

Welfare Dependency and Poverty Traps: Evaluating the contribution of health policy using administrative data

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1 Motivation

Health is a vital component of worker productivity and labor market participation capacity. It can, consequently, reduce earnings or perhaps remove workers from the market all together. This is specially true for informal or self-employed workers who lack any kind of job security. In particular, because women play a key role as care givers and resource managers in the household, their labor market participation and outcomes may suffer a lot more from any health shocks affecting the family, specially if they are single mothers with low income. Women would face difficulties in the labor market not only as a result of their own health issues but those of the whole family. In the context of poor households, women's income can represent an important share of their budget and these losses may place them in many other poverty traps. Would an intervention in health care be effective in improving labor market outcomes for poor women? Would it prevent them from entry into welfare?

The Brazilian case is a great laboratory to answer these questions. It combines the provision of a recently implemented universal primary health care together program with welfare programs to the poor. More than that, the execution of the welfare programs is recorded in a national registry system, the CadUnico, that contains data on almost all poor families in the country. Similarly, the Ministry of Health, maintains systems with records of utilization of all its public health services.

To match the period for which CadUnico has more consistent data¹, we take advantage of the most recent implementation of the Family Health Program (PSF, for Programa de Saude da Familia) in the municipality of Rio de Janeiro as a health intervention that focuses on primary care, giving special attention to women and children's health along with support to chronic diseases that greatly affect the elderly.

Using PSF's sequential implementation in Rio together with a difference-in-differences strategy we find an increase in income for women working in the informal labor market, those more susceptible to stop working as a result of any health issue in the family. Women in both formal and informal markets were also more likely to be working, as a result of the better supply of health care. Formal workers with low salaries normally work for small companies that do not provide health insurance, so they depend upon the public health care system as well.

These findings suggest that health interventions can strengthen the social protection capacity, contributing to women's careers, perhaps reducing entry into welfare and dependence on social protection systems through many channels.

¹The Ministry of Social Development and Fight Against Hunger (MDS) has improved its efficiency in managing the registry and ensures better quality of the data from 2012 onwards.

2 The Family Health Clinics Program (PCSF)

The municipality of Rio de Janeiro until December 2008 was the country's capital city with the lowest coverage of Family Health teams: 3.5 percent of the population.

Following guidelines from the Ministry of Health, the PSF was first implemented in small and medium cities, as a smaller number of teams would be necessary to cover most of the population. In large cities it was implemented more incrementally, following difficulties in management and personnel.

The municipality of Rio de Janeiro was one of the last cities to implement the PSF. However, starting from 2008 the program was extended largely and rapidly. Figure 1 depicts the expansion in the construction of Family Health Clinics (CSFs) across the municipality. Covering 3 percent of the city in 2008, it reached 52 percent in 2011 and 86 percent in 2017 with nearly 118 brand new health clinics delivered. The COuncil's official plan included one CSF for every 12,000 inhabitants, one health team for every 4,000 inhabitants and one community health agent for every 200-400 inhabitants. Each health team is composed by a family doctor, a nurse, an assistant nurse, health community agents and health surveillance agents.

The CSFs expanded the concept of primary care introduced earlier by the nationally implemented PSF by adopting large health units, which concentrate 5 or more family health teams, with a physical structure composed by dedicated rooms for general practice, pediatrics, oral health, hypertension and diabetes care, and gynaecology. They also provide a list of in-house low complexity procedures, vaccination and a pharmacy that provides some prescription medicines free of charge. Technologies that facilitated doctor's services were also adopted such as electronic patient records, allowing doctors to have greater resolubility in diagnostics by easily assessing patients' medical history.

This setup was planned with the aim of facilitating the attraction of doctors to the clinics. Rio de Janeiro is one of the capitals with the highest number of per capita doctors in the country (4.35 in 2013, against 1.38 in Macapa in northern Brazil.) but there is still an unmet demand for family doctors. In addition, physicians may not be attracted or prepared to work in marginalized neighborhoods overburdened with social problems. The shortage of human resources is pointed as one of the main reasons for the late implementation of PSF in Rio. Together with the construction of the clinics, the council launched a residency program in family care and wage compensations to attract doctors to the most deprived neighborhoods.

Rio de Janeiro's Municipal Health Secretariat (SMS) estimates that the mensal cost of a team in a CSF is R\$ 62.000,00-R\$ 82.000,00, where 70 percent of this figure is covered by the city council.

Specifically for women, there is special focus on offering pre-natal care, familiar planning, advice and provision of different types of contraceptive methods, and other gynaecology care. Related to children's health, services like baby health and development reviews, vaccinations and support to breastfeeding are provided. Special attention is also given to the review of patients with chronic diseases such as diabetes and hypertension.

3 Specification

$$y_{int} = \phi'_i + \lambda'_n + \delta'_t + \pi'_{ie} + \sum_{k=1}^K \gamma_{pre,k} \times CSF_{nt+k} + \sum_{j=0}^J \gamma_j \times CSF_{nt-j} + \epsilon \quad (1)$$

The unit of observation is an individual i , in neighborhood n over a month/year t . ϕ'_i , λ'_s and δ'_t are individual, neighborhood and month/year fixed effects, respectively. We further include fixed

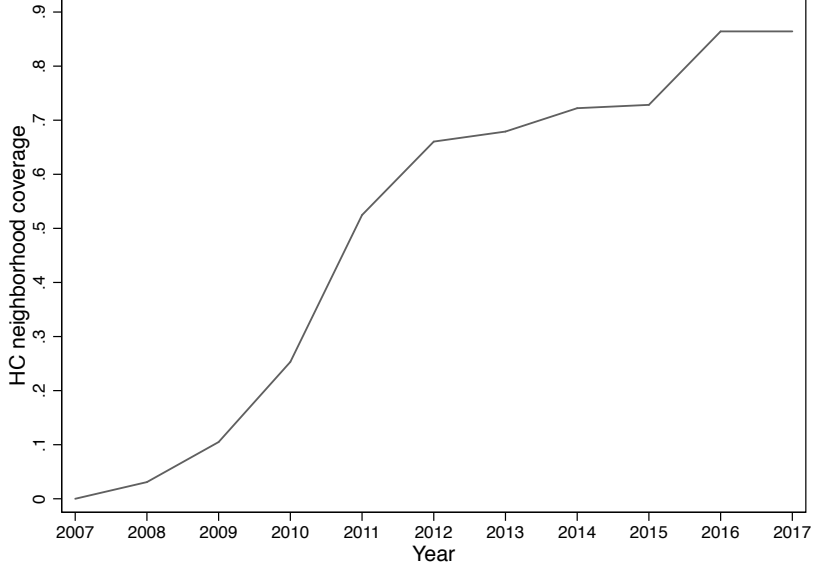


Figure 1: CSF's expansion

effects of an individual's time of entry in the registry π'_{ie} to account for the fact that we only observe individuals from certain cohorts in our data time window. y_{int} denotes some labor market related variable. CSF_{nt+k} is a dummy that captures whether the neighborhood n , where individual i lives, will receive coverage of a given clinic t months into the future. Likewise, CSF_{nt-j} is a dummy that assumes value 1 when the individual's neighborhood had already received the program in month $t - j$. Standard errors are clustered by administrative regions, which are clusters of neighborhoods under the samesubcouncil administration.

4 Data

4.1 Family Health Clinics (CSFs) inauguration and coverage

Data related to implementation of the CSFs (Clinica de Saude da Familia) are obtained from Rio's Municipal Health Secretariat (SMS). They provide the date of inauguration of each clinic, their location and catchment areas. It also identifies larger administrative areas of the city, the so called administrative regions, that are used for management purposes by sub-councils. We use these data to build a monthly panel of CSFs coverage at the neighborhood-administrative area levels. A total of 118 clinics were delivered in the period of 2008 through 2017, spanning 162 neighborhoods and 33 administrative regions.

[Figure : Insert here map with the spatial distribution of clinics overlaid by a heat map of income by census tracts and with neighborhoods boundaries.]

4.2 Individual outcomes - CadUnico

CadUnico is a national registry system, organized by the Ministry of Social Development and Fight Against Hunger (MDS) in Brazil, that aims to map over time all families and individuals of low socioeconomic status in the country. Every family with either a monthly per capita income of

at most half of the minimum salary or a monthly total income of up to 3 minimum salaries should be registered.

CadUnico is the entry point to reach most of government programs. Families are included in the registry under three different situations: (i) when they sign up for a social assistance program, (ii) when they voluntarily register themselves or (iii) when local governments actively try to register poor families independently of current eligibility status for a specific program.

Implemented in 2001, CadUnico has since evolved following the introduction of social programs that incentivize families to register and keep their records up to date. Today, it is the most comprehensive longitudinal socioeconomic profile of over 16 million families and 60 million individuals in the country. However, data available for research do not go back this far, as early data contains quality problems related to the lack of data entry checks and national level consistencies.

The CadUnico registry system is managed through two levels of government. At the local level, municipalities have the responsibility of identifying families in the target group, collecting their information and keeping their records up to date. From time to time, they are required to formally visit at least 10 percent of the families for data verification. At the national level, the federal government through CAIXA, a state owned bank, manages payroll accounting duties, provides IT services that unify the data entry system, consolidates the database and monitors data quality. The MDS in turn designs CadUnico regulations, oversees and coordinates municipalities and CAIXA's actions.

In practice, the government uses CadUnico's information for planning and actively identifying families that are eligible for social assistance programs. About eight federal government social security policies, including those of housing and subsidized landlines, use the registry to identify specific vulnerable groups they aim to reach. The Bolsa Familia Program, however, is its main user. It is a CCT program that benefits children in school age and has the largest coverage among all social security programs in the country.

When registering the family is asked to provide a permanent address and at least one valid identification document for each member of the family. Families are uniquely identified through an 11-digit sequence number, the Number of Social Identification (Numero de Identificacao Social - NIS), with which they can be followed over time and be easily identified in other governmental databases that also contain the NIS. CadUnico requires families that are part of the Bolsa Familia Program (BFP) to update their records each 24 months. If there is any change of circumstances within this period they should voluntarily anticipate it. If the family fails to provide an update when recalled – they receive an update recall message in their payroll slip, normally after 24 months since the last update – the municipality will actively try and locate the family to keep track of its current status. The benefit will effectively be canceled approximately 9 months after a family record has been identified as outdated.

Both when they first register and when update their records, the family representative, normally the mother, respond to questionnaires that profile labor market participation, income, education, disabilities, and enrollment in other social programs for all family members.

CadUnico interviews use three questionnaires:

1. The main questionnaire - Formulário Principal - contains questions on labor market participation, income, education, and disabilities for each of its members;
2. The supplementary questionnaire 1 - Formulário Suplementar 1 - registers enrollment in other social assistance programs; and
3. The supplementary questionnaire 2 - Formulário Suplementar 2 - contains labor market and health-related questions that are answered by the homeless only.

‘ The CadUnico’s database available to researchers, unfortunately, does not contain variables derived from the supplementary questionnaire 1. We use information on labor market participation and income from the main questionnaire to build a monthly panel for the period of 2014 to 2017 keeping in the sample women who are family representatives for whom we observe these variables at least once before and once after the implementation of a clinic that covers their neighborhood of residence. Neighborhoods were identified through the declared family address.

5 Descriptive Statistics

Our sample is composed by 14,546 women-month-year of an unbalanced panel that has an average length of 18 months-time between one observation and the next. These women are the family representatives for the CadUnico record updates. We keep women for whom we have at least two observations of income such that one was declared before a health clinic was introduced in their neighborhood of residence.

To measure income, we use the women’s declared income in the previous month of the CadUnico’s update. It is less noisy than income that spans a longer period of time. Participation in the labor market is measured as whether in the previous week to the interview the women had worked. A no answer to this question included options as no job, leaves or holidays. Table 1 displays descriptive statistics in the baseline observation for these and other variables at the household and individual levels.

Table 1: Descriptive Statistics at the baseline year

	Obs	Mean	Std.Dev.	Min.	Max.
<i>Household characteristics</i>					
# People in the family	6330	3.16	1.43	0.00	20.00
# Families in the household	6330	1.02	0.18	0.00	10.00
Has sanitation	6331	0.88	0.33	0.00	1.00
Has rubbish collection service	6331	0.89	0.31	0.00	1.00
Has electricity	6331	0.59	0.49	0.00	1.00
Has paved streets	6331	0.86	0.35	0.00	1.00
<i>Individual characteristics</i>					
Age	6331	37.80	11.56	16.10	95.20
Literate	6331	0.95	0.21	0.00	1.00
Income previous month (reais)	6331	218.37	299.99	0.00	1200.00
Worked in the previous week	6331	0.48	0.50	0.00	1.00
Formal worker	6331	0.13	0.34	0.00	1.00
PBF participant	6331	0.77	0.42	0.00	1.00

6 Results

Formal workers normally enjoy health insurance from employers as well as paid sick leaves. On the other hand, informal workers are self-employed in manual activities that require physical strength and pay is conditional on working. To present results in labor market outcomes we split

the sample into formal and informal workers and expect any interventions in health care to be stronger for the latter.

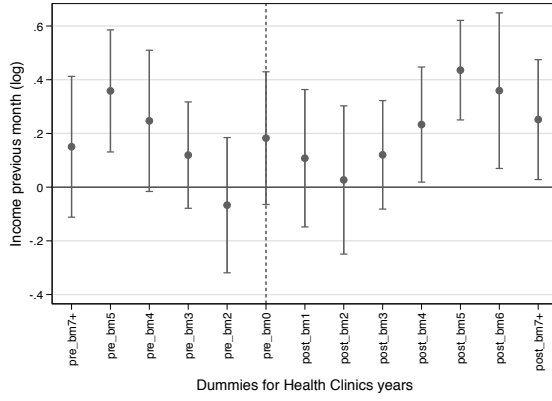
Panel (a) of 2 displays a pattern of growing income for informal workers that starts in bimester-3 that becomes larger and significant in bimester-5. In bimester-5, having at least one clinic providing health services in the neighborhood leads to a 38% increase in labor income. This means that the average income would jump from \$218 reais in the baseline to approximately \$300 reais, after 10 months of the CSF in the neighborhood. Considering an average of 3 people in the family, this would mean an increment of \$25 reais per capita per month. Reassuringly, we do not observe the same effects for formal workers in Panel (b). Panel (c) displays the results for the full sample and the patterns of informal workers dominate.

The coefficients for whether the women worked in the previous week in Figure 3 exhibit a similar pattern for informal workers, but more imprecise, with the coefficient on the probabilities jumping up at the same lag of income. For formal workers, because of job security, health shocks should not change income status but they do change whether a worker was in activity at any period of time. This is true because, though formal workers, they are poor enough to be registered in CadUnico and, therefore, jobs may not offer health insurance² and they also make use of the CSFs.

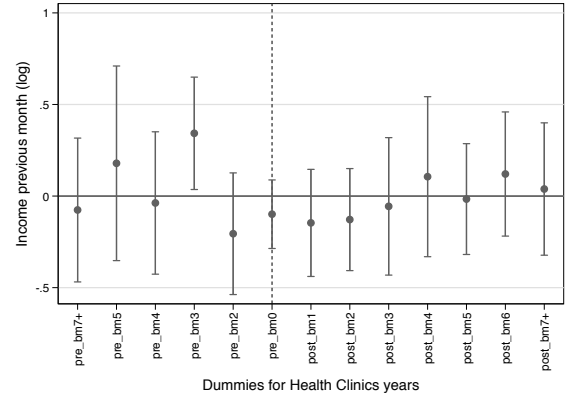
This increase in income may not be enough for a family to leave the Bolsa Familia Program, but can prevent the entry of families who are close to the program profile from above. Families that are at the edge from below do not have incentives to report their gains in income that crosses the PBF participation threshold. We will have to look at this on aggregate data.

Once families get into welfare, there are perverse incentives to remain even when they become ineligible. Consequently, an intervention in health care early on, preventing people from going into welfare in the first place, would save on welfare in the future.

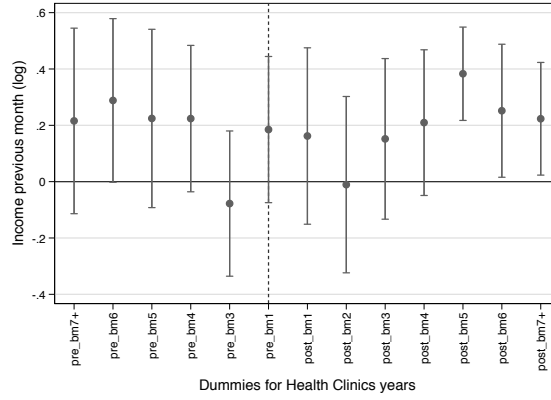
²With the Brazilian legislation, small and medium companies do not receive tax rebates from providing their employees with health insurance. Large companies either can benefit from legislation or have agreements with labor unions to provide health insurance. By law, once the company provides the benefit, it cannot be withdrawn from workers. This rule might also prevent small and medium companies from at least trying to provide it for some time.



(a) Income in the previous month for informal workers



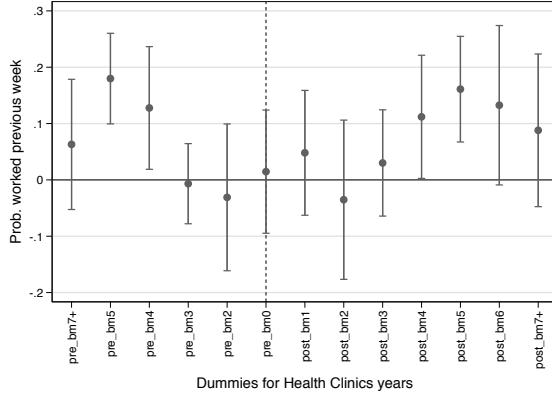
(b) Income in the previous month for formal workers



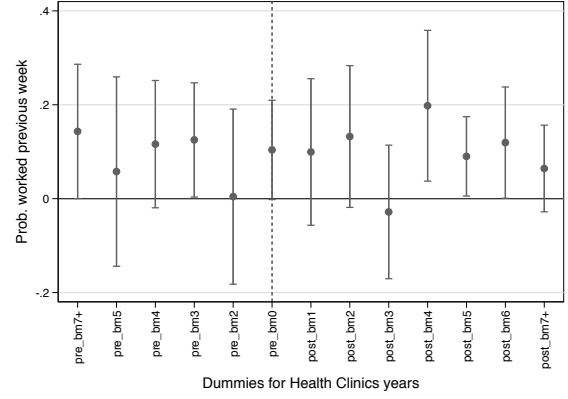
(c) Income in the previous month for all workers

Figure 2

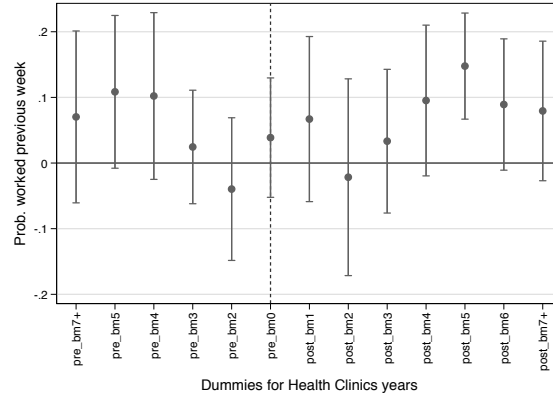
Note: Each figure plots together the estimated coefficients $\gamma_{pre,k}$ and γ_j and their respective standard errors with a confidence interval of 0.9, based on the estimation of equation 1, except that here the dummies represent a period of two months, for parsimony.



(a) Worked in the previous week for informal workers



(b) Worked in the previous week for formal workers



(c) Worked in the previous week for all workers

Figure 3

Note: Each figure plots together the estimated coefficients $\gamma_{pre,k}$ and γ_j and their respective standard errors with a confidence interval of 0.9, based on the estimation of equation 1, except that here the dummies represent a period of two months, for parsimony.

References