Economies of Scale and Scope in Brazilian Complementary Pension Funds: Theory and Evidence

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Structure of the Presentation

- Motivation
- Literature Review
- Descriptive Statistics
- Theoretical model
- Empirical Results
- Normative Implications

Motivation

Accumulated Assets in 30 Years in Function of Gross Returns and Administrative Fees

Assuming a Monthly Contribution of $ 1,000

	Administrative Rate			
Gross Return Rate	0%	1%	2%	3%
4%	685,271	575,329	486,461	414,316
5%	815,376	679,983	570,985	482,878
6%	974,513	807,499	673,558	565,725

Soure: Author

Literature Review

- USA
  - Caswell (1976), Mitchell & Andrews (1981), Hsin & Mitchell (1997)
- Australia
  - Bateman & Mitchell (2004)
- Holland
  - Bikker & Dreu (2009)
- Panel data from Australia, Canada, Holland and USA
  - Bikker et al. (2011)

Literature Review

- Equation

$$Ln(C_{it}) = \alpha_0 + \alpha_1 \ln(PART_{it}) + \alpha_2 \ln(Assets_{it}) + \alpha_3 X_{it} + \varepsilon_{it}$$

- All results support evidence on the existence of economies of scale

Table

Variable Correlations Matrix

	Participants	Assets
Administrative Cost	0.81	0.88
Administrative Cost/Participant	-0.14	N.A.
Administrative Cost/Asset	N.A.	- 0.10

N. A.: Not applicable

Source: SPPC/MPS

Elaboration: author

Figure 1

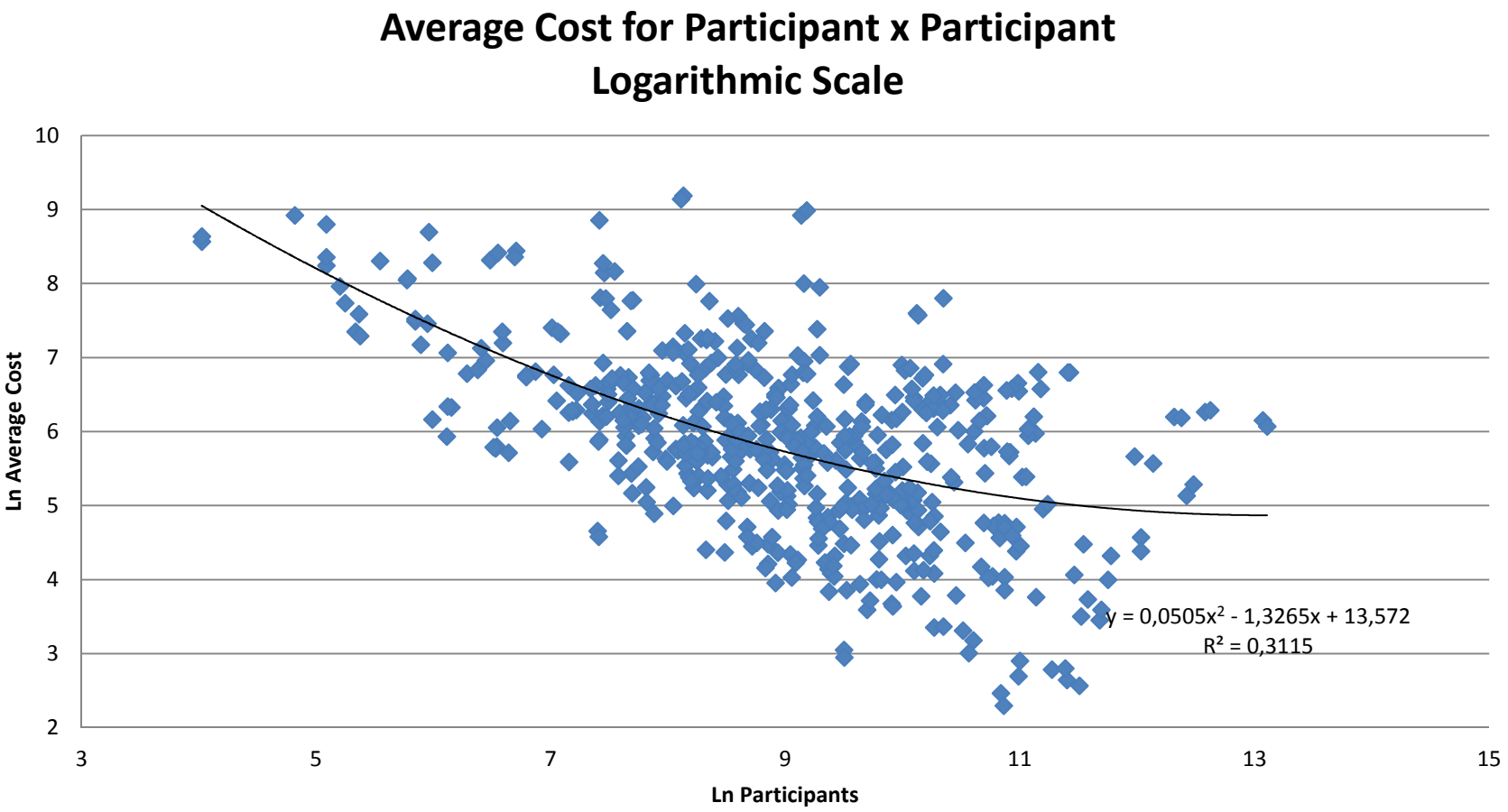
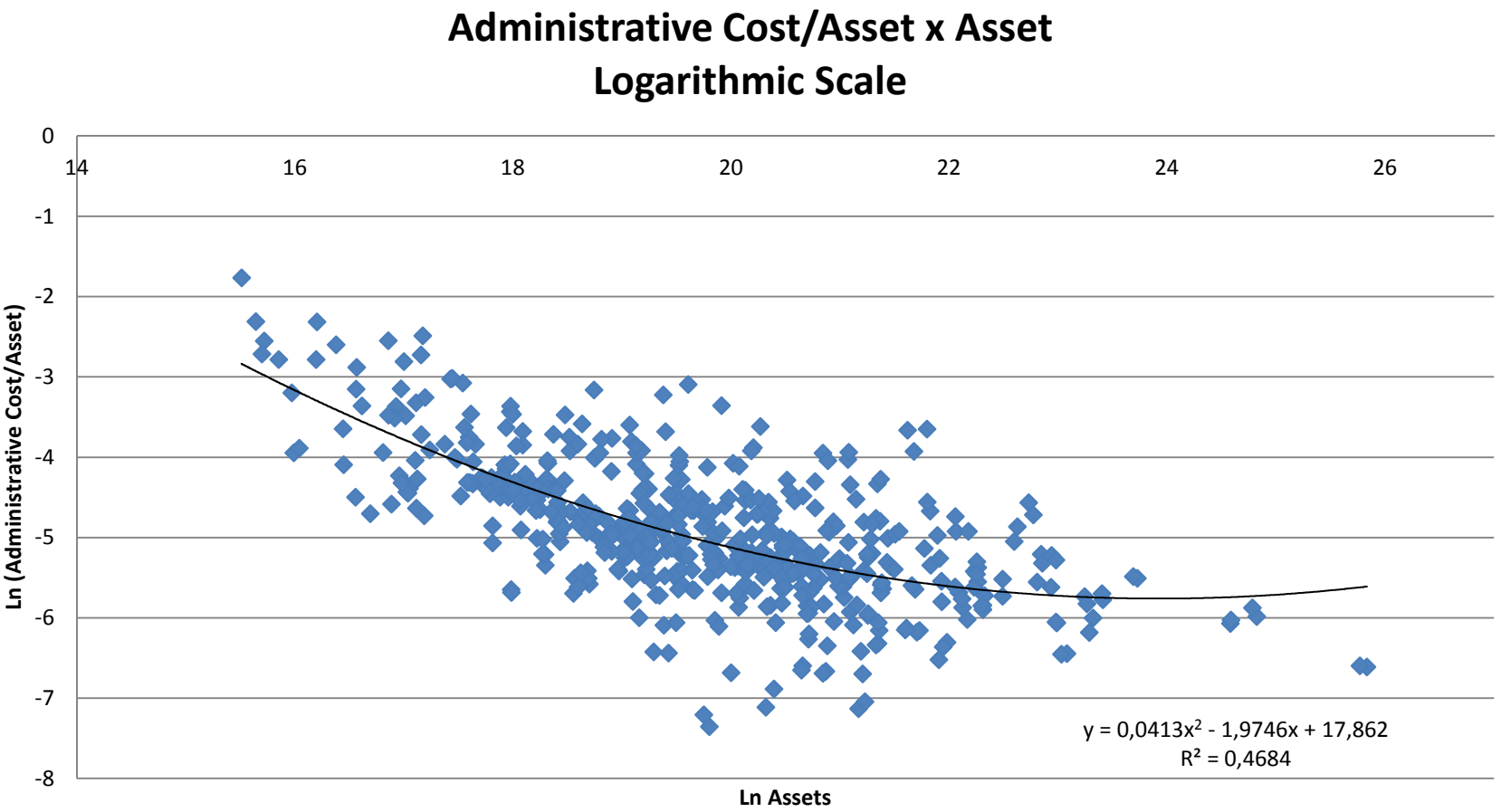

Average Cost for Participant x Participant
Logarithmic Scale
Ln Average Cost
10
9
8
7
6
5
4
3
2
3
5
7
9
11
13
15
Ln Participants
y = 0,0505x² - 1,3265x + 13,572
R² = 0,3115

Figure 2


Administrative Cost/Asset x Asset
Logarithmic Scale
0
-1
-2
-3
-4
-5
-6
-7
-8
14
16
18
20
22
24
26
Ln (Administrative Cost/Asset)
Ln Assets
y = 0,0413x² - 1,9746x + 17,862
R² = 0,4684

Theoretical Model

- PPF for two outputs and one input
- Outputs
  - Assets (W)
  - Participants (Y)
- Inputs
  - Administrative factors (X)
- General format
  - F(W,Y,X) = 0

Theoretical Model

- Elasticity of Scale

$$\varepsilon = \frac{\partial lnX}{\partial lnW} + \frac{\partial lnX}{\partial lnY}$$

- If ε < 1, economies of scale
- If ε > 1, diseconomies of scale
- If ε = 1, neither economies nor diseconomies

Theoretical Model

- Participants function
  - Y = g(At, As)
  - At means active participants, As means retirees and survivors
- Hypothesis that retirees and survivors demand more administrative services implies that
  - Gains of scale reduce as retirees and survivors grow (judicial demands, benefit maintenance, customer service etc)
  - Scale of equivalence

Theoretical Model

- PPF

$$X = W^{\alpha} + (As + \theta At)^{\beta}$$

Where $\alpha>1$, $\beta>1$ and $0< \theta < 1$

Under these assumptions cost grows with the ratio of beneficiaries/active participants

Econometric Results

- Equation
- $Ln(C_{it}) = \alpha_0 + \alpha_1 \ln(PART_{it}) + \alpha_2 \ln(Assets_{it}) + \alpha_3 X_{it} + \varepsilon_{it}$
- Control Variables
  - Beneficiaries/Participants (ln)
  - Dummy for private sponsor
  - Quantity of plans for each entity
  - Quantity of sponsors for each entity

Econometric Results

- Models
  - Model 1: OLS
  - Model 2: Panel GLS with random effects
  - Model 3: Panel with fixed effects
  - Model 6: Stochastic frontier for cost with unvarying efficiency over time and Cobb-Douglas function
  - Model 7:Stochastic frontier for cost with varying efficiency over time and Cobb-Douglas function
  - Model 8: Stochastic frontier for a translog

Normative Implications

- Existence of economies of scale and scope point to the existence of a multi-sponsored oligopoly
  - Few entities explore economies of scale better
  - Economies of scope make the cost of a new sponsor low
  - Competition among big entities allows small firms to benefit from economies of scale by joining complementary pension funds in a multi-sponsored way
  - Private pensions are important in a fiscal constraint context