The role of teachers’ expectation on the human capital formation technology

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Outline

1. Introduction
2. Human Capital Formation Technology
3. Measures
4. Sampling and Fieldwork
5. Descriptive Statistics
6. Empirical Model
7. Results
8. Conclusion
9. Stata Use
The role of subjective expectations about returns is well documented in the education literature.


Most of the literature focused on parental beliefs (Dizon-Ross (2019)).

However, it is also well documented that teachers play a fundamental role on children formation.


Socioemotional skills: Jackson (2018).

Teachers’ expectation is also important: Dobie and Fryer (2012), Pinto and Ponczek (2018) and Papageorge et al (2016).
Introduction

Our goal is threefold

- Elicit teachers’ beliefs on the relative importance of cognitive and socioemotional skills on human capital formation.
- Show how beliefs play an important role on teachers’ allocation on different tasks.
- Evaluate an intervention that sends information to teacher about the importance of socioemotional skills.

We are collecting data on 84 municipal schools in Rio. Data from 168 3rd and 4th-grade teachers and around 3,500 students.
Human Capital Formation Technology

Adult Outcome (t+1)

1-\(\alpha\)  \(\alpha\)  

Cog Skills (t+1)  Non-cog Skills (t+1)  Socio-econ Charac.

Cog Skills (t)  Non-cog Skills (t)  Teacher’s Tasks Investments
**Assumption**: Teachers maximize the expectation of adult outcome

This expected value will depend on:

- Teacher’s belief on the importance of non-cognitive skills
  
  \( \phi^\tau = E[\alpha|\Omega^\tau, \theta^N_t, \theta^C_t] \)

- Teacher’s Tasks Investments
Measures

**Expectation and Investment Measure**

1st Part: **Effort allocation** in each of the teaching practices (inside or outside the classroom). Total effort should sum 100.

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Dentro da sala de aula – atividades devem somar 100 unidades de esforço

- Resolver/discutir questões da matéria em sala de aula: 0
- Incentivar os alunos a buscarem métodos alternativos para resolver os problemas que encontram dificuldades ou a se aprofundarem no conteúdo: 0
- Elogiar o esforço dos alunos: 0
- Buscar relacionar o conteúdo da matéria ao cotidiano dos alunos: 0
- Encorajar bom comportamento: 0
- Passar e/ou corrigir tarefa de casa: 0
- Realizar avaliações com o intuito de identificar as dificuldades dos alunos: 0
- Estimular a autonomia dos alunos e a participação deles em aula: 0
- Revisar com os alunos o conteúdo anterior antes de avançar para um conteúdo novo: 0
- Estabelecer conexões emocionais com os alunos: 0
- Estimular os alunos a trabalharem em grupo: 0
Measures

- **Expectation and Investment Measure**
  - 2nd Part: **Rank of teaching practices** according to their priors on how much each practice develops students’ socioemotional skills.
Measures

- **Expectation and Investment Measure**
  - 3rd Part: *Teachers’ expectations* on future wage and schooling of students with different combinations of cognitive and non-cognitive skills.
1. How beliefs are formed? (Rokeach, M., 1960)
   - Self-generated: Experience, Experiment, Reflection.
   - Externally generated: Information, Experts, Authority, etc.
   - Reverse Causality: Teaching practices (experience) might impact belief and not the other way around.
   ⇒ We randomly selected participants for an information intervention (text messages: change in information set).
1st Challenge: Endogeneity

**Information Intervention** ($T_1$): Text messages during 2018 school-year.

- **Treatment:** 14 messages with pieces of evidences on the importance of socioemotional skills (+ 14 control messages).
  - Eg. "It is well documented that socioemotional skills are rewarded in the labor market in the form of higher wages and a shorter period of unemployment."
- **Control:** 14 messages with general info about the Brazilian school system.
  - Eg. "There are approximately 280 thousand schools in Brazil and about 5% of these are in the State of Rio de Janeiro."
1st Challenge: Endogeneity

- Focus Group of the Messages with 27 elementary school teachers of a Sao Paulo municipal school with SEL.

- 83% (73%) of teacher’s said they would rethink their teaching practices after reading treatment (control) messages.
Information Intervention: Text Messages

📍 Treatment – Intervention 2 (belief’s text messages) 📍 Control – Intervention 2 (belief’s text messages)
Challenges

1. How beliefs are formed? (Rokeach, M., 1960)
   - Self-generated: Experience, Experiment, Reflection.
   - Externally generated: Information, Experts, Authority, etc.
   - Reverse Causality: Teaching practices (experience) might impact belief and not the other way around.
     ⇒ We randomly selected participants for an information intervention (text messages: change in information set).

2. From beliefs to practice (Schraw and Olafson, 2006):
   - Teacher beliefs may not predict behavior. Problems with instrumentation due to lack of knowledge.
     ⇒ SEL Intervention train teachers how to implement "socioemotional tasks".
2nd Challenge: Know-how

SEL Intervention ($T_2$): *Programa Compasso*

- Created by a Brazilian NGO called *Vila Educacao*; based on the American *Second Step*.
- Regular school teachers are trained in the methodology to teach 22 socioemotional lessons once a week.
- Material: student’s handbook (homeworks for family integration), CDs, DVDs and teacher’s handbook.

  - Some significant on executive functions and angry bias, especially on violent neighborhood.
Challenges

1. How beliefs are formed? (Rokeach, M., 1960)
   - Self-generated: Experience, Experiment, Reflection.
   - Externally generated: Information, Experts, Authority, etc.
   - Reverse Causality: Teaching practices (experience) might impact belief and not the other way around.
     ⇒ We randomly selected participants for an information intervention (text messages: change in information set).

2. From beliefs to practice (Schraw and Olafson, 2006):
   - Teacher beliefs may not predict behavior. Problems with instrumentation due to lack of knowledge.
     ⇒ SEL Intervention train teachers how to implement "socioemotional tasks".

3. Measurement Error on Teaching Practices (Stigler and Hiebert, 1999)
   - Teachers report what they believe and not what they actually do.
     ⇒ Class Observation: random sample of 20 schools (40 classrooms) during the month of October.
3rd Challenge

- Measurement Error on Teaching Practices (Stigler and Hiebert, 1999)
  - Teachers report what they believe and not what they actually do.
    ⇒ Class Observation: random sample of 20 schools (40 classrooms) during the month of October.
    - Double-coded
    - Task intensity on a likert-scale
    - Correlation with teacher report: 68%.
    - Measurement error is not different for treated and controls
Sampling and Fieldwork

- **2017 sample:** 94 schools; Around 4000 students (3rd and 5th grade); 188 teachers.

- **2018 sample:** 84 (out of 2017’s 94) schools; Around 3500 students (3rd and 4th grade); 168 teachers.
Sampling and Fieldwork

- **Teachers’ Measures:**
  - Growth Mindset
  - Perceived Stress Scale
  - Teacher Efficacy
  - Teacher Expectation and Investments Measure - only in 2018

- **Students’ Measures:**
  - Cognitive Skills (Executive Function and Vocabulary)
  - Socioemotional Competences (ACES and teacher’s report)
Table 1: Take-up

<table>
<thead>
<tr>
<th></th>
<th>$T_1 = 1$</th>
<th>$T_2 = 1$</th>
<th>$T_2 = 0$</th>
<th>$T_1 = 0$</th>
<th>$T_2 = 0$</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample (100%)</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>168</td>
</tr>
<tr>
<td>Baseline</td>
<td>27 (64%)</td>
<td>23 (55%)</td>
<td>27 (64%)</td>
<td>24 (57%)</td>
<td>101 (60%)</td>
<td></td>
</tr>
<tr>
<td>Follow-up</td>
<td>38 (90%)</td>
<td>35 (83%)</td>
<td>35 (83%)</td>
<td>32 (76%)</td>
<td>140 (83%)</td>
<td></td>
</tr>
<tr>
<td>Both Baseline + Follow-up</td>
<td>27 (64%)</td>
<td>21 (50%)</td>
<td>24 (57%)</td>
<td>21 (50%)</td>
<td>93 (55%)</td>
<td></td>
</tr>
<tr>
<td>$T_1$ Total</td>
<td>48 (57%)</td>
<td></td>
<td></td>
<td>45 (54%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- No evidence of unbalance nor selective attrition.
- Teachers from both groups are similar on observables.
- Statistical power compromised.
Expected Wages - Baseline

Teacher: Cog
Student: Low Cog
R$2,307.70

Student: High Cog
R$3,379.03

Teacher: NCog
Student: Low Cog
R$2,915.26

Student: High Cog
R$3,930.51

Teacher: Cog
Student: Low NCog
R$2,672.82

Student: High NCog
R$3,980.81

Teacher: NCog
Student: Low NCog
R$3,628.21

Student: High NCog
R$4,662.34
Beliefs

Beliefs (Baseline vs Follow-up)
Descriptive Statistics

- How we measure the investments (effort) of the teachers on non-cog tasks?
  - Investment-Ranking: correlation between task-investments and task-ranking (baseline).
  - We fixed baseline task-ranking.

- This is robust to many different definitions of Investment-Ranking.
Descriptive Statistics

Adherence with Teacher's Non-Cognitive Wage Premium

![Graph showing adherence with teacher's non-cognitive wage premium.](image)
Exploring the Message Treatment - Empirical Method

- Main Model:

\[
\beta_1^T = \alpha_0 + \alpha_1 \beta_0^T + \alpha_2 \phi_0^T + \alpha_3 \phi_1^T + \sum_{i=1}^{21} \gamma_i d_{strata_i} + \varepsilon^T
\]

\[
\phi_1^T = \mu_0 + \mu_1 T_1 + \mu_2 \beta_0^T + \mu_3 \phi_0^T + \sum_{i=1}^{21} \delta_i d_{strata_i} + u^T
\]

- \(\beta_1^T\): correlation in \(t\) between task-investments and baseline task-ranking, ie, \(\text{Corr}(r(S_{ij})_t, (r(\alpha^N_j) - r(\alpha^N_i)))_0\)

- \(\phi_t\): non-cognitive expectation measure in \(t\).
- \(T_1\) as a instrument for \(\phi_1^T\).

- Dependent variable estimated: bootstrap or WLS (inverse of \(\beta_1^T\) variance)
## Results

### Table 2: First Stage

<table>
<thead>
<tr>
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<th>(1)</th>
<th>(2)</th>
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<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment ($T_1$)</td>
<td>0.115***</td>
<td>0.145***</td>
<td>0.115**</td>
<td>0.145***</td>
</tr>
<tr>
<td></td>
<td>(0.042)</td>
<td>(0.044)</td>
<td>(0.052)</td>
<td>(0.054)</td>
</tr>
<tr>
<td>Baseline Expectation ($\phi_0$)</td>
<td>0.146</td>
<td>0.176</td>
<td>0.146</td>
<td>0.176</td>
</tr>
<tr>
<td></td>
<td>(0.146)</td>
<td>(0.153)</td>
<td>(0.164)</td>
<td>(0.177)</td>
</tr>
<tr>
<td>Baseline Correlation Investment-Ranking ($\beta_0$)</td>
<td>-0.115</td>
<td>-0.188</td>
<td>-0.115</td>
<td>-0.188</td>
</tr>
<tr>
<td></td>
<td>(0.157)</td>
<td>(0.152)</td>
<td>(0.171)</td>
<td>(0.176)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.268</td>
<td>0.331</td>
<td>0.268</td>
<td>0.331</td>
</tr>
<tr>
<td>Observations</td>
<td>93</td>
<td>93</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>Covariates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strata Fixed Effects</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Teacher’s Covariates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLS</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Bootstrap (500 reps)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</tbody>
</table>
Table 3: Second Stage - IV

<table>
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<th>(3)</th>
<th>(4)</th>
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<th>(6)</th>
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</thead>
<tbody>
<tr>
<td>Baseline Correlation</td>
<td>0.553***</td>
<td>0.550***</td>
<td>0.553***</td>
<td>0.567***</td>
<td>0.553***</td>
<td>0.550***</td>
</tr>
<tr>
<td></td>
<td>(0.158)</td>
<td>(0.146)</td>
<td>(0.167)</td>
<td>(0.150)</td>
<td>(0.163)</td>
<td>(0.146)</td>
</tr>
<tr>
<td>Baseline Expectation Measure</td>
<td>-0.256*</td>
<td>-0.254**</td>
<td>-0.211</td>
<td>-0.221*</td>
<td>-0.256</td>
<td>-0.254*</td>
</tr>
<tr>
<td></td>
<td>(0.142)</td>
<td>(0.125)</td>
<td>(0.151)</td>
<td>(0.130)</td>
<td>(0.318)</td>
<td>(0.130)</td>
</tr>
<tr>
<td>Follow-up Expectation Measure</td>
<td>0.654*</td>
<td>0.514*</td>
<td>0.696</td>
<td>0.529*</td>
<td>0.654</td>
<td>0.514*</td>
</tr>
<tr>
<td></td>
<td>(0.376)</td>
<td>(0.275)</td>
<td>(0.444)</td>
<td>(0.300)</td>
<td>(0.996)</td>
<td>(0.277)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.204</td>
<td>-0.092</td>
<td>-0.160</td>
<td>-0.068</td>
<td>-0.204</td>
<td>-0.092</td>
</tr>
<tr>
<td></td>
<td>(0.315)</td>
<td>(0.264)</td>
<td>(0.332)</td>
<td>(0.257)</td>
<td>(0.534)</td>
<td>(0.263)</td>
</tr>
<tr>
<td>Observations</td>
<td>93</td>
<td>93</td>
<td>93</td>
<td>93</td>
<td>93</td>
<td>93</td>
</tr>
</tbody>
</table>

- Covariates:
  - Strata Fixed Effects
  - Teacher's Covariates
- Method:
  - GMM
  - WLS
  - Bootstrap (500 reps)

Results are larger for inside than for outside the classroom tasks.
So Far...

- $T_1$ (Information intervention) has an impact of 0.1 on teacher’s expectations.

- Increased expectations get teachers to invest 50% more in "socioemotional tasks".

- Further Questions: (i) Do teachers know how to implement socioemotional tasks? Teacher’s from SEL intervention do. (ii) Is it possible that the results above are actually from SEL intervention?
## Table 4: Using $T_2$ instead of $T_1$

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEL Treatment ($T_2$)</td>
<td>-0.051</td>
<td>-0.039</td>
<td>-0.051</td>
<td>-0.039</td>
</tr>
<tr>
<td></td>
<td>(0.053)</td>
<td>(0.053)</td>
<td>(0.056)</td>
<td>(0.058)</td>
</tr>
<tr>
<td>Baseline Expectation</td>
<td>0.245</td>
<td>0.264*</td>
<td>0.245</td>
<td>0.264</td>
</tr>
<tr>
<td></td>
<td>(0.149)</td>
<td>(0.149)</td>
<td>(0.166)</td>
<td>(0.185)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.216</td>
<td>0.242</td>
<td>0.216</td>
<td>0.242</td>
</tr>
<tr>
<td>Observations</td>
<td>93</td>
<td>93</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>Covariates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strata Fixed Effects</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Teacher's Covariates</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Method:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLS</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Bootstrap (500 reps)</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 5: Effects on Students’ Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Cognitive Scores</th>
<th>Non-Cognitive Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PPVT</td>
<td>BDS</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.019</td>
<td>0.396**</td>
</tr>
<tr>
<td></td>
<td>(0.174)</td>
<td>(0.193)</td>
</tr>
<tr>
<td>SEL Treatment</td>
<td>0.056*</td>
<td>-0.025</td>
</tr>
<tr>
<td></td>
<td>(0.032)</td>
<td>(0.037)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.129</td>
<td>0.127</td>
</tr>
<tr>
<td>Observations</td>
<td>3222</td>
<td>2556</td>
</tr>
</tbody>
</table>

Covariates: School Pairs Fixed Effects, Strata Fixed Effects, Assessors Fixed Effects, Grade Fixed Effects, Violence, Students's age, gender and SSE.
Conclusions

- $T_1$ (information Intervention) has an impact of 0.1 on teacher’s expectations.
  - Taking a teacher from the 2nd decil of baseline expectation to the median expectation.

- Increased expectations get teachers to increase their socioemotional effort in 6%.
  - Taking a teacher from the 1st decil of investment-ranking correlation to the mean/median.

- Treatment has direct impact on students’ outcomes:
  - Executive Function (BDS): from the 1st to the 4th decil.
  - Non Cognitive Skills (ACES): from the 1st to the 2nd decil.
  - More violent areas: reduced angry bias from mean to 1st decil.
Data-set Construction

* Juntando a base de professores limpa na Co-working
/*
use "$cow\y2\t\t\t0.dta", clear
save "$base\y2\t\t\t0.dta", replace
use "$cow\y2\t\t\t1.dta", clear
save "$base\y2\t\t\t1.dta", replace
*/

use "$base\y2\t\t\t0.dta", clear
merge 1:1 cdschool class using "$base\y2\t\t\t1.dta"
rename _merge merge_0_1
Variables

70 * Criando um código para cada professor
71 egen teachercode = concat(cdschool class), punct(" ")
72 gen grade_3=(class=="3° ano")
73 gen treat_real=(treat&grade_3)
74
75 /* Parte 3 do questionário: quanta renda o professor acha que alunos
diferentes combinações de habilidades
76 cog e ncog receberão no futuro em dois casos: professores que focam
professores que focam em não cognitivo.*/
77
78 forvalues num=0(1)1{
79 **Prof Cog
80 gen xc_`num'=belief_p3_1_m1_`num' //alto cog alto ncog
81 gen zc_`num'=belief_p3_2_m1_`num' //alto cog baixo ncog
82 gen yc_`num'=belief_p3_3_m1_`num' //baixo cog alto ncog
83 gen wc_`num'=belief p3 4 m1 `num' //baixo cog baixo ncog
84
85 **Prof Não-Cog
86 gen xn_`num'=belief_p3_1_m2_`num' //alto cog alto ncog
87 gen zn_`num'=belief_p3_2_m2_`num' //alto cog baixo ncog
88 gen yn_`num'=belief_p3_3_m2_`num' //baixo cog alto ncog
89 gen wn_`num'=belief_p3_4_m2_`num' //baixo cog baixo ncog
90 }
91
92
Variables

* Passando o log

```stata
forvalues num=0(1)1{
    foreach var in xc`num' zc`num' yc`num' wc`num' xn`num' zn`num' yn`num' wn`num'{
        qui sum `var'
    
        gen tag`var'`num'=1 if `var'==r(min)
        replace `var'=(`var'-(r(min)))/(r(max)-r(min))
        replace `var'=`var'+1
        replace `var'=ln(`var')
    }
```

/* Função objetivo: \( y = A(h)(\theta^N)^\alpha(\theta^C)^{1-\alpha} \)
Resolvendo o modelo temos: \( dy_dthetaN + dy_dthetaC = \gamma \) (1)
\( dy_dIC = (1-\gamma)(1-\phi) \) (2)
*/

* dy_dthetaN = prêmio financeiro médio dado para o não cognitivo (considerando os dois tipos de professores)
```stata
gen dy_dthetaN`num'=1/4*(xc`num'-zc`num'+yc`num'-wc`num'+xn`num'-zn`num'+yn`num'-wn`num')
```

* dy_dthetaC = prêmio financeiro médio dado para o cognitivo (considerando os dois tipos de professores)
```stata
gen dy_dthetaC`num'=1/4*(xc`num'-yc`num'+zc`num'-wc`num'+xn`num'-yn`num'+zn`num'-wn`num')
```
Variables

* Seria o \( \gamma^\tau \)
```
gen gamma_t`num'=dy_dthetaN`num'+dy_dthetaC`num'
qu sum gamma_t`num'
```

* Padronizando \( \gamma \) para ficar entre 0 e 1
```
replace gamma_t`num'=(gamma_t`num' - r(min))/(r(max) - r(min))
```

* \( dy_{DIC} \) = prêmio financeiro médio dado para o professor que foca no cognitivo
```
gen dy_dIC`num'=-1/4*(xn`num`-xc`num`+yn`num`-yc`num`+zn`num`-zc`num`+wn`num`-wc`num`)
gen dy_dIN`num'=1/4*(xn`num`-xc`num`+yn`num`-yc`num`+zn`num`-zc`num`+wn`num`-wc`num`)
```

* Isolando \( \phi \) em (2) temos:
```
gen phi_t_aux`num'=1-(dy_dIN`num`)/(1-gamma_t`num')
gen phi_t_aux2`num'= phi_t_aux`num'
```
```
Variables

forvalues num=0(1)1{
* Criando a razão dos investimentos = razão do esforço nas práticas 2 a 2
gen S_num_ji=p1_num_j/p1_num_i
* Criando o ranking (três maneiras distintas) da razão dos investimentos = razão do esforço nas práticas 2 a 2
bysort cod_prof dentro: egen r1_S_num_ji = rank(S_num_ji), field
bysort cod_prof dentro: egen r2_S_num_ji = rank(S_num_ji), track
bysort cod_prof dentro: egen r3_S_num_ji = rank(S_num_ji), unique
bysort cod_prof dentro: egen r4_S_num_ji = rank(S_num_ji)
* Criando a diferença entre os rankings socioemocionais das práticas
gen p2_num_ji-p2_num_j-p2_num_i
la var p2_num_ji "Diferença entre ranking das práticas 2 a 2 em t=\'num\''

* Deixando os rankings no negativo, só para o maior ter maior número!
foreach var in r1 S_num_ji r3 S_num_ji r4 S_num_ji{
replace \var = - \var
}
}
Descriptive Statistics

```stata
293  gen dif_belief = phi_t_sample_1 - phi_t_sample_0
294
295  twoway (kdensity dif_belief if treat_belief==1) (kdensity dif_belief if treat_belief==0),
   legend(lab(1 "Treatment") lab(2 "Control")) graphregion(color(white)) ytitle("")
   bgcolor(none) xtitle("") title("Belief {stSerif}{\{it:{\&phi}\{sup:{\&tau}\}}\}") saving(
   "$grafs/delta_belief.gph", replace)
296  graph export "$grafs/delta belief.png", as(png) replace
297
298  xi: reg phi_t_sample_1 phi_t_sample_0 i.pair_belief, rob
299  predict belief_res, res
300
301  twoway (kdensity belief res if treat_belief==1) (kdensity belief res if treat_belief==0),
   legend(lab(1 "Treatment") lab(2 "Control")) graphregion(color(white)) ytitle("")
   bgcolor(none) xtitle("") title("Belief {stSerif}{\{it:{\&phi}\{sup:{\&tau}\}}\}") saving(
   "$grafs/residuo belief.gph", replace)
302  graph export "$grafs/residuo belief.png", as(png) replace
```
Descriptive Statistics

293  gen dif_belief = phi_t_sample_1 - phi_t_sample_0
294
295  twoway (kdensity dif_belief if treat_belief==1) (kdensity dif_belief if treat_belief==0),
296  legend(lab(1 "Treatment") lab(2 "Control")) graphregion(color(white)) ytitle("")
297  xtitle("") title("Belief\{stSerif\}{{\it{:\&phi}{sup:{&tau}}}\}}") saving(\n298  "$grafs/delta\_belief.gph", replace)
299  graph export "$grafs/delta\_belief.png", as(png) replace
300
301  xi: reg phi_t_sample_1 phi_t_sample_0 i.pair\_belief, rob
302  predict belief_res, res
303
304  twoway (kdensity belief_res if treat_belief==1) (kdensity belief_res if treat_belief==0),
305  legend(lab(1 "Treatment") lab(2 "Control")) graphregion(color(white)) ytitle("")
306  xtitle("") title("Belief\{stSerif\}{{\it{:\&phi}{sup:{&tau}}}\}}") saving(\n307  "$grafs/residuo\_belief.gph", replace)
308  graph export "$grafs/residuo\_belief.png", as(png) replace
Motivação: ranking correlaciona com belief?

Gráfico Correlação vs Prêmios financeiros

twoway (scatter corr_0_ji raw_dy_dthetan_0) (lfit corr_0_ji raw_dy_dthetan_0), xlabel(, grid gmax) leg(off) ytitle("Investment-Ranking") xtitle("Non-Cognitive Wage Premium") graphregion(color(white)) bgcolor(none) title("Adherence with Student's Non-Cognitive Wage Premium") saving(corr_n, replace)

graph export "$grafsartigo/corr_wagethetan.png", as(png) replace

twoway (scatter corr_0_ji raw_dy_dIN_0) (lfit corr_0_ji raw_dy_dIN_0), xlabel(, grid gmax) leg(off) ytitle("Investment-Ranking") xtitle("Non-Cognitive Wage Premium") graphregion(color(white)) bgcolor(none) title("Adherence with Teacher's Non-Cognitive Wage Premium") saving(corr in, replace)

graph export "$grafsartigo/corr_wagein.png", as(png) replace
Results

```stata
490  reg phi_t_sample_1 treat belief phi_t_sample_0 i.pair_belief, rob
491  estimates store itt
492  reg phi_t_sample_1 treatbelief phi_t_sample_0 i.pair_belief etnial underEduc, rob
493  estimates store itt2
494  bootstrap, reps(1000): reg phi_t_sample_1 treat belief phi_t_sample_0 i.pair_belief, rob
495  estimates store itt3
496  bootstrap, reps(1000): reg phi_t_sample_1 treat belief phi_t_sample_0 i.pair_belief etnial underEduc, rob
497  estimates store itt4
498  estout itt itt2 itt3 itt4, cells(b(fmt(3) star) se(fmt(3) par)) stats(r2 N) starlevels(* 0.1 ** 0.05 *** 0.01)
```
/*

foreach var in corr b corr 0 b corr 1 b {
  ivregress gmm `var'1_ji `var'0_ji phi_t_sample_0 i.pair_belief (phi_t_sample_1=
  treat_belief)
estimates store iv1`var`

  ivregress gmm `var'1_ji `var'0_ji phi_t_sample_0 i.pair_belief (phi_t_sample_1=
  treat_belief) [aw=se`var'1_ji]
estimates store iv2`var`
}

ivregress gmm `var'1_ji `var'0_ji phi_t_sample_0 i.pair_belief etnial under Educ (phi_t_sample_1=treat_belief)
estimates store iv3`var`

ivregress gmm `var'1_ji `var'0_ji phi_t_sample_0 i.pair_belief etnial under Educ (phi_t_sample_1=treat_belief) [aw=se`var'1 ji]
estimates store iv4`var`

bootstrap, reps(2000): ivregress gmm `var'1_ji `var'0_ji phi_t_sample_0 i.pair_belief (phi_t_sample_1=treat_belief)
estimates store iv5`var`

bootstrap, reps(2000):ivregress gmm `var'1_ji `var'0_ji phi_t_sample_0 i.pair_belief etnial under Educ (phi_t_sample_1=treat_belief)
estimates store iv6`var`
}
estout iv1corr b iv2corr b iv3corr b iv4corr b iv5corr b iv6corr b , cells(b(fmt(3) star) se(fmt(3) par)) stats(r2 N) starlevels(* 0.1 ** 0.05 *** 0.01)
estout iv1corr_1_b_ iv2corr_1_b_ iv3corr_1_b_ iv4corr_1_b_ iv5corr_1_b_ iv6corr_1_b_, cells(b(fmt(3) star) se(fmt(3) par)) stats(r2 N) starlevels(* 0.1 ** 0.05 *** 0.01)
estout iv1corr_0_b_ iv3corr_0_b_ iv2corr_0_b_ iv4corr_0_b_ iv5corr_0_b_ iv6corr_0_b_, cells(b(fmt(3) star) se(fmt(3) par)) stats(r2 N) starlevels(* 0.1 ** 0.05 *** 0.01)