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ASSESSING THE IMPACTS OF WORKFORCE SKILL IMPROVEMENT ON INCOME TRANSFER PROGRAMME BENEFICIARIES IN BRAZIL

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Introduction

- Conditional Cash Transfer Social Programs are designed to prevent poverty and reduce inequality;

- In 2003, Brazil established the Bolsa Família Program to tackle poverty and inequality:

  - Serves families with a per capita income of up to R$ 89.00 per month or those with incomes between R$ 89.01 and R$ 178.00, provided if the family have children aged between 0 to 17 years old;

  - To be eligible for the transfers, families must meet certain requirements in the areas of health, education, and social assistance;

- While compliance with the Bolsa Família Program's educational requirements for **children** receives much attention, little attention is paid to the lack of job requirements for adults in recipient families

Introduction (cont.)

- Also:
  - Although monitoring children school attendance has been shown to reduce grade repetition rates, **it does not appear to have** a strong enough impact on educational outcomes to suggest that the program is solely responsible for improving student achievement
  - This is partly since basic education in Brazil is almost universally accessible, disapproval rates are low, progression is high, and several policies supporting school attendance have been implemented for some time

Introduction (cont.)

- Social Cash Transfer programs, which provide transfers from the government to low-income families, **affect the consumption patterns of the beneficiaries**
  - i.e. are efficient in alleviate poverty effects, at first, temporary
- The increased resources received by the families result in a shift towards more capital-intensive goods, such as agriculture and manufacturing, compared to the government's expenditure on services;
- This shift of government resources towards the poorest families leads to a relative increase in the price of capital in comparison to labor price;

Introduction (cont.)

- Therefore, it is important to consider training programs to improve job qualifications and increase income
    - Improving human capital through training can lead to higher individual productivity and earnings, with a greater impact on wages for those with lower levels of education

It's important to assess the impact of solutions that not only involve heads of households in the labor market but also provide training to improve their skills, making the effects of income transfers permanent rather than temporary

Methodology – DAYANE model

- It is a multiregion, multisector, multifactor computable general equilibrium model
- The basedata is based on PAEG model
- Is designed in TABLO language using GEMPACK based of GTAP v.6 code
- Is used for comparative-static simulations, with its assumptions, equations, and variables referring implicitly to the future economy

Methodology – DAYANE model (cont.)

Table 1 – Sectors and Regions of the Model

Sectors	Regions
Agriculture	Brazil - North (NOR)
Paddy rice (pdr)	Brazil - Northeast (NDE)
Cereal grains (gro)	Brazil - Midwest (COE)
Oil seeds (osd)	Brazil - Southeast (SDE)
Sugar cane; sugar industry (c_b)	Brazil - South (SUL)
Animal products (oap)	Rest of Mercosur
Milk and dairy products (rmk)	United States of America
Other agricultural products (agr)	Canada
Industry	Rest of Americas
Food products (foo)	Mexico
Textiles (tex)	European Union
Wearing apparel leather products (wap)	Rest of Europe
Wood products (lum)	Japan
Paper products publishing (ppp)	Russia
Chemical rubber plastic prods (crp)	China
Other manufacturing (man)	India
Services	Australia and New Zealand
Electricity, gas, water distribution (siu)	Fast development Asia
Construction (cns)	Africa
Trade (trd)	Middle East
Transport (otp)	Rest of Asia
Services (ser)	

Source: Gurgel, Lima e Pinto (2020)

Methodology – DAYANE model

- Families Income Classes – Brazil (based in 2014 minimum wage (MW))

  - F1 - until 1 MW;
  - F2 - more than 1 MW until 2.5 MW;
  - F3 - more than 2.5 MW until 4 MW;
  - F4 - more than 4 MW until 5 MW;
  - F5 - more than 5 MW until 6 MW;
  - F6 - more than 6 MW until 7 MW;
  - F7 - more than 7 MW until 8 MW;
  - F8 - more than 8 MW until 10 MW;
  - F9 - more than 10 MW until 12 MW;
  - F10 - more than 12 MW;

10 income classes for Brazilian regions

- consumption (19 sectors) [COMM x RBRA x FAM]
- income

Methodology – DAYANE model

- Families' income source - Brazil:
  - Capital (+);
  - Land (+);
  - Transfers from Gov (BolsaFam, SocialPrograms, OthTransf, PubRetirement, ITaxRefund) (+);
  - Income Tax (-);
  - Labor (+):

splitted into:

- The qualification levels – Brazillian families
  - S1 - No Instruction;
  - S2 - Incomplete Basics;
  - S3 - Complete Basics;
  - S4 - Incomplete Fundamental;
  - S5 - Qualified Basics;
  - S6 - Complete Fundamental;
  - S7 - Incomplete High School;
  - S8 - Qualified Fundamental;
  - S9 - Complete High School;
  - S10 - Qualified High School;
  - S11 - Incomplete College;
  - S12 - Complete College;

12 skill levels for each 10 income classes for Brazilian region
[COMM x FAM x RBRA x SKILL]

To modelling the labor market, the study considered formal and informal workers aged between 18 and 65 years old, excluding civil servants and military personnel as their wages are not determined by the market. Hourly earnings below R$1 and above R$100 were not considered;

The person weights from the POF and PNAD surveys were used to expand the data;

Methodology – DAYANE model

- Thus:
  - In Brazilian regions, household expenses still consider Income Taxes (ITAX), and government transfers (TRANSF) as income:

$$VOM_{BRA_{fact}} - ITAX_{BRA} + TRANSF_{BRA} = VIPA_{BRA} + VDPA_{BRA}$$

$$PSAVE_{BRA} = [VOM_{BRA_{fact}} - ITAX_{BRA} + TRANSF_{BRA}] - [VIPA_{BRA} + VDPA_{BRA}]$$

  - And the Government:

$$INDTAX_{BRA} + ITAX_{RBA} - TRANSF_{BRA} = VIGA_{BRA} + VDGA_{BRA}$$

$$GSAVE_{BRA}[= INDTAX_{BRA} + ITAX_{RBA} - TRANSF_{BRA}] - [VIGA_{BRA} + VDGA_{BRA}]$$

Results

Table 2 – Impacts of Bolsa Família beneficiaries skill improvement in factor income changes

		Basic Educated[1]					
		BRA	**NOR**	**NDE**	**MDE**	**SDE**	**STH**
Labour	(%Δ)	0.885	0.898	1.047	0.707	0.872	0.897
Capital	(%Δ)	0.529	0.962	0.071	0.671	0.551	0.622
Land	(%Δ)	0.972	1.100	0.738	0.974	0.767	1.945
NatRes	(%Δ)	1.461	2.100	3.453	-0.518	1.502	-0.253
GDP	(%Δ)	0.734	0.968	0.567	0.695	0.753	0.754
		Incomplete Fundamental[2]					
		BRA	**NOR**	**NDE**	**MDE**	**SDE**	**STH**
Labour	(%Δ)	0.521	0.570	0.636	0.399	0.530	0.458
Capital	(%Δ)	0.300	0.622	-0.051	0.373	0.332	0.348
Land	(%Δ)	0.545	0.559	0.509	0.352	0.380	1.272
NatRes	(%Δ)	0.870	1.391	2.350	-0.424	0.869	-0.267
GDP	(%Δ)	0.734	0.968	0.567	0.695	0.753	0.754

Where: NOR – North region; NDE – Northeast region; MDE – Midwest region; SDE – Southeast region; STH – South region;
[1] – Improving labour qualification of workers from skill S3 (Complete Basic) to S5 (Qualified Basics) – first shock;
[2] – Improving labour qualification of workers from skill S4 (Incomplete Fundamental) to S5 (Qualified Basics) – second shock;

Results

Table 4 – Impacts on families labour income in Brazilian regions

	First Scenario[1]					*Second Scenario*[2]				
	NOR	**NDE**	**MDE**	**SDE**	**STH**	**NOR**	**NDE**	**MDE**	**SDE**	**STH**
	% ch	**% ch**	**% ch**	**% ch**	**% ch**	**% ch**	**% ch**	**% ch**	**% ch**	**% ch**
	US$bi	**US$bi**	**US$bi**	**US$bi**	**US$bi**	**US$bi**	**US$bi**	**US$bi**	**US$bi**	**US$bi**
F1	2.340	1.500	5.250	0.75	1.860	1.400	1.230	1.880	0.180	0.560
	0.009	0.013	0.008	0.008	0.006	0.005	0.011	0.003	0.002	0.002
F2	0.710	0.570	1.450	0.950	0.960	0.480	0.380	0.930	0.570	0.570
	0.014	0.0250	0.014	0.059	0.014	0.009	0.018	0.009	0.035	0.008
F3	0.840	0.290	1.150	0.500	0.700	0.930	0.260	0.680	0.430	0.390
	0.027	0.020	0.028	0.083	0.028	0.030	0.023	0.016	0.069	0.016
F4	-1.350	-0.510	0.310	0.500	0.380	-0.600	-0.230	0.220	0.230	0.220
	-0.070	-0.340	0.480	6.290	0.390	-0.060	-0.290	0.470	0.250	0.380
F5	1.450	-0.100	0.310	0.220	0.080	1.020	0.340	0.020	0.100	-0.07
	0.052	-0.017	0.013	0.071	0.007	0.036	0.034	0.001	0.033	-0.005
F6	0.420	-0.28	0.570	0.720	0.420	0.360	0.510	-0.480	0.490	0.210
	0.014	-0.031	0.031	0.227	0.046	0.012	0.044	-0.025	0.150	0.023
F7	3.350	0.990	1.040	-0.440	0.250	2.200	0.580	0.540	0.330	0.010
	0.078	0.073	0.043	-0.125	0.025	0.051	0.046	0.022	0.100	0.001
F8	4.200	4.54	0.890	-0.340	1.030	3.130	3.370	0.520	-0.20	1.060
	0.148	0.510	0.063	-0.195	0.208	0.110	0.386	0.037	-0.115	0.215
F9	-2.140	-2.02	2.840	3.230	2.010	-1.640	-2.470	1.060	2.050	0.960
	-0.061	-0.160	0.163	1.259	0.328	-0.047	-0.189	0.061	0.797	0.156
F10	-2.980	0.200	0.970	0.840	1.080	-1.300	-0.500	0.380	0.620	0.480
	-0.391	0.058	0.501	2.600	0.841	-0.171	-0.237	0.188	1.867	0.370

Where: NOR – North region; NDE – Northeast region; MDE – Midwest region; SDE – Southeast region; STH – South region;

[1] – Improving labour qualification of workers from skill S3 (Complete Basic) to S5 (Qualified Basics) – first shock;

[2] – Improving labour qualification of workers from skill S4 (Incomplete Fundamental) to S5 (Qualified Basics) – second shock;

The left column shows families income classes (F1 - F10); Each family has results presented in two rows: the top one is the percentage change on labour income summed over skill and commodities, the bottom one is the change in nominal US$bi

Results

Table 6 – Impacts on families welfare in Brazilian regions

	First Scenario[1]					*Second Scenario*[2]				
	NOR	**NDE**	**MDE**	**SDE**	**STH**	**NOR**	**NDE**	**MDE**	**SDE**	**STH**
	% ch US$bi	**% ch US$bi**	**% ch US$bi**	**% ch US$bi**	**% ch US$bi**	**% ch US$bi**	**% ch US$bi**	**% ch US$bi**	**% ch US$bi**	**% ch US$bi**
F1	1.515% 0.083	0.865% 0.182	3.668% 0.191	0.723% 0.032	1.349% 0.082	0.421% 0.023	0.173% 0.018	0.931% 0.013	0.121% 0.009	0.303% 0.007
F2	0.811% 0.182	0.556% 0.344	1.048% 0.144	0.818% 0.715	0.832% 0.183	0.346% 0.077	0.083% 0.051	0.488% 0.067	0.318% 0.277	0.349% 0.077
F3	0.869% 0.191	0.432% 0.261	0.921% 0.199	0.588% 0.903	0.699% 0.311	0.530% 0.117	0.065% 0.039	0.381% 0.082	0.266% 0.409	0.236% 0.105
F4	0.286% 0.03	0.145% 0.04	0.505% 0.08	0.583% 0.54	0.549% 0.17	0.188% 0.021	-0.075% -0.022	0.185% 0.028	0.177% 0.165	0.175% 0.053
F5	1.123% 0.011	0.256% 0.003	0.469% 0.005	0.433% 0.004	0.434% 0.004	0.663% 0.048	0.094% 0.020	0.093% 0.011	0.126% 0.108	0.062% 0.016
F6	0.790% 0.082	0.154% 0.054	0.633% 0.055	0.693% 0.373	0.545% 0.115	0.470% 0.026	-0.168% -0.030	0.351% 0.047	0.334% 0.298	0.202% 0.054
F7	1.789% 0.124	0.592% 0.065	0.853% 0.080	0.063% 0.037	0.463% 0.106	1.070% 0.074	0.198% 0.022	0.378% 0.035	0.266% 0.157	0.123% 0.028
F8	2.107% 0.115	1.734% 0.321	0.772% 0.136	0.120% 0.107	0.845% 0.260	1.420% 0.078	1.112% 0.206	0.387% 0.068	-0.009% -0.008	0.652% 0.201
F9	0.332% 0.019	-0.459% -0.057	1.700% 0.152	1.867% 1.563	1.292% 0.299	0.114% 0.007	-0.821% -0.101	0.660% 0.059	1.091% 0.913	0.578% 0.134
F10	0.136% 0.026	0.218% 0.134	0.766% 0.627	0.687% 2.838	0.780% 0.800	0.196% 0.037	-0.149% -0.091	0.338% 0.277	0.402% 1.660	0.340% 0.349
Total	0.808% 0.898	0.421% 1.281	0.825% 1.604	0.667% 7.747	0.729% 2.418	0.457% 0.508	0.036% 0.110	0.353% 0.687	0.343% 3.987	0.309% 1.024

Where: NOR – North region; NDE – Northeast region; MDE – Midwest region; SDE – Southeast region; STH – South region;

[1] – Improving labour qualification of workers from skill S3 (Complete Basic) to S5 (Qualified Basics) – first shock;

[2] – Improving labour qualification of workers from skill S4 (Incomplete Fundamental) to S5 (Qualified Basics) – second shock;

The left column shows families income classes (F1 - F10); Each family has results presented in two rows: the top one is the percentage change on labour income summed over skill and commodities, the bottom one is the change in nominal US$bi

Final remarks

The hypothesis of improvement in Bolsa Família families beneficiaries consumption and income are accepted. Also, the effects tend to be lasting, as the value of labour factor increases in all regions, and it is the main income source for the poorest families.

The results suggest that skill improvement increases families income. The impacts are higher in a scenario where the salary "gap" is larger. That is, the workers qualification from lower skill levels have higher wage gains, as expected, and heavily state in literature.

However, sectors that are low-skill-intensive (like agriculture) will decrease the output due to an increase in the price of the main productive factor. There is also clear evidence that skill improvement reduces families dependence on Bolsa Família Program in the long term.

More than that, it is clear that the better wages on labour market are enough to ensure the withdrawal of transfers, proportionally to increase on labour income, once even with transfers reduction, the higher wages ensure better economic conditions to the families .

Regarding families consumption and welfare, it was observed desirable impacts. Albeit the results in the poorest families could be better since the industries in the sectors that these families consume relatively more are precisely the ones that most reduce their supply