

# **When you can't afford to wait for a job: The role of time discounting for own-account workers in developing markets**

Thiago SCARELLI

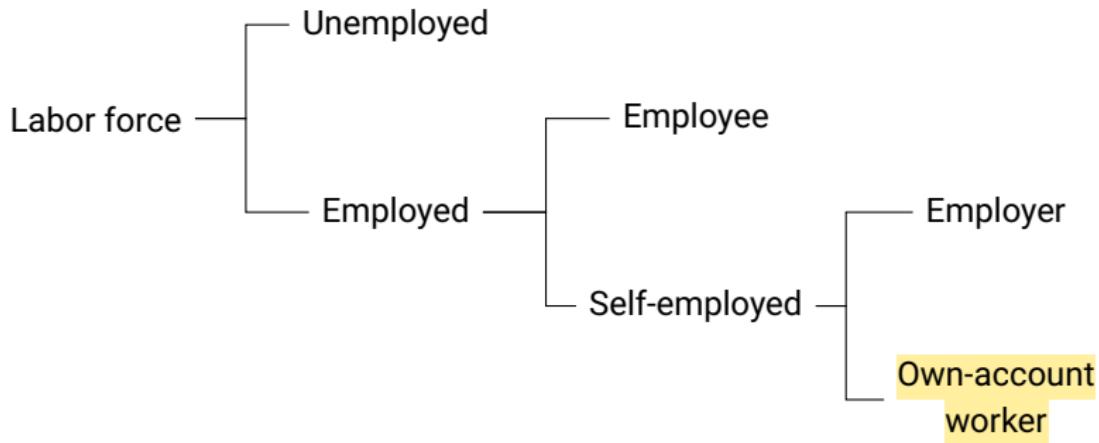
David MARGOLIS



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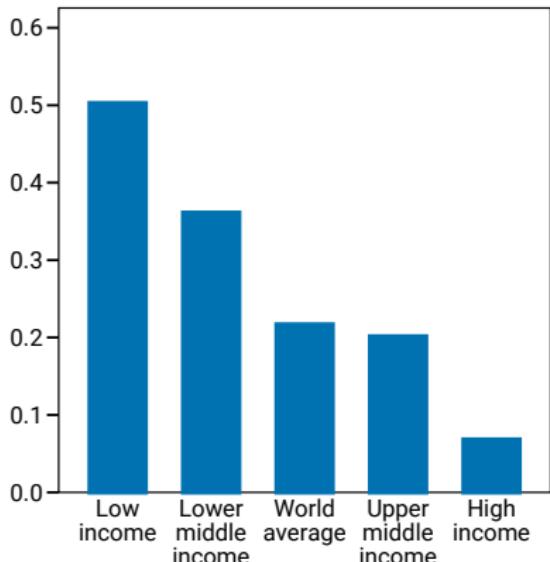
# Who are the own-account workers (OAWs)?



- ▶ In short: OAW are self-employed without employees.
- ▶ Notably, the literature covers **employees** and **employers** much better.

# Why should we care about them?

OAWs as % of employed population  
(urban areas, 2018). Source: ILO.



## Stylized facts

- ▶ 1 in 4 urban workers are OAW.
- ▶ Concentrated in poor regions.

## Implications

- ▶ OAW is not simply a rural issue.
- ▶ Strong association with income.
- ▶ Key develop. economics topic!

+ country scatterplot

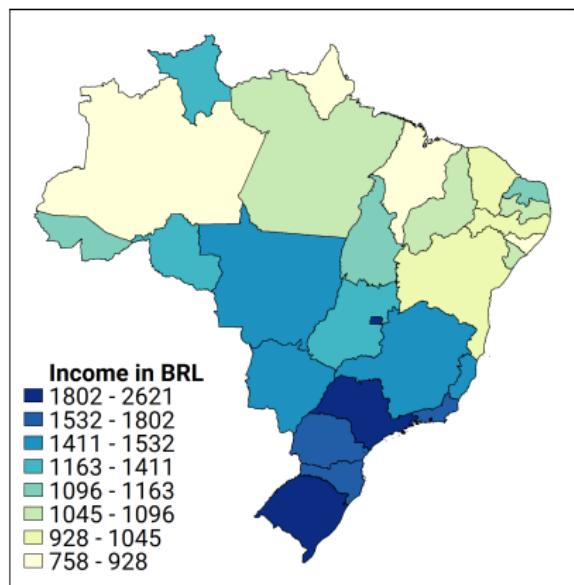
+ OAW share in rural areas

# Let's look at a particular case: Brazil

- ▶ Same pattern can be observed within a country:
- ▶ Poor Brazilian States also have the highest shares of OAW (corr: -0.82).

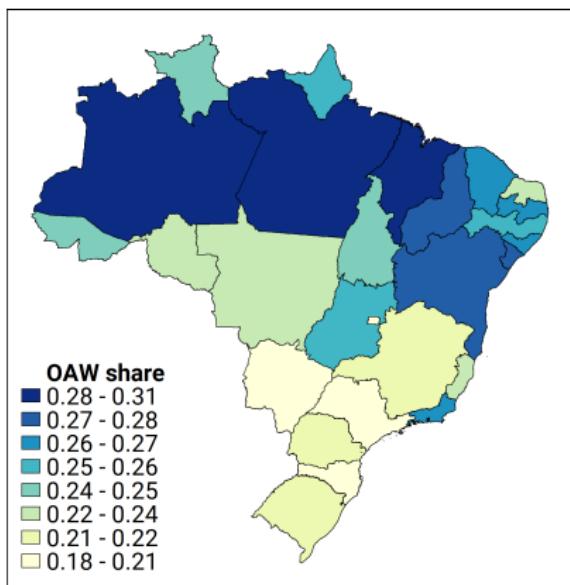
(a) Average per capita income (urban).

Source: IBGE.



(b) Share of own-account workers (urban)

Source: IBGE.



# What makes Brazil an interesting case?

## Representative and heterogeneous

- ▶ National average (24%) close to world average.
- ▶ Regional heterogeneity: from Italian (16%) to Senegalese (46%) levels.

## Good data

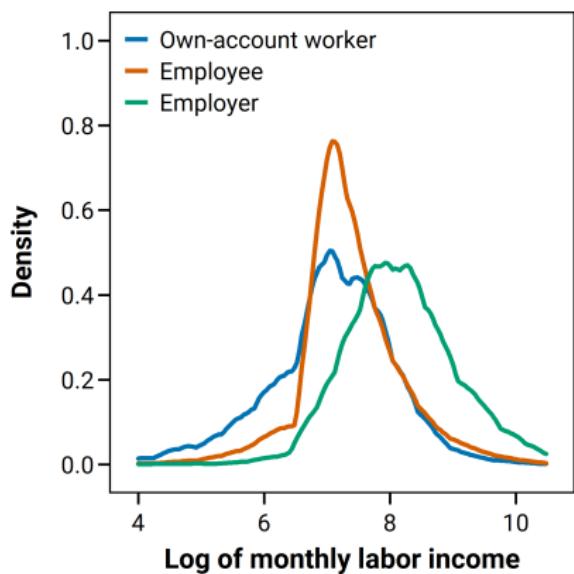
- ▶ Administrative data usually does not help us here.
- ▶ Brazil has a big nationwide household survey: PNAD.
- ▶ 560k individuals per quarter.
- ▶ Short rotating panel (5 quarters).
- ▶ Labor status, socioeconomic data, family information.

# Pieces of the self-employment puzzle in Brazil

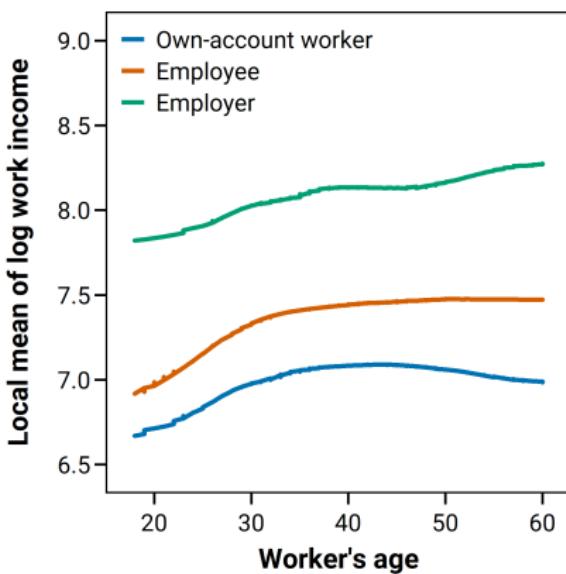
+

- ▶ OAWs are overrepresented at the low end of the earnings distribution.
- ▶ The earnings gap wrt employees (25%) persists over their working life.

(a) *Distribution of labor income (urban workers). Source: IBGE.*



(b) *Earnings conditional on age (urban workers). Source: IBGE.*



# Who are they? What are they doing?

- ▶ OAW are typically non-white males, without college.
- ▶ They mostly doing heavy work (17% in construction) or unskilled services (40% are small retail vendors, hair dressers or drivers). 

Summary statistics	Sample	OAW	Employee	Employer	Unemp.
<i>Skin color and gender (share in %)</i>					
white male	21	<b>28</b>	24	46	17
white female	25	<b>18</b>	24	22	20
non-white male	26	<b>35</b>	28	23	31
non-white female	28	<b>19</b>	25	9	32
<i>Highest education level (share in %)</i>					
illiterate or no school	6	<b>5</b>	2	1	2
elem school incomp	26	<b>29</b>	17	14	20
elem school	10	<b>10</b>	8	7	10
high school incomp	8	<b>7</b>	6	4	13
high school	29	<b>31</b>	36	31	38
college incomp	6	<b>4</b>	7	7	7
college or above	15	<b>15</b>	23	37	10
Average labor income (BRL)	2,388	<b>1,868</b>	2,313	5,931	0

# The "entrepreneurship" perspective

## **Who become self-employed?**

- ▶ Agents with appropriate skills (Roy, 1951; Lucas, 1978; Lazear, 2005)
- ▶ Agents with sufficient funds (Evans and Jovanovic, 1989)
- ▶ Agents with high tolerance to risk (Hihlstrom and Lafont, 1979)

## **Why do they earn less?**

- ▶ Satisfaction from "being your own boss" (Hamilton, 2000)

## The "necessity" perspective

- ▶ Self-employment in poor countries is complex and heterogeneous.  
(Banerjee and Duflo, 2011; Fields, 2012; Margolis, 2014)
- ▶ People may work on their own because they need to, they have no choice.

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## Our proposition

- ▶ Explore the time trade-off between OAW now vs. better paid job later.

## Adding structure to the idea of "necessity"

People may choose OAW because they have urgent consumption needs and can't afford to wait for a good job somewhere in the future.

- ▶ If wage employment is scarce
- ▶ and present consumption financing is limited,
- ▶ while low-productivity OAW is readily available,
- ▶ then a high discount rate can make a low-paid OAW the optimal choice.

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**Next step:** translate it in terms of a job search model.

# Canonical valuation equations in a job search model

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## Reservation wage

$$w_r = b + \frac{\lambda}{\delta + \rho} \cdot \int_{w_r}^{\infty} (w - w_r) dF(w)$$

# Introducing the OAW valuation

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**Question:** Why is there unemployment if OAW is always available?

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$$y > b + \frac{\lambda}{\delta + \rho} \cdot \int_{w_r}^{\infty} (w - w_r) dF(w)$$

## Why is OAW more prevalent in some places?

$$\mathbb{P}\left(y > b + \frac{\lambda}{\delta + \rho} \cdot \int_{w_r}^{\infty} (w - w_r) dF(w)\right) = \text{share of OAWs}$$

**Model's insights:** people choose to work on their own when

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6. their time discount rate ( $\rho$ ) is high: *present consumption is urgent.*

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**Next step:** operationalize this result into something we can estimate.

# The building blocks of the structural model

$$\rho > \frac{\lambda}{y - b} \cdot \int_{w_r}^{\infty} (w - w_r) dF(w) - \delta$$



$$\hat{\rho}_i > \frac{\mathbb{E}(\lambda | X_i)}{y_i - \mathbb{E}(b | X_i)} \cdot \left[ \mathbb{E}(w | w > w_r, X_i) - \mathbb{E}(w_r | X_i) \cdot \mathbb{P}(w \geq w_r) \right] - \mathbb{E}(\delta | X_i)$$

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## The PNAD survey and the population of interest

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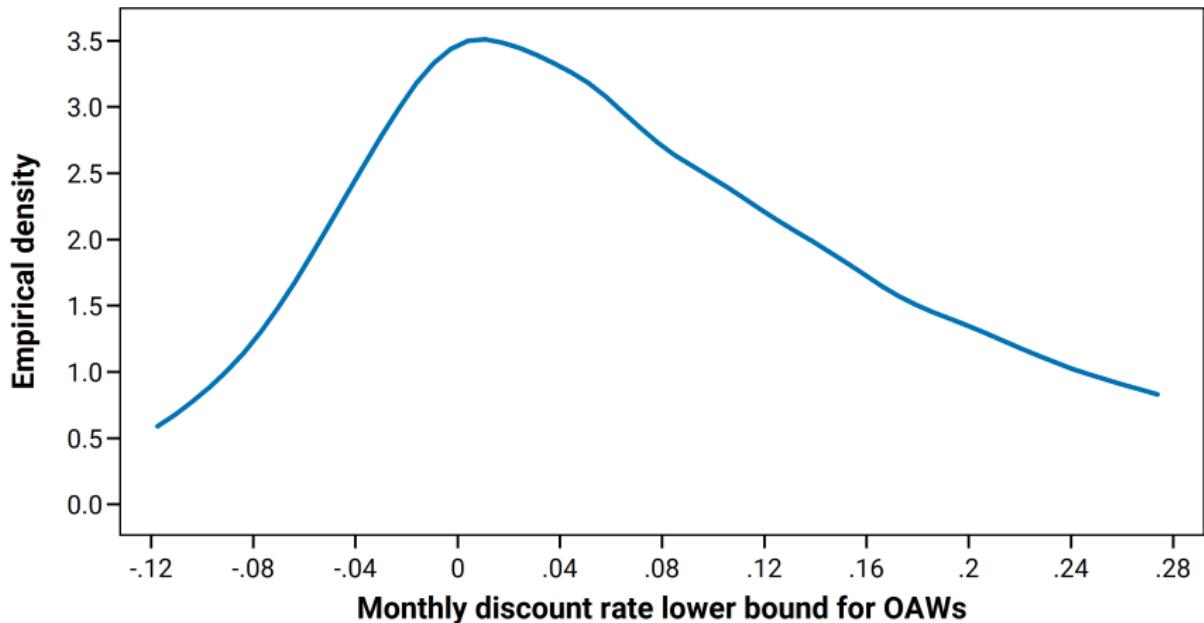
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Use this data to get the implicit discount rate lower bound for all OAWs.

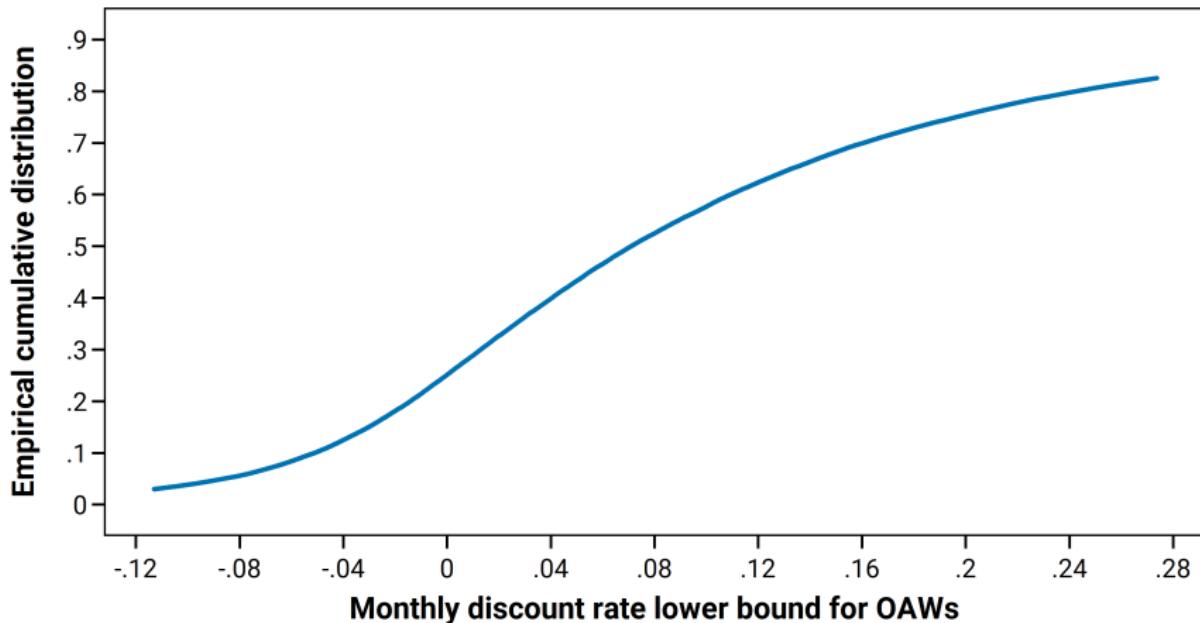
## Density of the implicit discount rate lower bound

- ▶ Most frequent values are around zero.
- ▶ Heavy tail on the high end of the distribution.



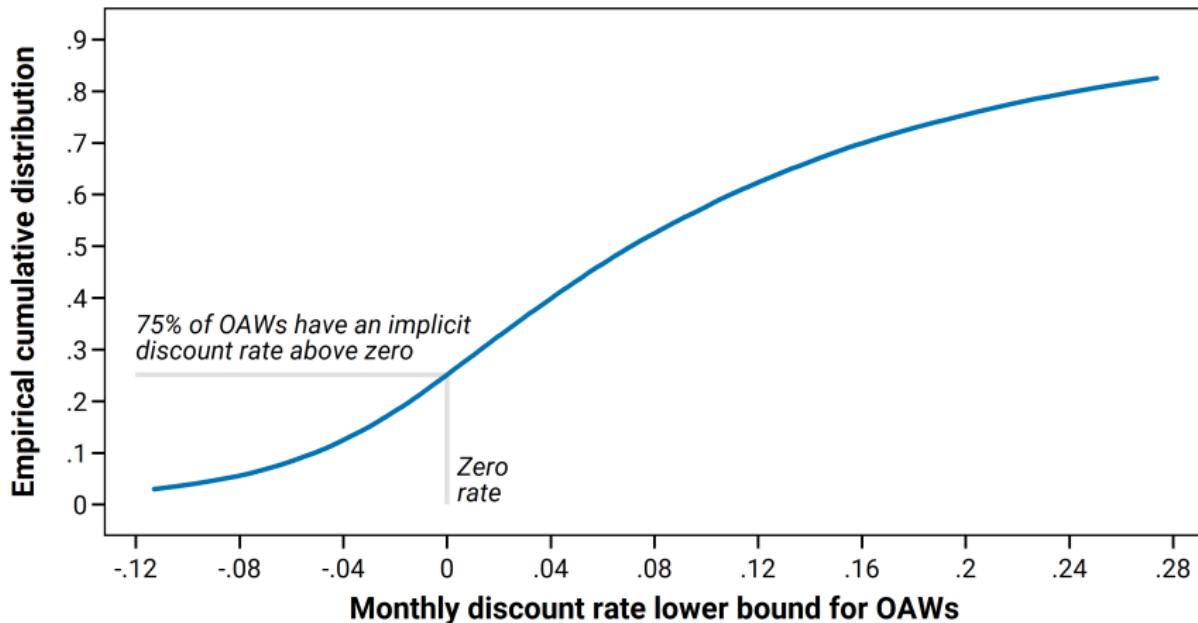
## CDF of the implicit discount rate lower bound

- ▶ **Benefit of the CDF:** provides meaningful interpretation to the lower bound.
- ▶ **Useful thresholds:** zero and the market's interest rate.



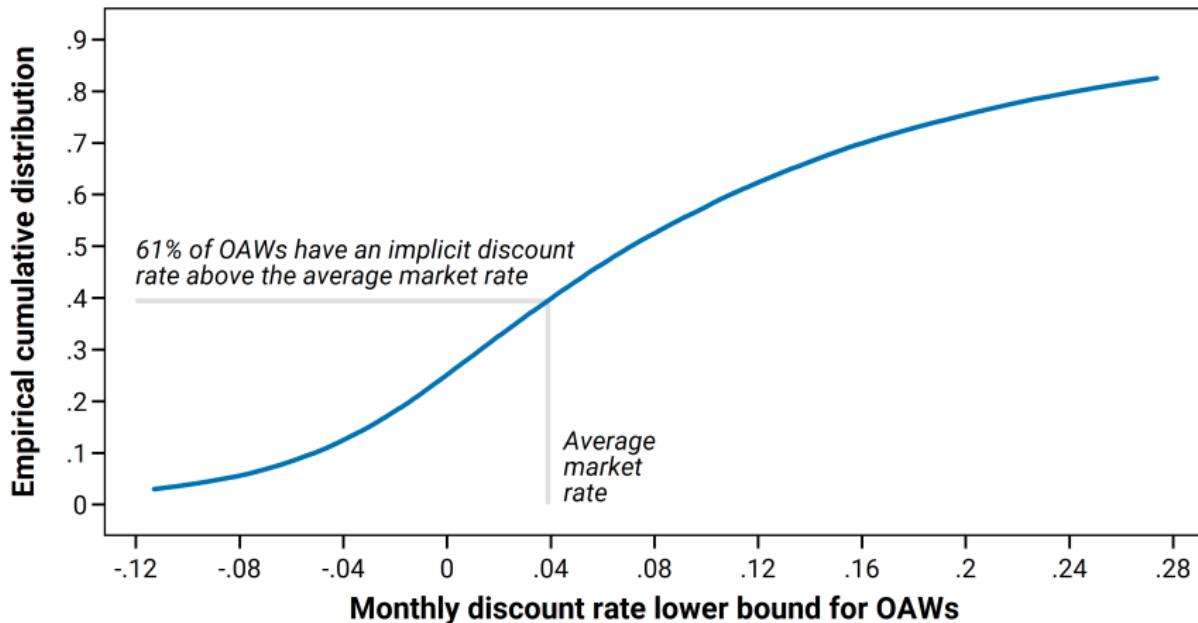
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## A simple measure of constrained OAWs

In the context of this model:

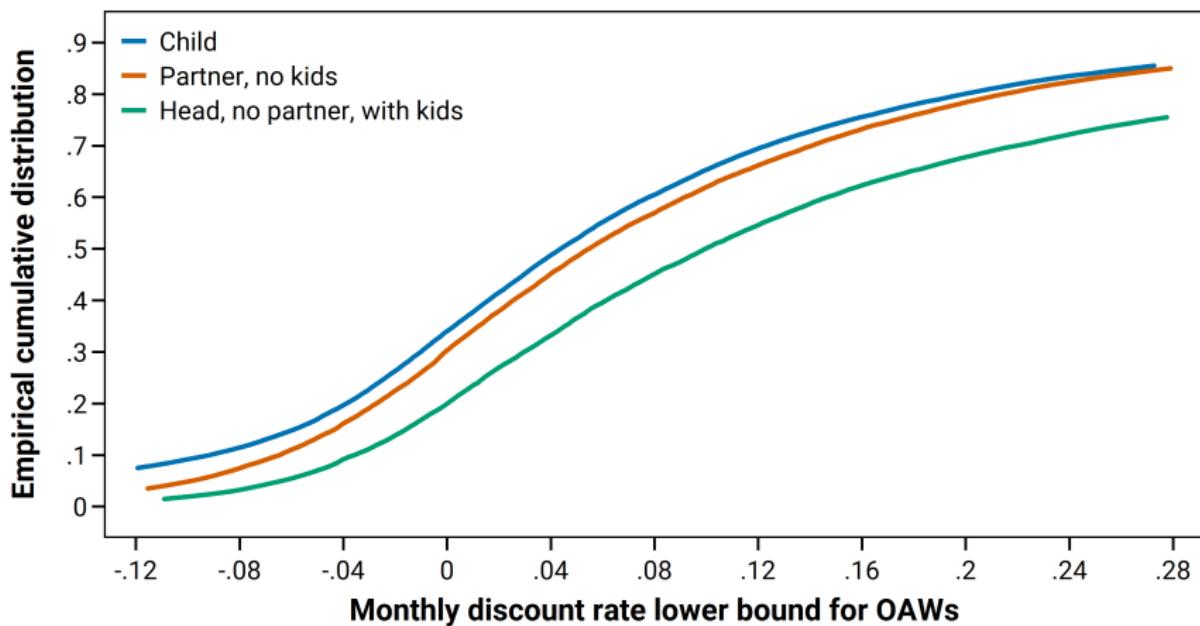
1. Workers occupational choice is informative about their discount rate.
2. If you are less patient than the market, you would borrow. Why?
3. To finance consumption while looking for a better job.
4. Any OAW whose discount rate is above the market's is constrained.

Labor market frictions + financial frictions = constrained OAWs.

# Conditional CDF by family position



- Descriptive evidence that single parents are more often constrained OAWs.



# Association of $\hat{\rho}$ with individual attributes

- ▶ Coefficients from a linear projection of the estimated lower bound.

## skin color, gender (ref. white male)

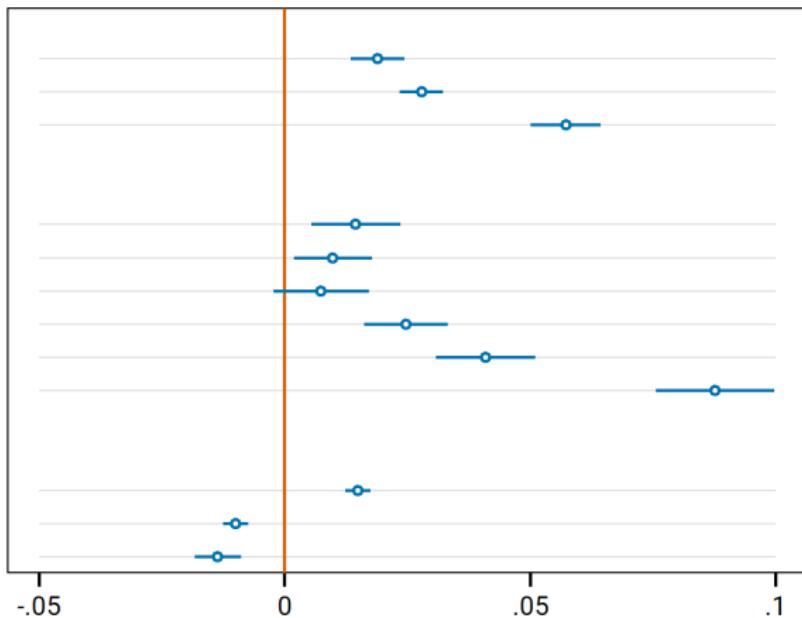
white female  
non-white male  
non-white female

## family position (ref. child)

head, with partner, no kids  
head, with partner, with kids  
partner, no kids  
partner, with kids  
head, no partner, no kids  
head, no partner, with kids

## family members by age

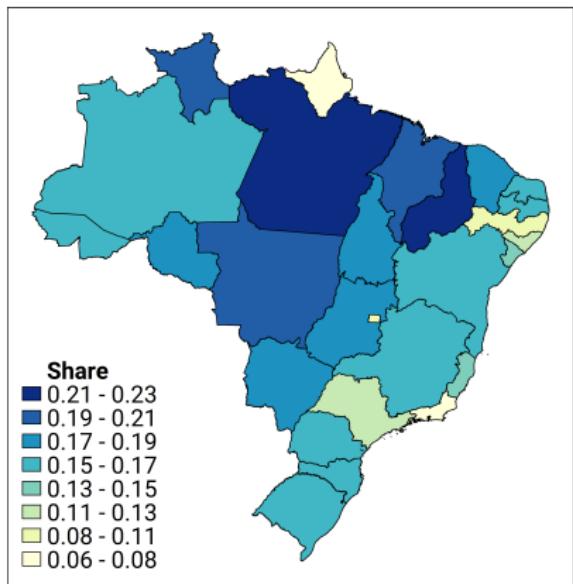
n. young members (below 18)  
n. adults (18 to 64 years)  
n. elderly members (above 64)



# Correlation with other discount rate determinants

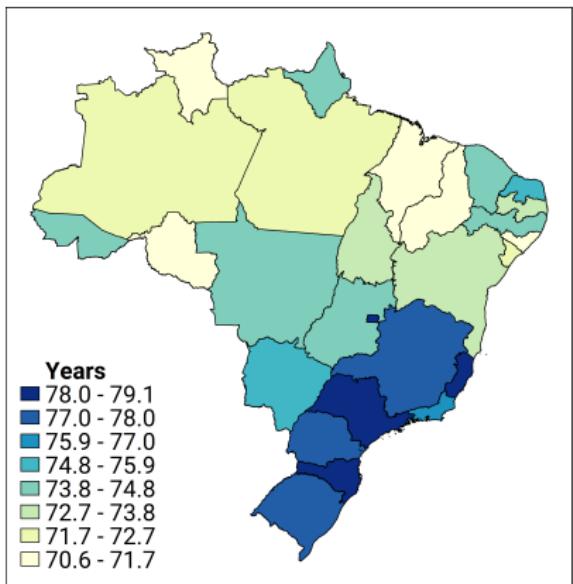
(a) Estimated share of constrained OAW.

Source: Own calculation.



(b) Life expectancy at birth

Source: IBGE.



# Research limitations

**Strong assumptions about the missing parts of an occupation's value.**

- ▶ Any taste for OAW (or for wage work) is assumed to be non-systematic.

**Potential specification error.**

- ▶ As with any structural estimation, the components could be misspecified.

**Incomplete picture of the discount rate.**

- ▶ The lower bound is not a sufficient statistic for the mean discount rate.

# In conclusion: what have we done?

## Objectives

- ▶ Formalize a new concept of constrained OAW.
- ▶ Understand the role of time discounting in labor market choices.

## Strategy

- ▶ Use wage equations to get counterfactual earnings for OAW.
- ▶ Explore the trade-off between OAW now vs. a better paid job later.

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## Results

- ▶ Simple model rationalizes OAW in dev. markets using canonical tools.
- ▶ Low-pay OAW can be optimal if jobs are scarce and consumption is urgent.
- ▶ Estimation suggests it matters: 3 in 5 Brazilian OAWs have  $\hat{\rho} > r$ .
- ▶ Vulnerable workers (e.g. single parents) appear to face particularly high urgency for consumption and are more often constrained OAWs.

## Implications

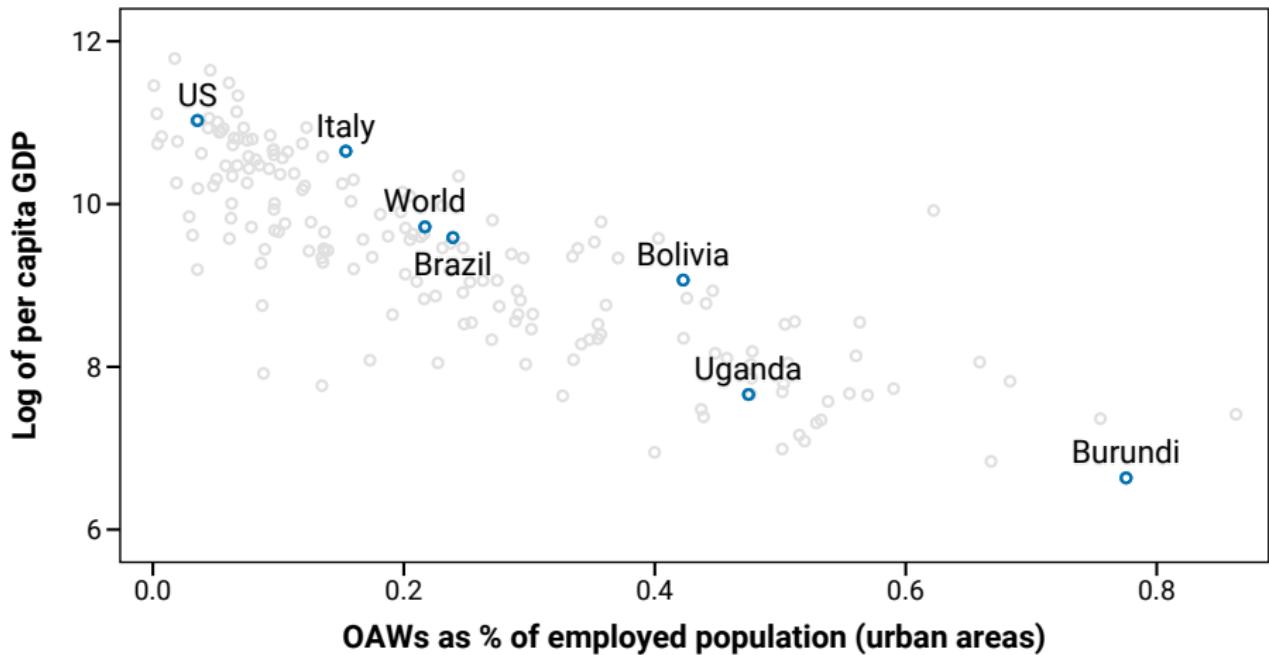
- ▶ Evidence of heterogeneity in worker's time discount rate.
- ▶ High incidence of OAW suggests misallocation of labor force.
- ▶ Policies allowing consumption smoothing could foster wage employment.

# Your contributions!

1. What should we emphasize in this research?
2. What is missing? Other robustness checks, decompositions... ?
3. What sort of field experiment could potentially elicit such mechanism?

# Appendix: Income vs. OAW share (2018)

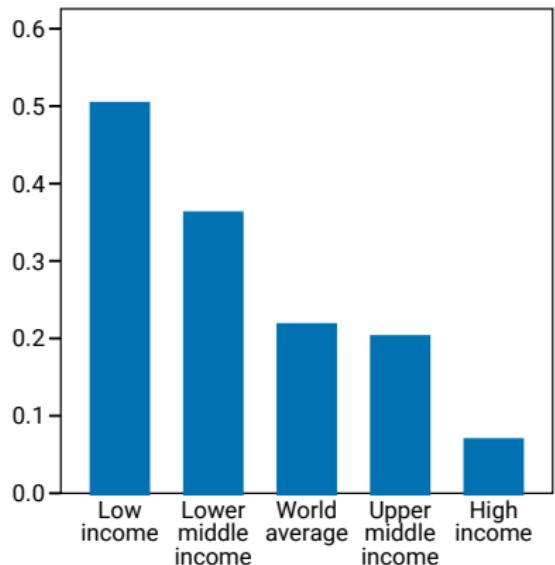
[return](#)



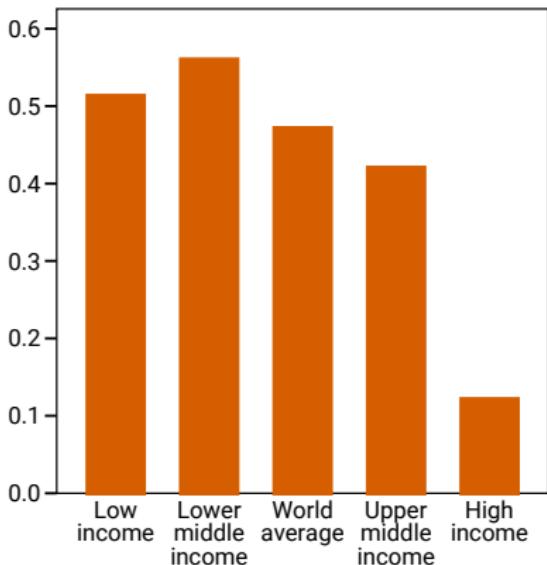
# Appendix: OAW in urban vs. rural areas

[return](#)

(a) OAWs as % of employed pop.  
(urban areas, 2018). Source: ILO.

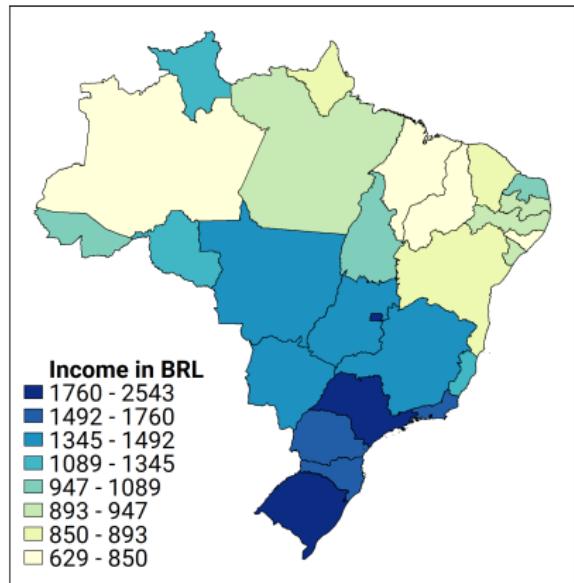


(b) OAWs as % of employed pop.  
(rural areas, 2018). Source: ILO.

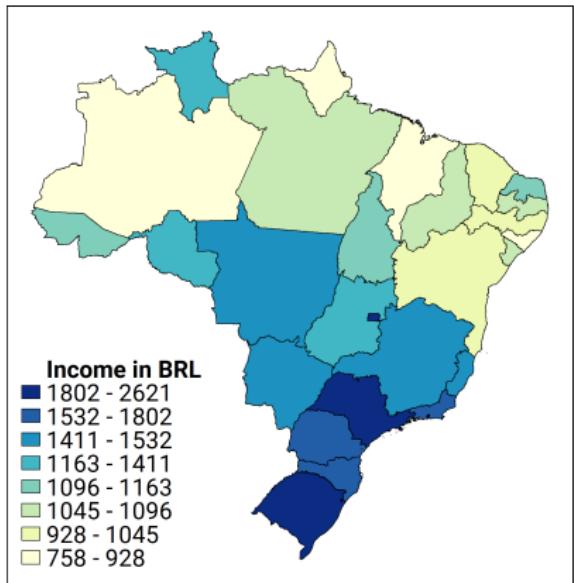


# Appendix: All areas vs. urban areas

(a) Average per capita income  
(all areas, 2018). Source: IBGE.

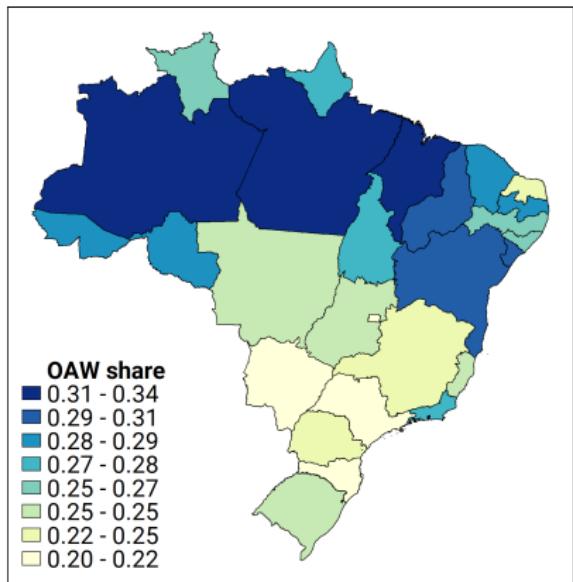


(b) Average per capita income  
(urban areas, 2018). Source: IBGE.

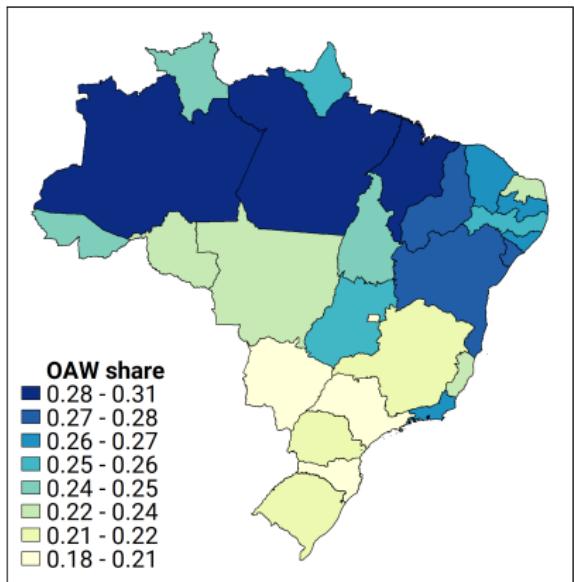


# Appendix: All areas vs. urban areas

(a) Share of own-account workers  
(all areas, 2018). Source: IBGE.



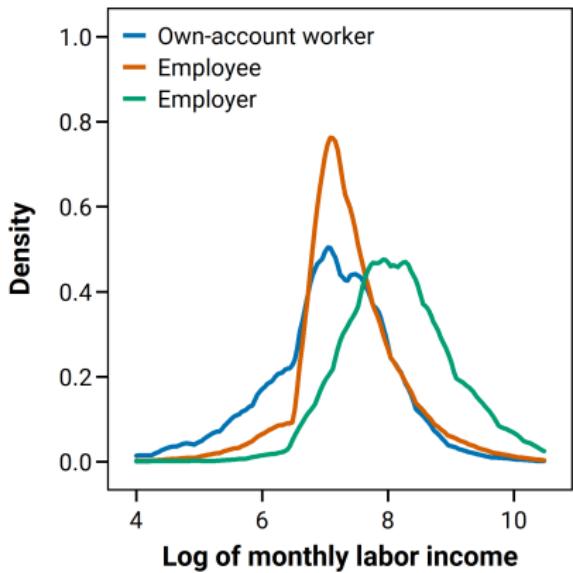
(b) Share of own-account workers  
(urban areas, 2018). Source: IBGE.



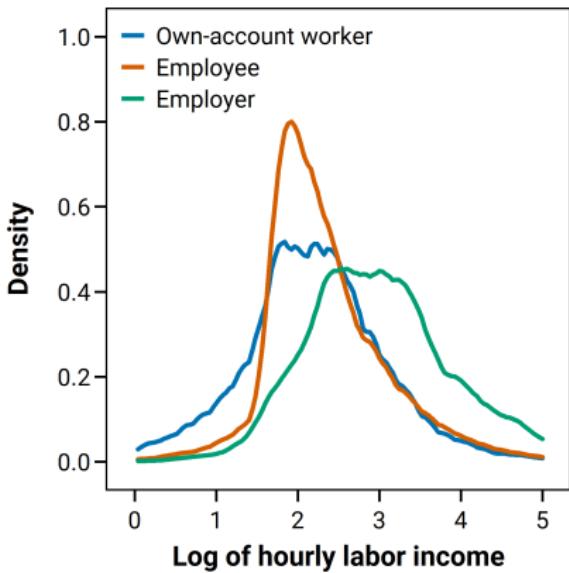
# Appendix: Monthly vs. hourly income

[return](#)

(a) *Monthly labor income*  
(urban areas, 2018). Source: IBGE.

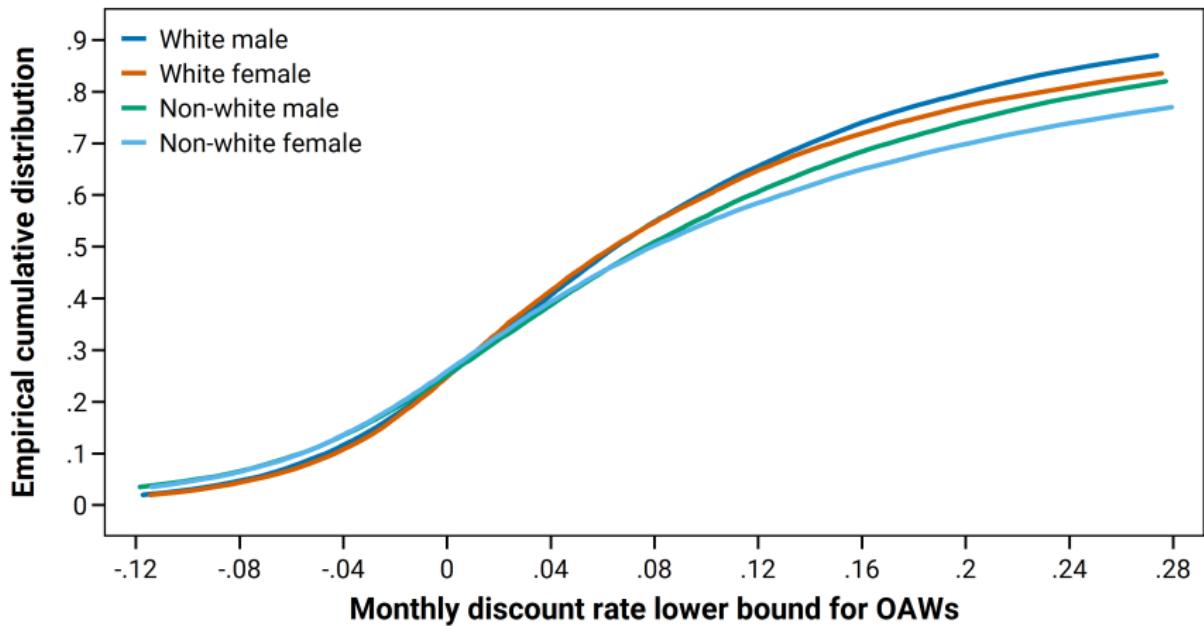


(a) *Hourly labor income*  
(urban areas, 2018). Source: IBGE.



# Appendix: Conditional CDF by gender

[return](#)



## Appendix: Alternative assumptions

**How do people build expectations about their potential wage?**

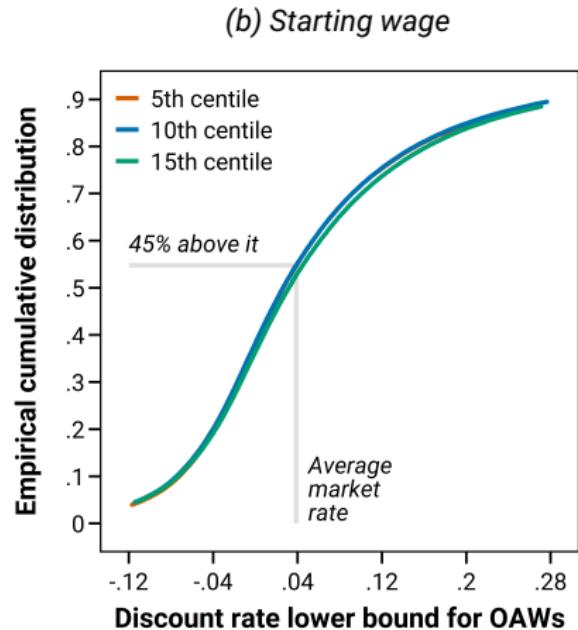
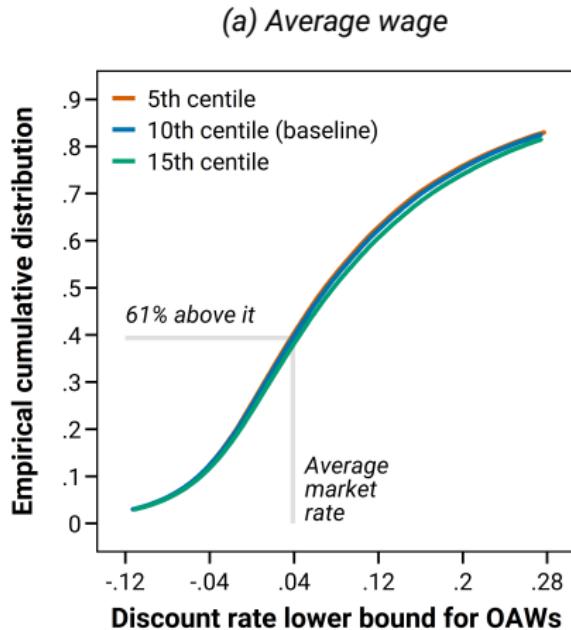
1. Workers like me are typically paid that much (mean wage).
2. Workers like me are being typically hired for that much (starting wage).

**How low should we go to get a sense of reservation wage?**

1. Conditional 15th quantile.
2. Conditional 10th quantile.
3. Conditional 5th quantile.

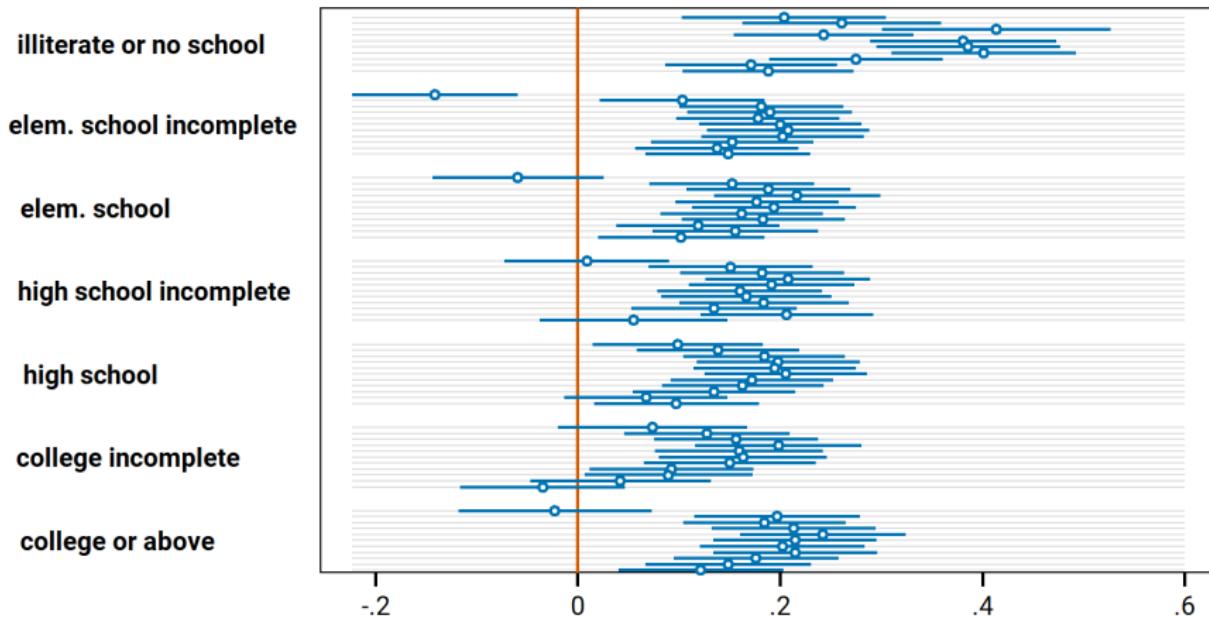
# Appendix: Alternative assumptions

1. Taking starting wages as reference, implicit discount rates are lower.
2. Results are robust to different assumptions for reservation wage.



# Appendix: Association of $\hat{\rho}$ with educ. and age

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Summary statistics	Sample	OAW	Employee	Employer	Unemp.
<i>Skin color and gender (share in %)</i>					
white male	21	28	24	46	17
white female	25	18	24	22	20
non-white male	26	35	28	23	31
non-white female	28	19	25	9	32
<i>Highest education level (share in %)</i>					
illiterate or no school	6	5	2	1	2
elem school incomp	26	29	17	14	20
elem school	10	10	8	7	10
high school incomp	8	7	6	4	13
high school	29	31	36	31	38
college incomp	6	4	7	7	7
college or above	15	15	23	37	10
<i>Household position (share in %)</i>					
head, with partner, with kids	18	27	21	36	12
head, with partner, no kids	8	10	7	12	4
head, no partner, with kids	8	7	7	5	6
head, no partner, no kids	9	10	8	7	5
partner, with kids	18	19	20	22	13
partner, no kids	8	7	7	8	4
child	24	13	22	7	45
<i>Income (in constant BRL)</i>					
Average labor income	2,388	1,868	2,313	5,931	0

<a href="#">return</a>	Job position	Distribution of employees	Distribution of OAW	Share of constr. OAW
management	private admin	4.2	1.9	49.4
graduate level	health	1.9	1.6	49.3
	finance, law	2.0	2.9	57.0
	education	6.0	1.2	70.4
	others	2.8	3.9	56.6
technical level	finance, law	3.9	2.7	49.3
	others	3.4	2.1	63.7
unskilled services	cook, waiter	3.6	2.3	61.9
	hair dresser	0.5	8.2	61.0
	driver	4.6	7.8	52.9
	retail	9.3	17.7	59.2
	street vendor	0.3	6.0	60.9
	waste management	0.5	0.9	80.2
	others	26.1	2.7	68.1
	food, drink	1.4	1.8	69.2
manufacturing	textiles	0.6	3.2	63.4
	others	10.3	9.9	64.2
	technical	2.4	14.5	59.2
construction	basic tasks	1.6	2.6	66.0
	technical	0.9	4.7	71.8
primary sector	basic tasks	1.2	0.8	78.4