A City of God: How Does Religion Affect Individual Behaviour and Outcomes?

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September 2020

Introduction

Motivation

- Individuals face **idiosyncratic (labour and health)** risks and some are hard to insure
- Are religion and religiosity driven by **(after-life) beliefs or insurance** against such shocks?
- How do religion and religiosity affect individual insurance and decision-making?

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- How do religion and religiosity affect individual insurance and decision-making?

This paper:

- Empirics: Survey with +1,000 questionnarires administered in the city of Rio de Janeiro
- Structural Model: Choice-theoretic heterogeneous-agents
- Quantitative: Role of religion and religiosity

Trends in Religion and Religiosity in Brazil

- Growth of Evangelicals and Protestants and Religiosity

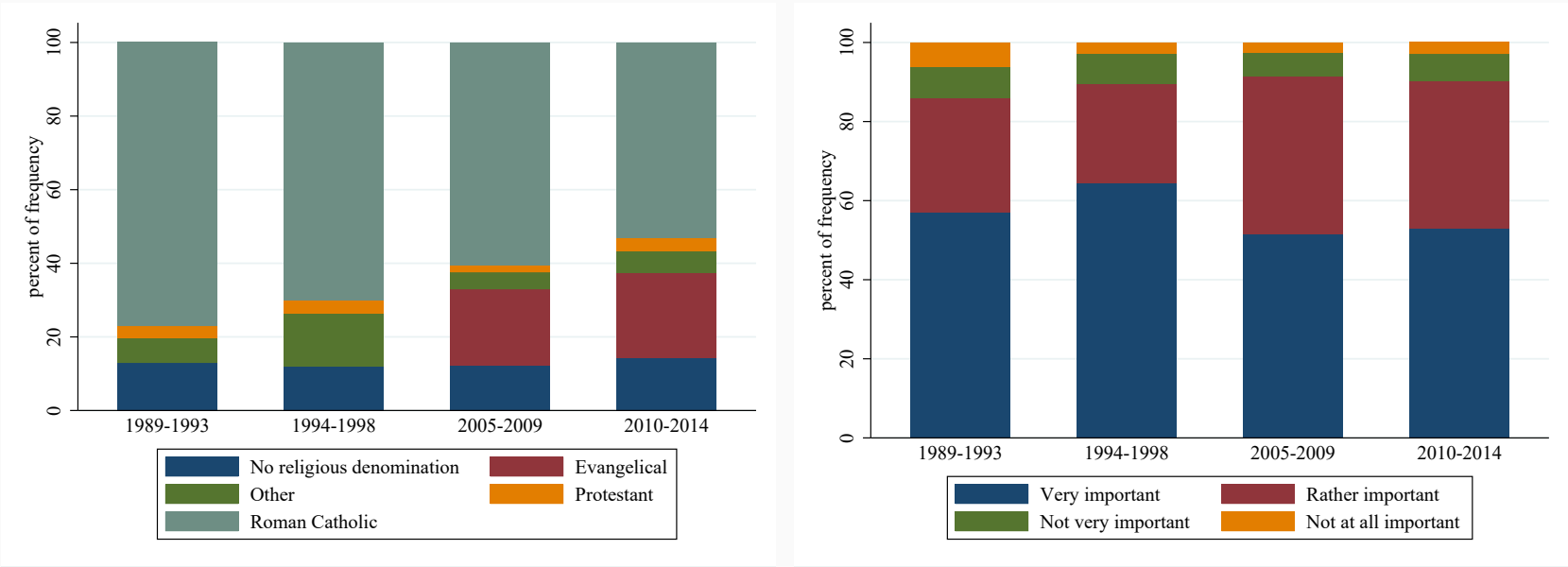

Figure 1: Religion and religiosity in Brazil. Source: World Value Surveys.

Trends in Religion and Religiosity in Brazil

- Rise in Church participation

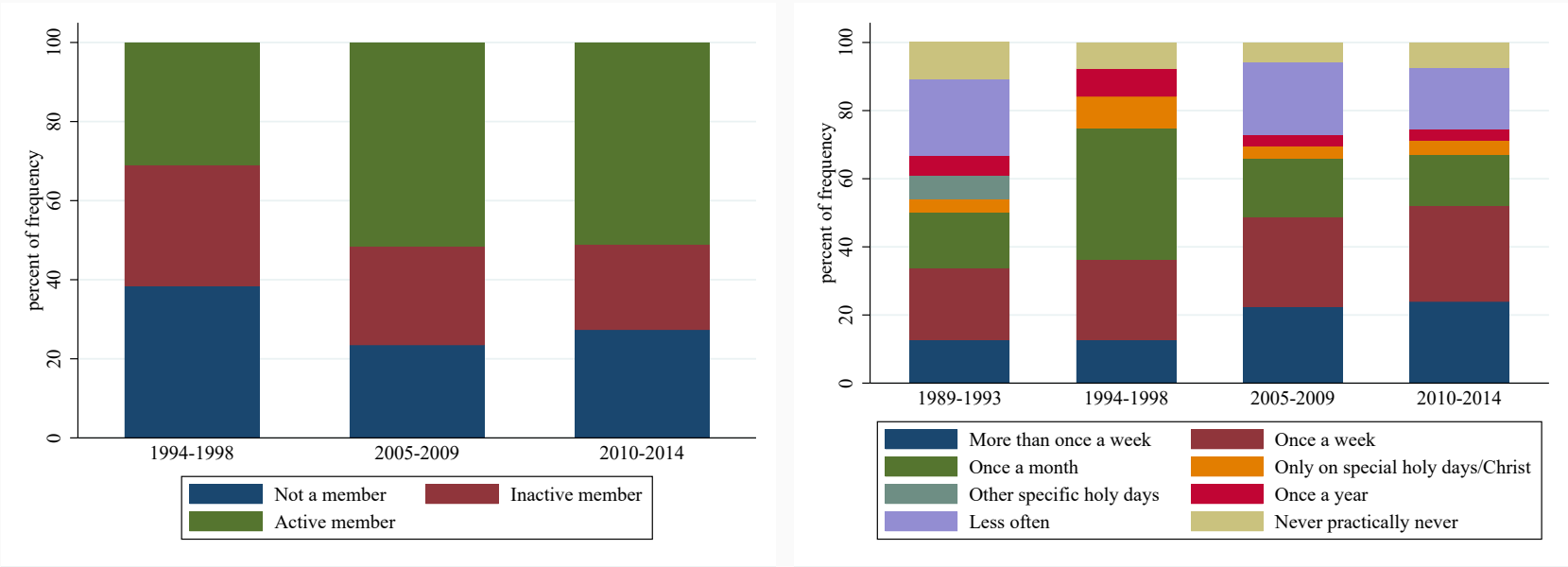

Figure 2: Religion and religiosity in Brazil. Source: World Value Surveys.

Figure 3: St Bede's Monastery (Olinda-PE) and Temple of Solomon (Sao Paulo)

Trends in Religion and Religiosity in Brazil


Figure 4: Typical Mass at St Bede's Monastery (Olinda-PE) and Typical Service at Temple of Solomon (Sao Paulo)

Survey

Survey

- Primary data collected in Brazil (Rio de Janeiro) on household-specific religious activities and community level risk-sharing
- Survey was implemented with the support of the Institute for Religion Studies (ISER) in Rio de Janeiro
- +1,000 field interviews with a representative distribution of religious denominations

Survey

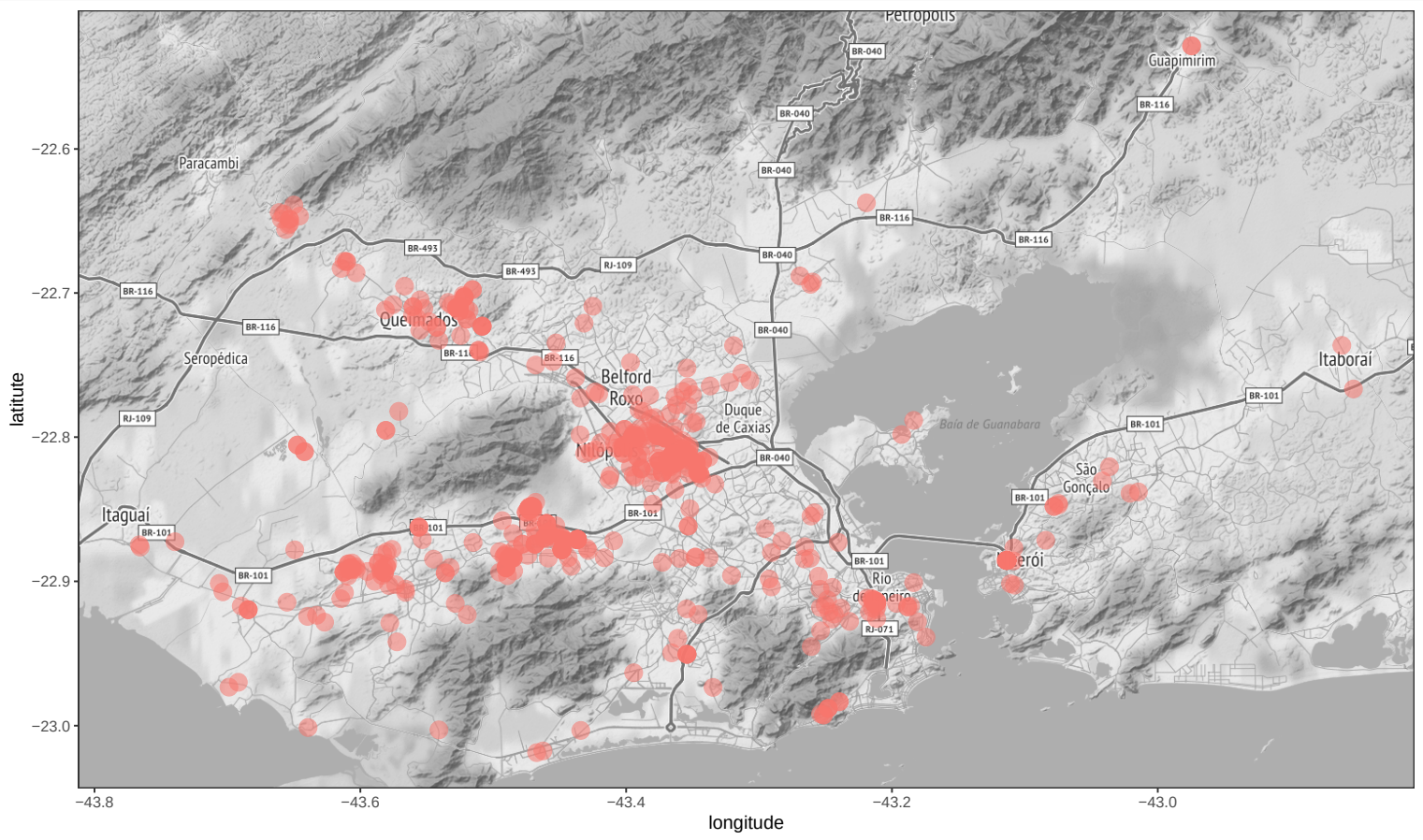

Figure 5: Geo-location of interviewees in the metropolitan area of Rio de Janeiro

Empirical results

Dependent variable: Community Support

Dependent variable: Community Support							
	Job	Health	Education	Child Care	Psychological	Other	Outside Help
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Religious Investments	0.138***	0.185***	0.157***	0.145***	0.177***	0.007	0.054**
	(0.021)	(0.022)	(0.019)	(0.020)	(0.017)	(0.010)	(0.022)
Pentecostal	-0.004	-0.069	0.078	0.008	-0.026	0.002	-0.074
	(0.076)	(0.081)	(0.079)	(0.077)	(0.067)	(0.034)	(0.070)
Protestant	0.045	-0.006	0.156*	0.105	0.059	-0.026	-0.036
	(0.078)	(0.084)	(0.080)	(0.078)	(0.068)	(0.040)	(0.073)
Roman Catholic	-0.103	-0.078	0.029	0.034	-0.097	0.019	-0.016
	(0.081)	(0.083)	(0.085)	(0.081)	(0.074)	(0.034)	(0.072)
Socio-economic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	.12	.13	.16	.13	.22	.05	.04
Observations	398	398	398	398	398	398	397

Dependent variable: Contribution (Frequency)

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	Pray	Time Pray	Religious Service	Church	Festivities	Voluntary Work	Donation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Probability of Job Loss	0.353	0.013	-0.036	-0.593	0.103	0.044	1.082***
	(0.497)	(0.465)	(0.453)	(0.451)	(0.494)	(0.549)	(0.413)
Probability of Large Expenditure	-0.103	0.602*	-0.005	0.160	0.782**	0.738*	0.703**
	(0.337)	(0.324)	(0.299)	(0.309)	(0.328)	(0.407)	(0.310)
Standardized Income	0.062	-0.034	-0.208	0.051	-0.349	0.152	0.702***
	(0.210)	(0.219)	(0.186)	(0.195)	(0.221)	(0.248)	(0.195)
Religiousness	0.664***	0.825***	0.837***	1.019***	0.845***	0.943***	0.532***
	(0.154)	(0.157)	(0.143)	(0.146)	(0.159)	(0.188)	(0.137)
Defining Religion as following Norms	0.044	0.043	0.220**	0.003	0.266***	0.162	0.122
	(0.104)	(0.104)	(0.094)	(0.095)	(0.100)	(0.125)	(0.094)
Defining Religion as Good Deeds	0.112	-0.255**	-0.291**	-0.261**	0.183	-0.079	-0.082
	(0.127)	(0.124)	(0.121)	(0.118)	(0.134)	(0.151)	(0.110)
Pentecostal	1.669***	0.855**	1.093***	1.140***	-0.487	0.453	1.006***
	(0.383)	(0.383)	(0.347)	(0.358)	(0.360)	(0.402)	(0.309)
Protestant	1.480***	1.008**	0.809**	0.621*	-0.090	0.293	1.048***
	(0.399)	(0.401)	(0.356)	(0.365)	(0.373)	(0.430)	(0.327)
Roman Catholic	0.397	0.263	-0.674**	-0.858**	-1.180***	-0.219	-0.247
	(0.357)	(0.389)	(0.333)	(0.354)	(0.370)	(0.440)	(0.319)
Socio-economic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	.09	.08	.1	.12	.08	.09	.1
Observations	366	366	365	364	362	357	358

Theoretical model

Theoretical model

- Overlaping generations model: young, middle-aged, old
  - consumption c,
  - assets a',
  - hours worked h and leisure l,
  - donations d,
  - time praying p,
  - time in community services t
- Labour productivity is composed of three components:
  - A transitory component: $z \in \{z_0, z_1\}$;
  - A permanent education component: $\rho \in \{\rho_1, \rho_2, \rho_3, \rho_4\}$; and
  - An age-specific component: $\varepsilon \in \{\varepsilon^y, \varepsilon^m, \varepsilon^o\}$.

Mechanisms Religion Can Affect Individuals

1. Labor market: z_0 unemployed and z_1 employed
   - Community support s_r.

$$s_r = [\zeta d^{\theta} + t^{\theta}]^{\frac{1}{\theta}}.$$

The probability of staying unemployed is

$$\pi_0(x) \times (1 - \phi_r), \quad \text{with } \phi_r = \frac{s_r}{\phi_0 + s_r}$$

2. After-life probability:

$$\pi_{after,r} = \frac{s_h}{\phi_2 + s_h}, \; s_h = [s_r^{\theta'} + \zeta_h p^{\theta'}]^{\frac{1}{\theta'}}.$$

Young individuals

$$V^y(a,z,\rho,r) = \max_{c,a',l,d,p,t} u(c,l) + \beta\,\delta^y_{cr} E_{z'}[(1-\gamma^m)V^y(a',z',\rho,r) + \gamma^m V^m(a',z',\rho,r)] + \beta(1-\delta^y_{cr})\pi_{after,r} V_{heaven},$$

Subject to:

$$c + a' + d = (1+i)a + wz\varepsilon^y \rho(1-l-p-t)$$

After-life probability:

$$\pi_{after,r} = \frac{s_h}{\phi_2 + s_h},\ s_h = [s_r^{\theta'} + \zeta_h p^{\theta'}]^{\frac{1}{\theta'}},$$

Labour market:

$$\Pi_{zz'} = \begin{bmatrix} \pi_0 \times (1-\phi_r) & 1-\pi_0 \times (1-\phi_r) \\ 1-\pi_1 & \pi_1 \end{bmatrix}, \phi_r = \frac{s_r}{\phi_0 + s_r}, s_r = [\zeta d^\theta + t^\theta]^{\frac{1}{\theta}}$$

Middle-aged individuals

$$V^m(a,z,\rho,r) = \max_{c,a',l,d,p,t} u(c,l) + \beta\delta^m_{cr} E_{z'}[(1-\gamma^o)V^m(a',z',\rho,r) + \gamma^o V^o(a',z',\rho,r)] + \beta(1-\delta^m_{cr})\pi_{after,r} V_{heaven},$$

Subject to

$$c + a' + d = (1+i)a + wz\varepsilon^m\rho(1-l-p-t)$$

After-life probability:

$$\pi_{after,r} = \frac{s_h}{\phi_2 + s_h},\ s_h = [s_r^{\theta'} + \zeta_h p^{\theta'}]^{\frac{1}{\theta'}},$$

Labour market:

$$\Pi_{zz'} = \begin{bmatrix} \pi_0 \times (1-\phi_r) & 1-\pi_0 \times (1-\phi_r) \\ 1-\pi_1 & \pi_1 \end{bmatrix}, \phi_r = \frac{s_r}{\phi_0 + s_r}, s_r = [\zeta d^\theta + t^\theta]^{\frac{1}{\theta}}$$

Old individuals

$$V^o(a,z,\rho,r) = \max_{c,a',l,d,p,t} u(c,l) + \beta\,\delta^o_{cr} E_{z'}[V^o(a',z',\rho,r)] + \beta(1-\delta^o_{cr})\pi_{after,r}\,V_{heaven},$$

subject to

$$c + a' + d = (1+i)a + wz\varepsilon^o\rho(1-l-p-t)$$

After-life probability:

$$\pi_{after,r} = \frac{s_h}{\phi_2 + s_h},\ s_h = [s_r^{\theta'} + \zeta_h p^{\theta'}]^{\frac{1}{\theta'}},$$

Labour market:

$$\Pi_{zz'} = \begin{bmatrix} \pi_0 \times (1-\phi_r) & 1-\pi_0\times(1-\phi_r) \\ 1-\pi_1 & \pi_1 \end{bmatrix}, \phi_r = \frac{s_r}{\phi_0 + s_r}, s_r = [\zeta d^\theta + t^\theta]^{\frac{1}{\theta}}$$

Calibration

Calibration - Simulated method of moments I

Table 1: Estimated moments

Moment	Empirical moment	Simulated moment
Average donation - Catholic	0.0141	0.0171
Average donation - Pentecostal	0.0251	0.0284
Average donation - Protestant	0.0278	0.0333
Average donation - Other religions	0.0235	0.0212
Average donation - young	0.0185	0.0159
Average donation - middle aged	0.0245	0.0187
Average donation - old	0.0241	0.0315
Average donation - low crime	0.0198	0.0202
Average donation - high crime	0.0242	0.0259
Avg. voluntary work in hours per week(sd from mean)	0.0167	0.0143
Avg. voluntary work - Catholic	-0.432	-0.1898
Avg. voluntary work - Pentecostal	0.194	0.127
Avg. voluntary work - Protestant	0.150	0.156
Avg. voluntary work - Other religions	-0.0656	-0.123
Avg. voluntary work - young	-0.1654	-0.255
Avg. voluntary work - middle aged	0.0381	0.028
Avg. voluntary work - old	0.232	0.138
Avg. voluntary work - low crime	-0.155	-0.099
Avg. voluntary work - high crime	0.114	0.052

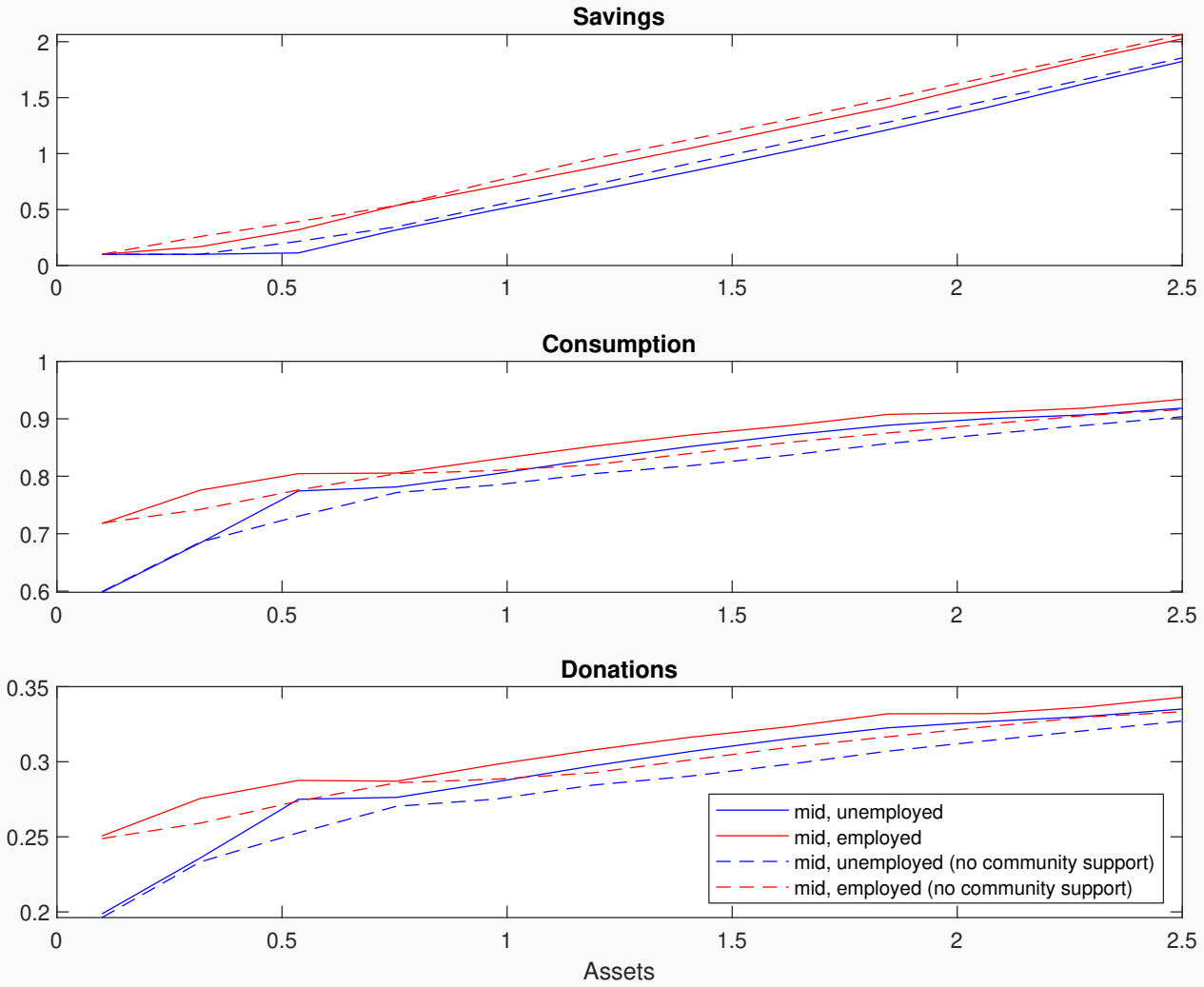
Calibration - Simulated method of moments II

Table 2: Estimated moments

Moment	Empirical moment	Simulated moment
Average pray in hours per week(sd from mean)	0.014	0.035
Average pray - Catholic	-0.130	-0.107
Average pray - Pentecostal	-0.088	-.066
Average pray - Protestant	0.107	-.648
Average pray - Other religions	-0.285	0.636
Average pray - young	-.0.088	-.094
Average pray - middle aged	0.011	0.0579
Average pray - old	0.102	-.144
Average pray - low crime	-0.05	-0.082
Average pray - high crime	0.007	-0.091
Average community help with job - Catholic	0.173	0.008
Average community help with job - Pentecostal	0.353	0.674
Average community help with job - Protestant	0.43	0.007
Average community help with job - Other religions	0.294	0.033
Average community help with job - young	0.272	0.109
Average community help with job - middle aged	0.347	0.114
Average community help with job - old	0.231	0.137
Average community help with job - low crime	0.232	0.321
Average community help with job - high crime	0.383	0.365

Counterfactual analysis

Shutting down community support



The Role of Religion: Lower educated Pentecostals

	Benchmark	No community support	No after-life	No community support and no after-life
Probability of remaining unemployed	0.06	0.80	0.17	0.8
Consumption	1	0.964	1.11	1.07
Hours worked	0.66	0.68	0.60	0.61
Donations	0.30	0.29	0.10	0.10
Time praying	1.2×10^{-7}	9.9×10^{-8}	0	0

Preliminary Concluding Remarks

Evidence:

- Rise of Protestants and Evangelicals in Brazil in the last three decades
- Rise of religiosity - Church attendance and participation
- Individuals invest differently in religious goods

Counterfactuals:

- Religion seems to be key for the labour market outcomes of unskilled Pentecostals
- Consumption higher due to investments in religion - about 4 percent higher
- Minor role for beliefs in the after-life