β_1	0.136	0.069	-0.044
	(0.91)	(0.55)	(-0.56)
β_2	**-0.567****	**-0.449****	**-0.095**
	(-2.47)	**(-2.57)**	**(-0.66)**
Obs.	20855	20855	20855
R^2	0.365	0.356	0.346

(b) Less Informative Targets

	Same YM + City	Same Bank	Same YM
	Diff. (=Sample Months - Placebo Months)		
β_1	0.037	-0.015	-0.117
	(0.30)	(-0.13)	(-1.06)
β_2	**-0.377***	**-0.205**	**-0.189**
	(-1.73)	**(-1.19)**	**(-1.13)**
Obs.	20855	20855	20855
R^2	0.331	0.327	0.327

Life Insurance vs. Annuities

- Life policies are usually short-term, annuities long-term
- Simply substitute life with annuities to improve qualified ratio

Table 6: Premium

(a) Dependent Variable: Log(Total New Premium+1)

	Sample Months	Placebo Months	Diff.
β_1	0.266	0.172	0.075
	(0.57)	(1.47)	(0.12)
β_2	**-0.604**	**-0.206**	**-0.651**
	(-0.81)	**(-1.20)**	**(-0.70)**
Obs.	6187	14740	21066
R^2	0.411	0.337	0.411

(b) Dependent Variable: Log(Life New Premium+1)

	Sample Months	Placebo Months	Diff.
β_1	0.526	0.468	0.058
	(0.44)	(0.56)	(0.04)
β_2	**4.777****	**0.065**	**4.712***
	(2.44)	**(0.04)**	**(1.95)**
Obs.	6187	14879	21066
R^2	0.597	0.543	0.56

(c) Dependent Variable: Log(Annuity New Premium+1)

	Sample Months	Placebo Months	Diff.
β_1	0.507	-0.795	1.303
	(0.46)	(-1.30)	(1.06)
β_2	**-7.193*****	**0.307**	**-7.499*****
	(-4.27)	**(0.25)**	**(-3.67)**
Obs.	6187	14879	21066
R^2	0.674	0.623	0.639

Lapsation Rates

- Check if investors indeed hold long-term contracts for longer
- Lapsation rate: number of lapsed contracts in the following 24 months scaled by total number of contracts sold in the month

Table 7: Lapsation

(a) Dependent Variable: Avg. Lapsation Rate (Equal Weighted)

	Sample Months	Placebo Months	Diff.
β_1	0.013	0.006	0.007
	(0.49)	(0.39)	(0.25)
β_2	**-0.021**	**-0.006**	**-0.015**
	(-0.61)	**(-0.29)**	**(-0.38)**
Obs.	6187	14879	21066
R^2	0.301	0.167	0.214

(b) Dependent Variable: Avg. Lapsation Rate (Value Weighted)

	Sample Months	Placebo Months	Diff.
β_1	0.012	-0.009	0.022
	(0.42)	(-0.46)	(0.63)
β_2	**-0.013**	**0.007**	**-0.02**
	(-0.33)	**(0.29)**	**(-0.44)**
Obs.	6187	14879	21066
R^2	0.304	0.163	0.21

Mortality Delta

- Mortality delta measures the differential payoff that an insurance contract delivers for death relative to life next year.

$$\Delta_{i,t} = D_{i,t} - \mathbf{E}[P_{i,t}]$$

- $D_{i,t}$ is the death payment; $\mathbf{E}[P_{i,t}]$ is the expected present value of all possible future payments

Table A3: Mortality Delta per Contract

	Sample Months	Placebo Months	Diff.
β_1	-0.193	0.03	-0.223
	(-1.47)	(0.17)	(-1.08)
β_2	**0.778****	**-0.223**	**1.002****
	(2.23)	**(-0.63)**	**(2.06)**
Obs.	4767	11870	16637
R^2	0.541	0.449	0.477

Outline

How Do Banks Sell More Annuities?

- Change the pricing of the products
  - by increasing the markups on life insurance products and reducing the markups on annuities
  - tilt demand toward long-term products to increase the qualified ratio
  - if price is fair, little effect on consumer welfare
- Banks can also persuade investors
  - bank customers know little about insurance products
  - bank agents are likely able to sell both life and annuity products
  - if no change in investor characteristics, likely impact on welfare

Markups of Life and Annuity Products

Table 8: Markup

	Life Insurance			Annuity		
	Whole	After 2014	Before 2014	Whole	After 2014	Before 2014
Income	0.010*	0.005	0.001	-0.023**	-0.026**	0.014
	(1.92)	(0.89)	(0.03)	(-2.63)	(-2.71)	(1.11)
Dividend	(0.03)	0.039*	-0.133*	0.283***	0.258***	0.00
	(-1.41)	(2.02)	(-1.95)	(4.61)	(3.56)	(0.00)
Gender	-0.01	0.02	0.06	0.059***	0.085***	-0.02
	(-1.12)	(1.62)	(1.05)	(3.65)	(5.24)	(-0.91)
Age	-0.004***	-0.004***	-0.009***	0.00	0.002*	0.00
	(-11.02)	(-6.14)	(-4.69)	(1.66)	(1.78)	(-0.37)
Duration	0.004***	0.006**	0.002***	0.007***	0.007***	0.010***
	(2.73)	(2.52)	(4.95)	(11.47)	(9.93)	(12.07)
Income*Dividend	-0.015***	-0.017***	-0.01	0.025***	0.027**	0.00
	(-3.86)	(-3.65)	(-0.57)	(3.49)	(2.63)	(0.00)
Gender*Dividend	0.024***	0.020***	-0.07	-0.027***	-0.035**	0.00
	(5.20)	(3.13)	(-1.15)	(-2.68)	(-2.67)	(0.00)
Age*Dividend	0.002***	0.001***	0.007***	-0.003***	-0.003**	0.00
	(7.38)	(3.29)	(3.68)	(-2.82)	(-2.27)	(0.00)
Income*Duration	0.00	0.00	0.008***	0.008**	0.010**	0.00
	(0.90)	(0.78)	(3.34)	(2.16)	(2.46)	(-0.15)
Gender*Duration	-0.022***	-0.045***	0.00	-0.027***	-0.037***	0.01
	(-3.73)	(-4.68)	(-0.44)	(-3.40)	(-4.73)	(0.47)
Age*Duration	0.001***	0.00	0.001***	-0.001**	-0.001**	0.00
	(4.55)	(0.87)	(5.48)	(-2.04)	(-2.42)	(0.62)
Obs.	69787	26605	41972	6769	5784	759
Adjusted R^2	0.729	0.753	0.592	0.737	0.695	0.825

Changes in Product Markups

Table 9: Markup and Markup Residual

(a) Dependent Variable: Markup

	All			Qualified			Unqualified		
	Sample	Placebo	Diff.	Sample	Placebo	Diff.	Sample	Placebo	Diff.
β_1	-0.002	-0.031	0.029	0.037	-0.038	0.075	0.007	0.018	-0.011
	(-0.05)	(-1.37)	(0.69)	(0.66)	(-1.13)	(1.21)	(0.37)	(1.14)	(-0.48)
β_2	**0.007**	**0.022**	**-0.015**	**-0.048**	**0.000**	**-0.048**	**-0.001**	**-0.019**	**0.018**
	(0.12)	**(0.74)**	**(-0.22)**	**(-0.37)**	**(-0.00)**	**(-0.34)**	**(-0.05)**	**(-1.04)**	**(0.64)**
Obs.	11508	29695	41203	1996	4365	6361	9185	24952	34137
R^2	0.88	0.868	0.873	0.883	0.86	0.868	0.825	0.869	0.862

(b) Dependent Variable: Residual Markup

	All			Qualified			Unqualified		
	Sample	Placebo	Diff.	Sample	Placebo	Diff.	Sample	Placebo	Diff.
β_1	-0.01	0.007	-0.017	-0.012	-0.011	0.00	-0.018	0.010	-0.028
	(-0.63)	(0.56)	(-0.87)	(-0.65)	(-0.59)	(-0.01)	(-0.99)	(0.67)	(-1.20)
β_2	**-0.004**	**-0.002**	**-0.002**	**-0.038**	**0.001**	**-0.039**	**-0.002**	**0.001**	**-0.004**
	(-0.14)	**(-0.11)**	**(-0.07)**	**(-0.77)**	**(0.04)**	**(-0.67)**	**(-0.12)**	**(0.08)**	**(-0.14)**
Obs.	11508	29695	41203	1996	4365	6361	9185	24952	34137
R^2	0.32	0.24	0.268	0.427	0.341	0.374	0.317	0.232	0.26

Changes in Investor Characteristics

Table 10: Investor's Characteristics

(a) Dependent Variable: Buyer Gender

	All			Qualified			Unqualified		
	Sample	Placebo	Diff.	Sample	Placebo	Diff.	Sample	Placebo	Diff.
β_1	-0.032	0.289	-0.339	-0.844	-0.324	-0.428	0.400	0.604	-0.286
	(-0.07)	(0.72)	(-0.60)	(-1.32)	(-0.63)	(-0.63)	(0.78)	(1.27)	(-0.41)
β_2	**0.359**	**-0.446**	**0.806**	**0.672**	**0.180**	**0.510**	**-0.241**	**-0.850***	**0.617**
	(0.69)	**(-0.93)**	**(1.15)**	**(0.95)**	**(0.20)**	**(0.45)**	**(-0.33)**	**(-1.77)**	**(0.72)**
Obs.	12428	30429	42857	2490	4832	7322	9938	25597	35535
Pseudo R^2	0.0131	0.0022	0.0055	0.0578	0.004	0.0241	0.0075	0.0031	0.0044

(b) Dependent Variable: Buyer Age

	All			Qualified			Unqualified		
	Sample	Placebo	Diff.	Sample	Placebo	Diff.	Sample	Placebo	Diff.
β_1	-0.117	2.696	-2.813	-2.686	-3.428	0.742	3.454	4.232	-0.778
	(-0.04)	(0.75)	(-0.58)	(-1.08)	(-0.64)	(0.13)	(0.87)	(0.87)	(-0.12)
β_2	**1.408**	**-0.468**	**1.876**	**1.462**	**10.881**	**-9.419**	**0.374**	**-5.138**	**5.512**
	(0.34)	**(-0.12)**	**(0.33)**	**(0.26)**	**(1.46)**	**(-1.03)**	**(0.05)**	**(-0.96)**	**(0.62)**
Obs.	11508	29695	41203	1996	4365	6361	9185	24952	34137
R^2	0.445	0.351	0.378	0.59	0.582	0.585	0.414	0.311	0.339

(c) Dependent Variable: Log Buy Income

	All			Qualified			Unqualified		
	Sample	Placebo	Diff.	Sample	Placebo	Diff.	Sample	Placebo	Diff.
β_1	0.617	0.520	0.097	1.082**	0.612	0.470	0.189	-0.590	0.779
	(1.39)	(1.62)	(0.18)	(2.54)	(1.68)	(0.86)	(0.27)	(-1.28)	(0.99)
β_2	**0.188**	**-0.240**	**0.428**	**-0.458**	**-0.453**	**-0.005**	**0.955**	**0.791**	**0.164**
	(0.33)	**(-0.68)**	**(0.66)**	**(-0.68)**	**(-0.91)**	**(-0.01)**	**(1.15)**	**(1.52)**	**(0.18)**
Obs.	4502	11577	16079	1410	3248	4658	2829	8052	10881
R^2	0.709	0.668	0.68	0.608	0.666	0.65	0.836	0.705	0.739

Outline

A Placebo Test: Personal Insurance Agents

- Insurance agents (not employed by the insurer or banks) are not subject to the new regulation
  - we should not see a kink in the response function
- We conduct a placebo test with personal agents
  - similar to the test for bank agents
  - except that now each observation is a personal-agent-month

New Contracts Sold in Each Month by PAs

Table 11: New Contracts for PA Channel

(a) Dependent Variable:Qualified Ratio from New contracts- Last Four Qtrs' New Ratio

	Sample Months	Placebo Months	Diff.
β_1	0.018	-0.035	0.052
	(0.12)	(-0.36)	(0.31)
β_2	**0.028**	**0.078**	**-0.05**
	(0.18)	**(0.79)**	**(-0.30)**
Obs.	4106	8146	12252
R^2	0.757	0.586	0.663

(b) Dependent Variable: (New Qualified Life/Total New Premium)-New Qualified Life Ratio Cutoff

	Sample Months	Placebo Months	Diff.
β_1	0.246	-0.071	0.317
	(0.89)	(-0.62)	(1.10)
β_2	**0.04**	**0.205***	**-0.165**
	(0.14)	**(1.73)**	**(-0.55)**
Obs.	4106	8146	12252
R^2	0.534	0.558	0.551

(c) Dependent Variable: (New Qualified Annuity/Total New Premium)-New Qualified Annuity Ratio Cutoff

	Sample Months	Placebo Months	Diff.
β_1	-0.228	0.036	-0.265
	(-0.66)	(0.22)	(-0.72)
β_2	**-0.012**	**-0.127**	**0.115**
	(-0.03)	**(-0.76)**	**(0.30)**
Obs.	4106	8146	12252
R^2	0.565	0.555	0.558

Other Tests on the PA sample

Table 12: Other Tests for PA Channel

(a) Dependent Variable: Log(Total New Premium)

	Sample Months	Placebo Months	Diff.
β_1	0.102	0.203	0.203
	(0.12)	(0.40)	(0.40)
β_2	**-0.134**	**-0.271**	**-0.271**
	(-0.14)	**(-0.50)**	**(-0.51)**
Obs.	4137	8215	12352
R2	0.696	0.671	0.68

(b) Dependent Variable: Lapsation Rate (Value Weighted)

	Sample Months	Placebo Months	Diff.
β_1	0.068*	-0.041	0.109**
	(1.92)	(-1.63)	(2.58)
β_2	**-0.06**	**0.027**	**-0.086***
	(-1.55)	**(0.99)**	**(-1.89)**
Obs.	4137	8215	12352
R2	0.184	0.217	0.206

Outline

Conclusion

- Life insurance is of increasing importance to households, but understudied in the finance literature
  - the insurance literature has focused on the demand side
  - recent financial research examines the supply side
- We study the distribution channel of life insurance products
  - distributors play an important role in the purchase decisions of households (life insurance vs. annuities)