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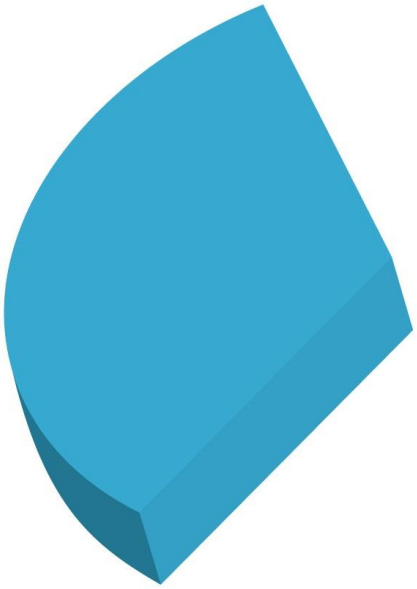

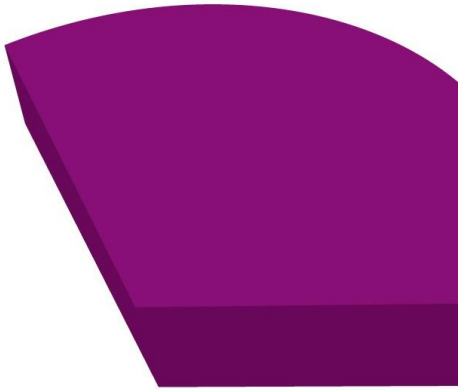

Does the Introduction of Non-Contributory Social Benefits Discourage Registered Labour? Testing the Impact of Pension Moratoriums on Unregistered Employment in Argentina (2003-2015)

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Does the introduction of non-contributory social benefits discourage registered labour? Testing the impact of pension moratoriums on unregistered employment in Argentina (2003-2015) *

Leonardo Eric Calcagno†

Abstract

In recent years, Argentina has reached nearly universal retirement benefits coverage[1]. This was achieved through two successive pension moratoriums, implemented in the third quarters of 2006 [2] and 2014 [3], which allowed buying back missing contribution years and retire even with incomplete careers. In principle, the effect of moratoriums on unregistered employment is unclear: they may discourage retirement contributions by opening an alternative way for retiring, but they also may be an incentive for senior workers with incomplete careers to contribute more years before retiring and thus reduce the social security debt they will buy back with the moratoriums. In this paper, we ascertain the impact of these pension moratoriums on senior workers' transitions between formal and informal employment. We first use a dynamic microsimulation framework to simulate careers and tell apart elderly workers needing a moratorium to retire (our treatment group) from elderly workers who may yet retire normally (our control group). We then compare the transitions between unregistered employment and registered labour of the treatment and control groups before and after each of these moratoriums. We find robust results on women's transition probabilities, with both moratoriums increasing the treatment group's probability of entering the formal sector. Probabilities of leaving the formal sector are however more nuanced, as the first (2006) moratorium increased it while the second (2014) decreased it, which may come from the latter being more difficult to subscribe to.

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[1]In March 2016, retirement pensions granted by ANSES represented 89% of people of retiring age. Source: own calculus using DNPE (2016a) and INDEC's demographic projections for 2016.

[2]Moratoriums Law 24476 and 25994

[3]Moratorium Law 26970

1 Introduction

Argentina's pension system has seen various modifications in the past twenty-five years, but surprisingly few papers have studied the impact of these changes on the labour market, and more specifically on labour supply. We feel in particular that the successive pension moratoriums carried out in 2006 and 2014, which allowed individuals with incomplete careers (lacking the minimum 30 years of contributions) to retire, may have had a sizeable effect on labour-market behaviour of individuals nearing retirement age. These policies temporarily granted access to retirement pensions to people of retiring age (60 for women, 65 for men) with incomplete careers[4] due to long unregistered (or informal) employment, unemployment or inactivity spells. These moratoriums granted nearly-universal access to retirement pensions, to the point that by June 2016 64% of direct retirement benefits granted by ANSES, Argentina's social security agency, originated from a pension moratorium (DNPE, 2016b, p. 23). These moratoriums, however, and the ensuing consensus that there ought to be universal pension coverage for the elderly [5], may have changed individual expectations. These policies acted as a news shock for men and women nearing retirement age as they may have lead them to believe that they would have access to some sort of pension benefit even if they had not contributed 30 years, a belief reinforced by the introduction of a second moratorium in 2014. This meant the expected income to be gained from unregistered employment increased relative to that of registered labour, and may have discouraged the latter among individuals not having yet reached retirement age. This possible unintended consequence would further reduce contributions to social security in a country with over a third of dependent workers being unregistered, and hamper its sustainability.

The existence, sign and magnitude of these moratorium's effects on formal labour supply are not however trivial, and are at the core of the ongoing debate on the voluntary or involuntary nature of unregistered labour. A significant impact of these moratoriums on transitions between registered and unregistered employment would contradict the literature stating there is a segmentation of developing countries' labour markets, where informal workers (particularly dependent workers) are rationed out of the formal sector, with its more stable, protected and better paid jobs (Arias & Escudero, 2007; Beccaria & Groisman, 2008; Kucera & Roncolato, 2008). These findings would advocate hence for the voluntary nature of unregistered employment. For this literature, informal labour is the workers' decision. They weigh its advantages and disadvantages relative to registered employment and choose whichever suits them best, in a non significantly segmented labour market. Even if we do find a significant impact of these moratoriums on labour-market transitions, its sign is not straightforward. On the one hand, we could expect a negative impact of these moratoriums on registered labour. Since

[4] The only non-contributory retirement benefit available were old-age non-contributory pensions. These are means-tested and accessible only to individuals aged 70 or more.

[5] As shown, for instance, by the unanimous approval by both chambers of the Argentinian Congress, of the Law 26970 pension moratorium passed the 27th of August 2014

they redistribute income toward workers with incomplete contributions, they may be an incentive to stop contributing to social security (Ulyssea, 2010; Bosch & Guajardo, 2012). But on the other hand, these moratoriums may actually be a (dis)incentive to (de)formalisation for senior workers in Argentina's retirement system. Indeed, a worker with incomplete contributions, having reached an age where he knew 30 years of contribution were impossible to reach by retirement age (for instance, a woman aged 50 with 10 years of contributions), had no reason to contribute for retirement pensions. With the moratoriums, however, from these missing contribution years is computed a social security debt. Then, after a discount on this debt, the subscriber adheres to a five-year payment plan, and through monthly instalments discounted from future retirement pensions, pays it back. So each contributed month before retirement means one fewer month to buy back[6], thus a lower debt and a higher expected retirement pension net of the moratorium instalments. So instead of being adverse, the unexpected effect of the moratoriums on senior workers labour supply may have actually been virtuous.

Not only are these moratoriums interesting elements in the ongoing debate regarding the voluntary or involuntary nature of unregistered labour, they are also fit for an impact analysis. Indeed, these measures were policy shocks that, in the case of the permanent Law 24476 moratorium[7] and the temporary, but more generous and accessible, Law 25994 moratorium[8] issued on 2006, were scarcely advertised and hence not anticipated by workers, as explained in the paper by Bosch & Guajardo (2012). The last moratorium, instituted on 2014 by Law 26970[9], was less of a surprise but still reinforced the belief there was a commitment by the government to guarantee universal access to pension benefits. At the same time, the second moratorium was less generous as we will further explain below, so it may thus have sent a signal to senior workers retiring after its period of validity that access to a pension for people with incomplete careers would be tougher in the future. These moratoriums hence resemble natural experiments, where we can observe the reaction of individuals to an unforeseen policy. *Ex post* assessment of social security policies using a difference-in-difference framework is fairly common in the literature. Examples include Bozio (2008) on France's 1993 pension reform impact on retirement decisions, de Carvalho Filho (2012) on Brazil's 1991 pension reform's impact on child labour and school enrolment and Garganta & Gasparini (2015), who see how the introduction in 2009 of a universal child benefit in Argentina modified the labour supply of low income households.

Despite these elements, there is almost no literature assessing the impact of Argentina's pension

[6] By Art. 9 of Law 24476, discounts on pension benefits are however subject to the limit established by the article 14, clause d) of the Law N ° 24.241., stating that deductions from social security benefits "may not exceed (...) 20% of the monthly benefit's amount". So social security debt is capped, and individuals with very incomplete careers may indeed not reduce their repayable social security debt even if they were to contribute every year until retirement. This aspect is however left out of the scope of this paper due to the added complexity it entails.

[7] Accessible since the 25th of November 2005 through Decree 1454/2005

[8] Accessible from the 6th of July 2006 through joint general resolutions 2091 and 579/2006 to the 30th of April 2007

[9] Accessible since the 19th of September 2014 until the 18th of September 2016

moratoriums on individual behaviour. To the best of our knowledge, there is only a working paper by Bosch & Guajardo (2012) that studies the impact of the Law 24476 and 25994 moratoriums on the labour-market. Using the EPHc labour survey (which we will introduce below), they apply a difference-in-difference technique to individuals five years below and five years above the minimum required retirement age. They find these moratoriums caused a decrease in total employment and formal employment of people five years above the minimum retirement age. Allowing people above the minimum retirement age to effectively retire was however the goal of these moratoriums, so these results are neither surprising nor an undesired effect of these measures, but evidence that they worked. Moreover, not all workers were affected by the moratoriums: those with longer careers were very likely to reach the minimum thirty years of contributions before retiring and thus would not need a moratorium to retire. Therefore, senior workers with long careers would constitute our control group, while those who barely contributed to social security would be our treatment group as they would need a pension moratorium to retire once they reach the minimum retirement age. However, Argentina lacks individual information on contributed years and accumulated social security rights. It is thus not possible to directly tell apart senior workers with long careers from those with a short formal employment history, which is probably why no other paper has tried to assess the impact of pension moratoriums on workers' individual behaviour.

This paper intends thus to fill the gap in the literature by providing an *ex post* assessment of pension moratoriums' impact on senior workers transitions between formal and informal employment. To do so, we develop a dynamic microsimulation model that allows us to estimate, or "back-cast", for each surveyed individual in the EPHc within 10 years of reaching retirement age (a total of 104,500 respondents) a plausible career in the manner of Li & O'Donoghue (2012). To the best of our knowledge, the only existing microsimulation model applied to Argentina has recently been developed by Cicowiez *et al.* (2016) in the topic of taxation, so our microsimulation model is the first to simulate social security variables and in particular labour informality in Argentina, and the second in Latin America after Brazil's BRALAMMO model (Zylberstajn *et al.*, 2011). We can thus tell apart from among senior workers those needing a moratorium to retire due to incomplete careers (our treatment group), from respondents with enough contributions to not need pension moratoriums to retire (our control group). Finally, we carry out an impact analysis of 2006 and 2014 pension moratoriums on senior workers' individual behaviour, following the methodology employed by Garganta & Gasparini (2015).

Our results suggest both moratoriums significantly increased the probability of informal senior women of entering the formal sector. The impact of these moratoriums on the probability of formal senior women of entering the informal sector are however more nuanced. The first (2006) moratorium

increased it while the second (2014) decreased it, which may come from the latter being more difficult to subscribe to. The lack of robust impact of these moratoriums on senior men's transitions may come from a male breadwinner paradigm: being the household's primary earners, the stability of male income associated with formal labour is privileged over an increase in the inter-temporal income derived from informal labour caused by the moratoriums. Also, since men retire at older ages, those nearing retirement are more subject to illness than women. Thus, their formal labour decision may be less related to retirement matters than to the health insurance associated with registered work.

The rest of the paper is organised as follows: in Section 2 we describe the aforementioned moratoriums, and put them in the historical background of Argentina's social security reforms. In Section 3, we describe the data used in this study and develop our methodology. Section 4 presents our main findings, while we lay out our concluding remarks in Section 5.

2 Pension moratoriums: their legal and economic context and characteristics

The 2006 and 2014 pension moratoriums happened in a particular context of reform and re-reform of Argentina's social security. In the early 1990's, a series of reforms [10] merged sectoral, unsustainable Pay-As-You-Go pension systems, but also family and unemployment benefits, into the SIPA[11] run by an agency called ANSES[12]. It also introduced a fully-funded pension pillar run by private funds, the AFJPs[13], where workers were affiliated by default and that soon captured most retirement contributions. This generated a high deficit in the PAYG branch, which kept on paying the benefits of people that had contributed to the previous existing PAYG systems. Finally, requirements for retiring in both pillars were toughened, with the retirement age progressively being pushed by five years, reaching 60 for women and 65 for men, and the required minimum contribution years for receiving a contributive pension being established at 30 years. However, Argentina experienced throughout the 1990's rising unemployment and informal employment, which peaked during the 1998-2002 crisis. These two elements lead to a drop in social security coverage of the elderly, aged 65 of more, decreasing from 80,90% in 1993 to 66,75% in 2003 according to Rofman & Oliveri (2011). Together with the freeze of pensions[14], this resulted in a significant decrease in social security benefits for the elderly.

[10] Most notably, Decree 2284 of 1991, that created the SUSS and dissolved previous family allowances funds; Law 24241, passed in 1993, that created a two-pillars pension system; and Law 24714, passed in 1996, that formalised the new family allowances system.

[11] It originally was called Unified Social Security System (SUSS), but it was renamed SIPA (*Sistema Integrado Previsional Argentino*) in 2008.

[12] *Administración Nacional de la Seguridad Social*

[13] *Administradoras de Fondos de Jubilaciones y Pensiones*

[14] The minimum retirement pension was for instance frozen at 150 pesos (150 US$) a month from December 1995 to December 2001. Source: DNPE (2012)

These moratoriums tried to revert this situation and were part of a wider policy shift adopted by the government elected in 2003. They decided that in order to improve the most vulnerable of the elderly's condition they had to increase the universalistic, or "Beveridgian", nature of the retirement system, by making retirement benefits nearly universal at the expense of weakening the link between contributions and pensions. First, the Kirchners' governments prioritised the increase of the minimum retirement pension while not adjusting the other retirement pensions by enough to make up for high inflation rates, until March 2009 when was first implemented the 26417 Pension Mobility Law.[15] Since additionally Argentina experienced high growth between late 2002 and 2008, ANSES could shoulder Law 24476 and 25994 moratoriums, which came fully into effect on March 2006 for the former and the second half of 2006 for the latter. Both moratoriums were complementary: Law 24476's is unlimited in time, but only allows buying back missing months before October 1993. Law 25994 moratorium was only accessible for a short time, but made it possible to buy back missing months until the 31st of December 2004. There were no further differences between them: both were accessible only for people past retirement age, and social security debt and moratorium instalments were computed identically. As pointed out by Bosch & Guajardo (2012), they "achieved remarkable results - an additional two million pension recipients were added in only a couple of years and elderly coverage rose from 68% in 2003 to nearly 90% in 2010". By June 2012, a maximum was reached with 2.5 million direct moratorium benefits, more than 60% of retirement benefits given by ANSES at the time [16]. However, their accessibility faded with time: after the 30th of April 2007, only Law 24476 was available and did not allow buying back non-contributed months after 1993. So for generations reaching retirement age at latter dates, buying back enough years to reach the compulsory 30 and retire became more difficult. In order to prevent coverage from dropping as younger generations retired, a new moratorium was needed in the absence of a comprehensive reform of the retirement system.

With the 2008 crisis however, the decision was made to bolster ANSES accounts by dissolving the fully-funded pillar and nationalising private pension funds[17]. All contributors and pensions were transferred to the PAYG pillar and individual accounts were merged into a buffer fund called the FGS[18]. This made it possible to grant universal child benefits[19] and a second pension moratorium in 2014, through Law 26970, despite an unstable and, since 2013, adverse economic context. This moratorium was originally scheduled to end the 18th of September 2016 but has recently been extended for women

[15] This insufficient adjustment gave way to increased litigiousness, with the Supreme Court of Justice ordering through the Verdicts Badaro (2007) and Elif (2009) to use benefits indexation rules for this period that were often more generous than the readjustments that ANSES had made.

[16] Source: own calculus from DNPE (2012)

[17] Through Law 26425, issued the 4th of December 2008.

[18] Fondo de Garantía de Sustentabilidad

[19] Through the AUH, *Asignación Universal por Hijo* launched in 2009.

up to the 23d of July 2019[20]. Even though it made it possible to buy missing months until the 31st of December 2003, this moratorium is less generous than the first ones: instalments are indexed with the same formula than retirement pensions and access to this moratorium is means and wealth tested. Nevertheless, adhesion was significant: by June 2016 there were 766.005 direct retirement pensions originating from Law 26970 moratorium (DNPE, 2016b, p. 23). We can thus see that these moratoriums vastly modified Argentina's social security system, representing almost two thirds of ANSES retirement benefits (DNPE, 2016b). The potential impact on individual expectations and behaviour may thus be significant. The methodology through which we estimate it is two-fold, combining a dynamic microsimulation framework and a difference-in-difference impact analysis, and will be described in the following methodology section.

3 Data and methodology

3.1 Our dataset: the permanent household survey (EPH)

This study is mostly based on data taken from different waves of the EPH, or Permanent Household Survey. It is a thorough individual-level survey focused on income, labour-market situation, household composition and dwelling's characteristics. Its design however changed over time. From inception in 1974 to 2003, it was a punctual survey that was carried out in the months of May and October. Although the cities it covered, the gap between each wave and the questionnaire it used varied over time, it is a rich individual-level survey that gives a comprehensive account of Argentina's labour-market over a long time period. As such, we use it to align our dynamic microsimulations to ensure simulated careers are consistent with historical labour market participation levels by age groups and gender, as we will further develop below.

Most of this work relies on the Continuous Permanent Household Survey (EPHc) available since the third quarter of 2003 and that replaced the punctual EPH. The EPHc consists of a randomised sample of the urban population of 31 Argentinian cities and metropolitan areas. These represent most of Argentina's urban population, and hence most of its total population, since about 91% of Argentinians live in towns of 2000 and more inhabitants[21]. It contains detailed information on individual characteristics, family links, education, various sources of income and most of all on the labour-market situation of the respondent. In particular, it contains direct (for wage-earners) and indirect (for independent workers, see (Maurizio, 2012) on identifying formal independent workers in the EPHc) information on whether a given worker is in the formal or informal sector. Each household is surveyed four times all

[20] As established by Decree N° 894/2016 issued the 28th of July 2016

[21] Source: own calculus using INDEC's National Census of Population, Households and Dwellings 2010, Argentina, processed with Redatam +Sp".

in all: two consecutive quarters first, then after a break of six months two other consecutive quarters. This allows both for a rotation in the studied population and the study of quarterly and yearly transitions. Around 50,000 individuals are interviewed each quarter, which gives us nearly 2.6 million of observations for the 2003-2015 period. We can thus study individual transitions and behaviour with this dataset. As we will se later in this work, these characteristics make it suitable for both building our dynamic microsimulation model and carrying out our double differences framework to assess the impact of pension moratoriums on labour-market transitions.

Unfortunately, following a change in INDEC's management and directors consecutive to the a new government taking office in December 2015, the EPHc's diffusion was cancelled for the second half of 2015 and the first quarter of 2016. This decision was taken on the grounds of alleged irregularities in carrying out the survey during the 2007-2015 period (INDEC, 2016). The EPHc's micro-level dataset has since resumed publication, but the available waves (second, third and fourth quarters of 2016) are incompatible with late 2014 and early 2015 waves, barring us from using them for studying yearly transitions. We thus leave out from our analysis the EPHc waves posterior to the second quarter of 2015.

3.2 Using dynamic microsimulation for estimating plausible individual careers

Before we can estimate the impact of these moratoriums on the behaviour of people affected by them, we must first tell apart our treatment group from our control group. We consider that the treatment group are individuals that, given their age and past contributions, cannot retire normally when reaching retirement age, that is, individuals for which the 30 contribution years condition is binding. Since we cannot observe this information directly, we estimate it through a dynamic microsimulation model we have developed. We can define this method as being "a tool to generate synthetic micro-unit based data, which can then be used to answer many "what-if" questions that, otherwise, cannot be answered." (Li & O'Donoghue, 2013, p. 4). We developed our model using LIAM2, a free and open-source package developed by the Belgian Federal Planning Bureau (Bryon *et al.*, 2015). Additional references include a wide array of dynamic microsimulation models developed by various French public bodies.[22]

Our objective is to simulate plausible behaviour at the individual level, while at the same time correctly reproducing past observed macroeconomic averages. This backwards microsimulation method is what Li & O'Donoghue (2012) call "back-casting" and is a technique that has seldom been used in the past. The most notable example of backwards microsimulation is Ireland's LIAM dynamic microsim-

[22]These include INSEE's model Destinie 2 (Blanchet *et al.*, 2011), CNAV's PRISME model (Albert *et al.*, 2009) and DREES' TRAJECTOIRE model (Duc *et al.*, 2013).

ulation model which, using the 1994-2001 Living In Ireland household survey (LII), reconstructed individual labour market trajectory since 1939 to carry out retirement simulations (Li & O'Donoghue, 2012). We first define a Markov chain framework, with all possible labour-market states rounded to five situations relevant for computing social security benefits. These are registered dependent employment, registered independent labour, unregistered labour, unemployment and inactivity. We then estimate quarterly transitions between these states through logistic behavioural equations, computed separately by gender (see Appendix 1). These are complemented by Mincer wage equations (see Appendix 2) to simulate past wages and thus sectoral labour-income quartiles that enter in our behavioural equations as explanatory variables. We use the 2003-2015 continuous EPH survey to estimate both behavioural and Mincer Wage equations and exploit its quarterly panel nature. This ensures simulated transitions mimic those observed in our database.

Our macro congruency is ensured by a Monte Carlo framework. Indeed, we get from the EPH since 1974 the repartition of our population between these five labour-market states by five-years age groups and gender. When doing our backward microsimulations, the amount of transitions is set so that these proportions are respected. Each period and for each possible previous labour-market state, we use these behavioural equations to compute propensity scores for each individual, depending on their characteristics at the current step of the simulation. Then those with the highest propensity scores for having transited from a given labour-market state are selected first, in what is called alignment by sorting. A random element ensures the same individuals are not always selected for these transitions. This operation is applied to all individuals in our dataset (2003-2015) and is repeated at each period until we reach 1954. For the 1954-1974 period where the EPH did not yet exist, we apply the alignment proportions of October 1974. This way, all individuals of working age surveyed in the EPHc are simulated since they were at least 16. To account for the fact these proportions are not the true historical values we introduce a high and a low scenario in our difference-in-difference estimates. For each individual, we count how many quarters he contributed in our simulations before October 1974. In the high scenario, we multiply this number by 1.1 while in the low scenario, we multiply it by 0.9. We finally round up these numbers to get the pre-1974 contributions for each individual in our dataset. These high and low estimates are then introduced as robustness checks in our difference-in-difference regressions, although most of the time they have no impact on the results.

The random component of our simulation however introduces a Monte Carlo variation (Simpson, 2015) as it can determine whether a given individual falls in the control or the treatment group based only on the chosen random seed. To eliminate this unwanted effect we follow Simpson (2015) and run twenty simulations that use different random seeds. After that, we aggregate these runs into one dataset where all surveyed individuals appear twenty times but with a career that is simulated using

each time a different random seed. This lowers the impact of the random component when assigning a given individual in the control or treatment group. If we take a respondent whose characteristics make him very likely to be in the control group, a majority of his "clones" (for instance 15) will be in the control group, while only a minority (5) of these "clones" will be in the treatment group. His behaviour will thus be counted in the control group with a weight of 75% and in the treatment group with a weight of 25%. If we however simulated careers only once, then the random seed may make this individual be counted as being 100% in the treatment group even though he likely is, given his characteristics, in the control group. To ensure we eliminated the impact of Monte Carlo variation on our difference-in-difference regressions, we ran our model 20 additional times with 20 different seeds and estimated our regressions separately from the first 20 runs. Our results were of the same sign and significance as those listed in Appendix 4.[23] Therefore, by aggregating different runs in one bigger dataset we obtained results that are robust to Monte Carlo variation.

Moreover, these backwards simulation have troubles in ensuring that each individual has a career that is longitudinally consistent and hence plausible (Li & O'Donoghue, 2012, p. 56). To begin with, behavioural equations in a Markov chains framework have trouble in telling apart individuals that seldom work in the formal sector, such as stay-at-home wives or workers confined to the informal sector, from others who are likely to have very long formal careers. Indeed, the estimated labour-market state in T-1 depends on the state in quarter T and on individual characteristics in T-1. Characteristics in T-1 and T only indirectly effect labour-market state in T-3, T-4 or T-200 (that is, 25 years ago). Moreover, due to our alignment by sorting procedure even respondents whose characteristics make them very unlikely to ever having worked in the formal sector usually are simulated as having contributed some quarters. Since each period only a limited amount of individuals are simulated as having contributed to social security, these contributed quarters are taken out from the careers of other individuals whose characteristics make them more likely of having had long contributory careers. This in turn reduces the percentage of individuals having contributed 30 years when reaching retirement age and thus able to retire normally. This problem is particularly present in the case of women, since these have both lower formal labour participation rates than men and an earlier retirement age.

We thus introduced a housewife module to help discriminate between long and (very) short formal careers. We consider that inactive women of working age that report being a housewife and do not have children under the age of 5[24] have been stay-at-home wives for the entirety of their marriage.

[23] The results with the 20 alternative runs are available upon request.

[24] In Argentina, public school is compulsory and free from the age of 5, and since that age school enrolment is nearly universal. Before that age however, school attendance is far lower: 94% of children aged 5 attend school or an educative facility, but only 71% of those aged 4 and 37% of those aged 3, as measured in the EPHc 2003-2015. We thus assume housewives with children aged 4 or younger have temporarily withdrawn from the labour market, and may have in the past contributed to social security.

Since we additionally assume that married and common-law couples were formed since the younger spouse turned 18, this implies these women are simulated as having been inactive their whole active lives. This allows us to flag a proportion of women (16% of women of working age according to the EPHc) for whom we simulate a career made entirely of inactivity spells, leaving room for other women of their age group for having contributed to social security in the past. We thus polarise through this module between women that probably never contributed and women who are likely to have had longer careers, and thus reach the 30 contribution years mark by age 60.

In the end, we get for each individual in our survey a total number of validated quarters since they were 16. Since it was also possible to validate some contribution years through affidavits[25] for people retiring up to 2007, we add these numbers to total validated quarters. We then add to this total four times the number of years to retirement age (the quarters they may yet validate before the minimum retirement age), and if the total is inferior to 120 (30 years×4 quarters) they enter the treatment group, since they no longer can retire normally. If the aforementioned sum is 120 or more they enter the control group. If we stick to individuals reaching retirement age in 10 years or less, this gives us for the 2003-2015 period 40 to 45% of men and 80% of women in the treatment group, for a total of 66% of the respondents retiring in 10 years or less not being able to retire normally. These figures are consistent with actual retirement rates before the implementation of moratorium pensions in 2006. According to the EPHc, between the third quarter of 2003 and the second quarter of 2006 16% of women aged 60 (11% if we exclude widows, since we cannot tell apart people retiring on a survivor's benefit from those receiving a direct pension) and 24% of men aged 65 were retired. This means that respectively 84% of women and 75% of men could not retire at retirement age before the implementation of moratoriums, and access to retirement only moderately increased with age[26]. Finally, Appendix 3 shows that our control group has characteristics of individuals that typically have had long formal careers: it is wealthier, with higher levels of education, more often working in the formal sector, with longer seniority in their jobs and concentrated within the wealthiest regions of the country[27].

[25] By virtue of Art. 38 of Law 24241.

[26] 36% of men aged 66 and 43% of those aged 67 were retired, while 17% of women aged 61 and 21% of those aged 62 were retired. Source: EPHc, third quarter of 2003- second quarter of 2006.

[27] Individuals in the control group live more often in the Autonomous City of Buenos Aires and Patagonia, which both have around 45% of their working population in the top 25% income quartile. The poorest regions in the country, Northeastern and Northwestern Argentina, have respectively 12% and 13% of their working population in the top 25% income quartile (Source: own calculation based on EPHc 2003-2015). As can be seen in Appendix 3, individuals in the control group are over-represented in those two wealthiest regions and under-represented in the two poorest regions.

3.3 Comparing yearly transitions into and out of formal employment between the treatment and control groups

The basic idea of this paper is that senior workers may have taken from granted, since the implementation of pension moratoriums, that in the future they may not need 30 years of contributions to retire. In order to carry out our difference-in-difference analysis, we must thus define the moments where the 2006 and 2014 moratoriums' existence and characteristics became widely known. First of all, although Law 24476 moratorium was implemented since March 2006, its existence was not much publicised and relatively few people had subscribed to it[28] before Law 25994 moratorium came into effect in the third quarter of 2006. Hence, we consider the third quarter of 2006 as the period in which the first wave of moratoriums started to be widely known and may hence have begun modifying individual behaviour, as in Bosch & Guajardo (2012). Law 26970 Moratorium, on the other hand, was announced during the second quarter of 2014 and accessible since the third quarter of 2014, so we choose this third quarter of 2014 as the date at which it came into effect. Also, since we consider the possibility worker's behaviour may have changed since the introduction of pension moratoriums in 2006, our model may be subjected to a "Lucas critique". We indeed simulate past behaviour through behavioural equations estimated between 2003 and 2015, mixing thus periods before and after pension moratoriums were available. As a robustness check, we thus re-run our microsimulation model simulating individual behaviour previous to the third quarter of 2006 with the help of behavioural equations estimated up until the second quarter of 2006, while behaviour after the introduction of pension moratoriums is reproduced using behavioural equations estimated with data from the third quarter of 2006 to the second quarter of 2015.

Before carrying out our difference-in-difference estimations, we plot the evolution over the 2003-2015 period of yearly transitions to and from formal employment of our control and treatment group to spot a change in behaviour following the introduction of pension moratoriums.

[28] At the beginning of July 2006, 125.000 individuals were receiving a Law 24476 or 25994 moratorium pension (Bermúdez, 10th of July 2006)

Figure 1: Yearly transitions from informal to formal labour, men aged 54 to 63 (2003-2015)

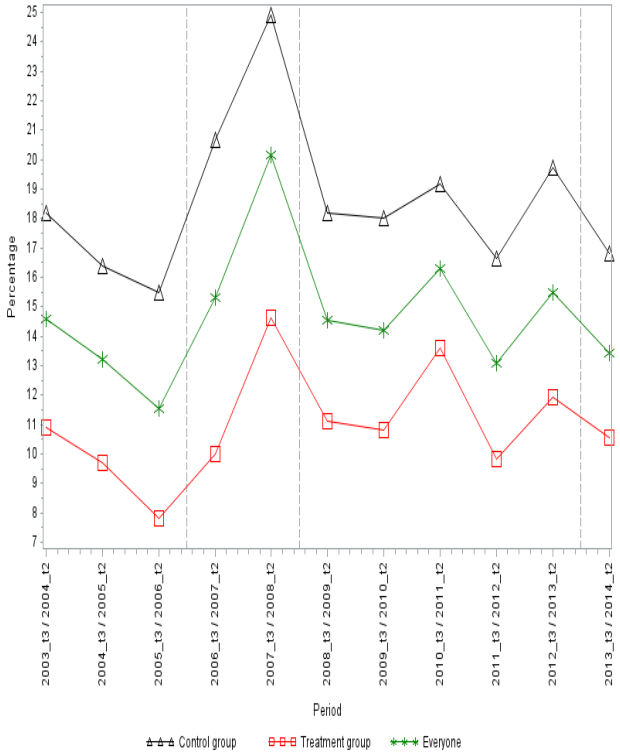
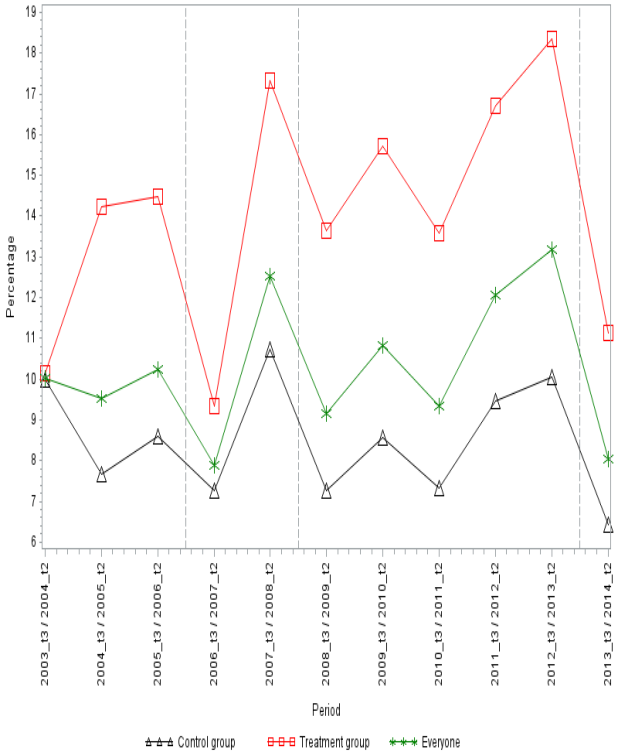


Figure 2: Yearly transitions from formal to informal labour, men aged 54 to 63 (2003-2015)



Source: EPHc(2003-2015). Reading example: in Figure 1, 11% of men from the treatment group had experienced a yearly transition from informal to formal labour between the second half of 2003-first half of 2004 to the second half of 2004- first half of 2005. Missing quarters: third quarter of 2007 (the survey was not carried out by the INDEC) and second quarter of 2014 (inconsistencies in household id variables make studying individual transitions involving that quarter impossible).

Figure 3: Yearly transitions from informal to formal labour, women aged 49 to 58 (2003-2015)

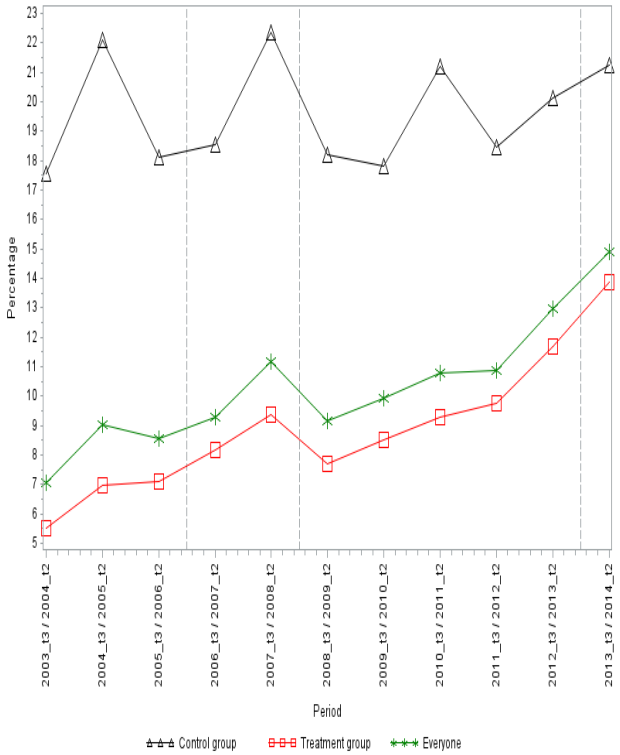
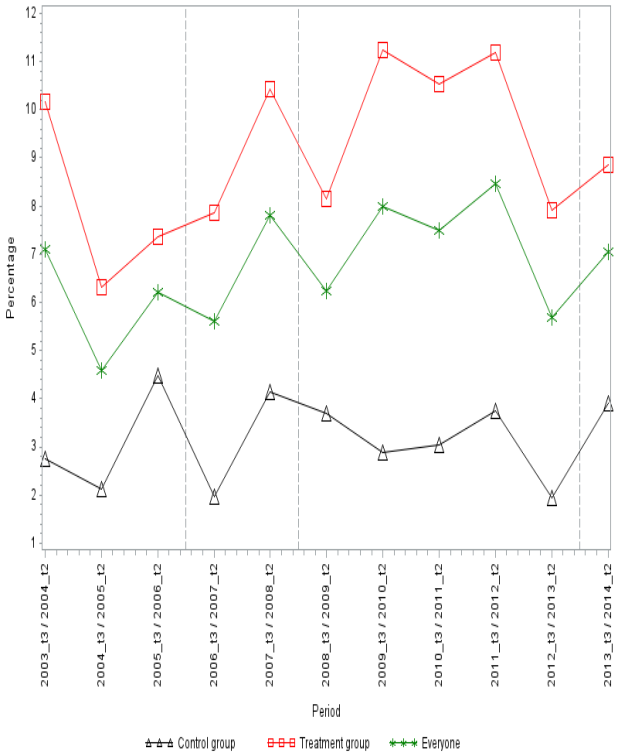


Figure 4: Yearly transitions from formal to informal labour, women aged 49 to 58 (2003-2015)



Source: see Figures 1 to 2

We indicate the first and second moratoriums through dotted lines, as well as the 2008 crisis. The control group has always higher transitions into formal employment and lower transitions out of it, consistent with its longer estimated registered careers. The probabilities to transit between formal and informal labour in a given year are low, ranging between 7% and 15%, but not insignificant and higher for transitions into the formal sector. This suggests there is not a strict segmentation of the formal and informal sectors in Argentina for senior workers. Despite this, we cannot see a clear change in the treatment group's behaviour relatively to the control group after the first moratorium. Only transitions into informal labour of women in the treatment group seem to have increased between the 2006 moratorium and the 2008 crisis, while those of the control group remained stable. We however can see a slight change in behaviour with the second moratorium. Women in the treatment group saw a faster increase in formalisation probabilities than those in the control group (Figure 3), while their deformalisation probabilities increased less than the control group's (Figure 4) the former's (de)formalisation probability increases (decreases) faster than the latter's. In the case of men, de-formalisation probabilities of the treatment group decreased more than the control group's (Figure 2). Finally, even though transitions in and out of formal employment do not seem to have been greatly affected by pension policy shocks (the 2006 and 2014 pension moratoriums but also the 2008 nationalisation of private pension funds), they were barely affected by economic fluctuations either. For instance, the doubling throughout the period of senior women's formalisation probability, driven mainly by women in the treatment group, was barely affected by the 2008 crisis and even increased the fastest during the 2012-2015 economic stagnation. Only senior men's formalisation rates seem to have been sensible to the conjuncture as they dropped with the 2008 crisis. As such, the slight changes in behaviour between the control and treatment groups we analysed earlier that seem to be provoked by the moratoriums may be particularly significant.

3.4 Estimating the moratoriums' impact through difference-in-difference analysis

We build a Difference-In-Difference (DID) model to ascertain whether the treatment group reacted differently to these policies than the control group, in the manner of Garganta & Gasparini (2015) and Bosch & Guajardo (2012). Unlike Bosch & Guajardo (2012), we study the impact of these moratoriums on individual labour-market transitions and not in levels. We do this in order to control for individual unobserved characteristics and for the structural mobility induced by the increase over the 2003-2015 period in formal labour and the decrease of both unemployment and informal labour among people of working age. Not only do we study the policy's impact on the probability to become a formal worker, as in Garganta & Gasparini (2015); we also ascertain pension moratorium's impact on the probability a formal worker has to become informal, what we call deformalisation. Finally, we indirectly identify

registered independent labour in the manner of Maurizio (2012). A significant proportion (33%[29]) of workers within 10 years of the minimum retirement age are independent. We cannot therefore follow Garganta & Gasparini (2015) and leave independent workers out of our sample. For each transition and each moratorium, and separately by gender, the equation we estimate is:

$$\mathbb{1}_{it} = \alpha + \beta_1 Pol_{it} + \beta_2 Post + \gamma \left(Pol_{it} \times Post\right) + \theta X_{it} + \epsilon_{it} \tag{1}$$

Where $\mathbb{1}_{it}$ is a dummy that indicates whether individual i at time t made the studied transition in the course of the year. Pol_{it} is a dummy that scores 1 when the individual belongs to the treatment group (that is, when he will need a moratorium to retire) and 0 when he belongs to the control group. $Post$ is an indicator variable that distinguishes post-program periods from those before the policy implementation, and we add an interaction term between these two variables. The controls X_{it} are: level of education, the firm's sector, region of residence, age, number of children aged 4 or less, yearly GDP growth as a proxy for the economic conjuncture, civil state and partner's labour-market state. Labour income quartile (within formal dependent labour, formal independent labour and informality) as a proxy of individual labour productivity, length of unemployment, and labour-market state are also added when relevant. We also take the whole sample, then compute the impact of the first moratorium with data before the 2008 crisis only (from the third quarter of 2003 to the third quarter of 2008) and the second moratorium's with data after the 2008 crisis. As robustness measures, we not only take into account the aforementioned variations on length of pre-1974 careers and Lucas critique consistency of behavioural equations, we also take independent workers out of our analysis to limit any bias that may have been caused by our identification method of formal independent workers. Finally, in order to improve the fit of our models, we use a stepwise selection method with an entry and exit threshold of 10%, train our model in 80% of our randomly selected and validate it on the remaining 20%.

4 Results

The results are listed in Appendix 4. They indicate that the moratoriums had little impact on senior men's behaviour: the 2006 and 2014 moratoriums had no statistically significant impact on men's formalisation probabilities. Also, the 2014 moratorium had a negative, but not robust, impact on men's transitions out of formal employment. The 2006 moratorium had a negative and significant effect on the probability of men leaving the formal sector. This result however was not robust to excluding independent workers from the sample: the impact became negative and it was not robust to the Lucas Critique. On the other hand, both moratoriums had impacts on women's transition probabilities that were significant and robust to various specifications. The impact on women's formalisation probab-

[29]Source: own computation using the EPHc (2003-2015).

ilities was positive. However, the impact on women's deformalisation probabilities differs from one moratorium to the other: it is positive (which means it encouraged leaving the formal sector) for the 2006 moratoriums while it is negative for the 2014 moratorium.

The above results, in particular the lack of significant impacts of the moratoriums on men's transition probabilities, can be partially attributed to a labour-market segmentation, as only 15% of informal senior men transit within a year to the formal sector. This means labour formality seems to mainly be the employer's decision. However, there is still a significant leeway for senior workers to enter the formal sector. Moreover, there are next to none barriers to access the informal sector from a registered job[30] and we still fail to find a significant impact of moratoriums on men deformalisation probabilities. The lack of impact on men's transition probabilities means the moratoriums did not prove to be an incentive big enough to make them transit differently between the formal and informal sectors: the inter-temporal increase in expected income derived from the informal sector was not enough to encourage senior formal workers to leave formal labour. On the one hand, the persistence of a male-breadwinner scheme in Argentina[31] means the job stability provided by the formal sector may be preferred over the instability of earnings in the informal sector even if the inter-temporal income expected from the latter increased due to pension moratoriums. On the other hand, the fact health coverage is restricted to formal workers[32] is more relevant for men approaching retirement than for women. Indeed, the former generally have a worse health in general, both because they retire at older ages (65 instead of 60) and have higher mortality rates and lower life expectancy than women of the same age. When deciding whether to be in the formal or informal sector, health coverage is bound to be a decisive factor for senior men approaching retirement than for women, leaving retirement matters in the background.

The fact the moratoriums impacted women's transitions into and out of formal employment may be due both to the male-breadwinner bias and to the lesser relevance for them of health coverage. The former means their labour income often complements their partner's while they still have to take upon themselves most domestic labour, so having the wife have an unstable informal job may be more acceptable in the household. The latter means future retirement pensions matter more in women's decision to work in the formal or informal sector. First of all, the positive impact of both moratoriums on women's formalisation probabilities may mean these moratoriums gave women with

[30]Some do exist, particularly for upper-tier informal labour. For instance, setting up a small unregistered business requires some capital, which is a barrier to entry for individuals subject to liquidity constraints (Fiess *et al.*, 2010)

[31]Evidence of such a scheme is present in our behavioural equations listed in Appendix 1. Indeed, being married instead of being single increases the probability of being a registered wage-earner for men but decreases it for women. Similarly, being married instead of being single decreases the probability a man has of being inactive while it increases it for women.

[32]Basic health insurance in Argentina, called "Obra Social", is often managed by Labour Unions and depends on the worker's branch. A notable exception is Health Insurance for the retired, which is managed by the PAMI ("Program of Comprehensive Healthcare"), an autonomous body within the Federal Health Ministry.

incomplete careers a reason to contribute to social security in reducing future moratorium instalments and facilitating access to a hypothetical moratorium pension in the future. When studying women's deformalisation probabilities however, the results are more nuanced. The fact the 2006 moratorium encouraged female workers to leave the formal sector while the 2014 moratorium discouraged such transitions may be due to the varying generosities of both moratoriums. The 2006 moratorium was particularly generous: it allowed buying back non-contributed years since 2004, did not have barriers of entry and had instalments that were not adjusted to inflation. Together with the economic boom during which it was issued, it may have lead people to believe getting a retirement pension would be automatic from then on. In comparison, the 2014 moratorium, adopted during a stagnating economic situation, appears to have sent a signal of tougher conditions to retire in the future. Not only enrolment to this plan is means and wealth tested, but also instalments are indexed with the same formula than pension benefits. This increases the real pension discount derived from a higher accumulated social security debt and makes it all the more important to have fewer contribution years to buy back. The gradual replacement of moratorium pensions since 2016 by a universal benefit for the elderly that is lower than the minimum pension and accessible only by age 65 suggest these expectations may have been accurate.

5 Conclusion

This paper's contribution is two-fold. On the one hand, it completes unavailable information on careers in Argentina with a dynamic microsimulation model, a tool which had until recently (Cicowiez *et al.*, 2016) not been used for studying this country's economy and been previously used only once in the study of social security in Latin America (Zylberstajn *et al.*, 2011). Additionally, our backwards dynamic microsimulation, or "back-casting", has barely been used for reconstituting missing information on individual careers and reproducing historical data (Li & O'Donoghue, 2012). With these simulated careers, this work divides senior workers that retire within ten years into a treatment group with incomplete careers and a control group with presumably more complete careers. We then develop a difference-in-difference model in order to assess the impact of the news shock derived from pension moratoriums on the labour supply of workers with incomplete careers.

We fail to find any significant effect of pension moratoriums on senior men's behaviour. These results are in line with the literature stating there is a segmentation of the labour market in developing countries between a formal and an informal sector. Informality seems hence to be mainly the employer's and not the worker's decision, who is rationed out of the formal sector due to barriers of entry. We nevertheless show there is no impermeable barrier between formal and informal labour even for senior workers, with more than one chance out of ten to enter the formal sector each year, which leaves

informal workers some leeway to enter formality. This also means the change in the inter-temporal income associated with informal labour caused by the moratoriums did not prove to be enough of an incentive for men changing their formal labour supply. Stronger incentives for male labour formality may come from the male-breadwinner paradigm, where the stability of the husband's income may be favoured over increased, but fluctuating, earnings available in the informal sector. Also, men approaching retirement age are older than women and are in an overall worse health condition, so the health coverage associated with formal labour is likely a more important factor in their decision than the pension moratoriums. Regarding senior women, although the 2006 moratoriums had a nuanced effect since they appear to have encouraged both their formalisation and their deformalisation, the 2014 moratorium prompted senior women to increase their social security contributions. This is likely because it was implemented during a complicated economic situation and was harder to subscribe to, sending a signal that retiring with incomplete careers in the future would be harder. Moreover, the increased real value of instalments when buying back non-contributed years made it all the more important to have the fewest possible non-contributed years to buy back when attempting to retire.

We can thus conclude that pension moratoriums in Argentina have improved the living conditions of the elderly without diminishing social security affiliation of senior workers. Our results nevertheless also show that more flexibility in transitions to retirement, with in this case pension moratoriums, may encourage increased contributions to the pension system. This would advocate for providing additional incentives for workers' contributions in the form, for instance, of supplementary pension schemes. Limitations of this work lie mainly on the limitations of our data: estimating individual careers for constituting our treatment and control groups reduces our impact analysis accuracy. This work's explanatory power would be higher with direct information on individual careers and contributions to social security. Also, the lack of data on independent workers' affiliation to social security bars us from studying their specific reactions to pension moratoriums, even though they have *de facto* the most latitude in deciding if they contribute and how much they do. Further work on this topic may include studying Argentina's 2016' pension reform[33] that gradually replaced pension moratoriums with a less generous, but permanent, universal pension for the elderly. Studying the impact of the introduction of this universal benefit on formal labour supply some years from now as compared to the introduction of the first pension moratoriums may be interesting to see if this permanent reform affected senior worker's formalisation rates more than the news shocks derived from both temporary moratoriums.

[33] Law 27260, issued the 22th of July 2016, instituted a wide-ranging pension reform that, among others, instituted a "Universal Pension for the Elderly Adult" (Art. 13). This pension is given unconditionally to men and women aged 65 or more that don't have any retirement benefit and gives the beneficiary access to the PAMI, the federal health insurance of the retired. It is however permanently equal to 80% of the minimum pension (Art. 14) and no survivor's benefit may originate from it after pensioner's death. Its financing depends for the moment on the current Federal budget (Art. 19), but this may change by 2019, when a major social security reform is scheduled to take place according to the bill's Art. 12.

Appendix 1: Behavioural equations: determinants of past quarter's labour-market state

In our dynamic microsimulation model, we use logistic regressions to simulate past labour-market states. The dependent variable is hence the previous quarter's labour-market state. We use the EPHc (2003-2015) to estimate our behavioural equations, but we use them for simulating careers up to 1954. It is thus crucial to avoid overfitting our model to the data, so that our model's predictive power is less dependent on the dataset it was simulated in. To do so, we use 5-fold stepwise selection for our logistic equations: we randomly select 80% of our dataset as the training base where we estimate our equations, and then validate them in the remaining 20% test base. The Significance Level for Entry (SLE) and to Stay (SLS) in our stepwise selection method are both set at 10%. As can be seen in the tables below, we get similar c-statistics (the Area Under the Curve) for the training and validation bases and values that range from almost 0.8 to 0.95. This advocates for the predictive power of our logit regressions and thus for the micro-coherence of our model.

Behavioural equations: men aged 16-64, 2003-2015.

Dependent variable	$Wage-earner_{t-1}$	$Independent_{t-1}$	$Unregistered_{t-1}$	$Unemployed_{t-1}$	$Inactive_{t-1}$
Intercept	0.5276 ***	0.0808	-0.1323 ***	-0.4743 ***	0.1820 *
$Primary\ education_{t-1}$	-0.4969 ***	-1.3995 ***	1.0329 ***		0.3768 ***
$Secondary\ education_{t-1}$	-0.1817 ***	-0.7164 ***	0.6523 ***		0.5099 ***
$Tertiary\ education_{t-1}$	Ref.	Ref.	Ref.	Ref.	Ref.
$Age_{t-1} \in [16;20[$	Ref.	Ref.	Ref.	-0.4634 ***	Ref.
$Age_{t-1} \in [20;25[$	0.8695 ***	0.8452 ***	0.5993 ***	Ref.	-0.8659 ***
$Age_{t-1} \in [25;30[$	1.2663 ***	1.4622 ***	0.6697 ***	-0.1666 ***	-1.2544 ***
$Age_{t-1} \in [30;35[$	1.2313 ***	1.6923 ***	0.6212 ***	-0.0782 **	-1.4440 ***
$Age_{t-1} \in [35;40[$	1.2148 ***	1.7724 ***	0.6767 ***	-0.3903 ***	-1.4838 ***
$Age_{t-1} \in [40;45[$	1.1876 ***	1.8067 ***	0.6182 ***	-0.3076 ***	-1.1753 ***
$Age_{t-1} \in [45;50[$	1.1196 ***	1.9367 ***	0.6149 ***	-0.3431 ***	-1.0063 ***
$Age_{t-1} \in [50;55[$	0.9908 ***	1.9864 ***	0.6006 ***	-0.2433 ***	-0.7219 ***
$Age_{t-1} \in [55;60[$	0.9660 ***	1.9567 ***	0.5190 ***	-0.2027 ***	-0.3847 ***
$Age_{t-1} \in [60;65[$	0.7417 ***	2.0062 ***	0.4418 ***	-0.2645 ***	0.00269
$Single_{t-1}$	Ref.	Ref.	-0.3021 ***	Ref.	0.6854 ***
$Married_{t-1}$	0.5134 ***	0.2867 ***	-0.2188 ***	-0.5379 ***	Ref.
$Divorced_{t-1}$	0.2683 ***	0.1427 ***	-0.0944 *	-0.2337 ***	-0.1621 **
$Common-law_{t-1}$	0.3293 ***	0.1921 **	Ref.	-0.4243 ***	-0.1164 ***
$Widowed_{t-1}$	0.2753 ***	0.2236 **	-0.3042 ***	-0.4704 ***	0.2673 ***
$No\ partner_{t-1}$	-0.1909 ***	-1.2421 ***	-0.3272 ***	0.1804 **	Ref.
$Wage-earner\ partner_t$	Ref.	-1.2297 ***	-0.6644 ***	0.4587 ***	-0.1837 **
$Independent\ partner_t$	-0.7685 ***	Ref.	-0.9978 ***	-0.6602 ***	-0.7414 ***

Source: Author's Calculation based on EPHc microdata, 2003-2015. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Behavioural equations: men aged 16-64, 2003-2015.

Dependent variable	$Wage-earner_{t-1}$	$Independent_{t-1}$	$Unregistered_{t-1}$	$Unemployed_{t-1}$	$Inactive_{t-1}$
$Unregistered\ partner_t$	-0.4941 ***	-1.6413 ***	Ref.	0.2385 ***	-0.3587 ***
$Unemployed\ partner_t$	-0.2299 ***	-1.7739 ***	-0.3055 ***	0.8260 ***	-0.8255 ***
$Inactive\ partner_t$	-0.0615 **	-1.2701 ***	-0.3570 ***	Ref.	-0.2548 ***
$Children_{t-1}\ aged \leq 4 = 0$	0.0122		-0.0752 ***	0.0532	0.5987 ***
$Children_{t-1}\ aged \leq 4 = 1$	Ref.		Ref.	Ref.	Ref.
$Children_{t-1}\ aged \leq 4 = 2+$	-0.1882 ***		0.1131 ***	-0.0737	0.2228 **
$Q1_t \times Wage-earner_t = 1$	Ref.			0.6436 ***	0.4150 ***
$Q1_t \times Wage-earner_t = 0$	-4.1889 ***				
$Q2_t \times Wage-earner_t = 1$	4.7790 ***	-0.2787 ***	-0.6602 ***		
$Q3_t \times Wage-earner_t = 1$	5.0873 ***	-0.1585 ***	-1.0852 ***	-0.5750 ***	-0.3548 ***
$Q4_t \times Wage-earner_t = 1$	5.1321 ***		-1.3042 ***	-0.9706 ***	-0.8104 ***
$Q1_t \times Independent_t = 1$	-0.2383 ***	Ref.	1.3420 ***	1.5927 ***	1.4897 ***
$Q1_t \times Independent_t = 0$		-4.1203 ***			
$Q2_t \times Independent_t = 1$		4.3689 ***	1.1725 ***	0.7461 ***	0.8264 ***
$Q3_t \times Independent_t = 1$	0.2589 ***	4.5590 ***	0.8598 ***	0.2649 **	
$Q4_t \times Independent_t = 1$	0.4588 ***	4.6130 ***	0.4520 ***		
$Q1_t \times Unregistered_t = 1$	-0.2642 ***	1.2070 ***	Ref.	2.2478 ***	1.8235 ***
$Q1_t \times Unregistered_t = 0$			-2.4969 ***		
$Q2_t \times Unregistered_t = 1$	0.1555 ***	1.4320 ***	2.7553 ***	1.9061 ***	1.4039 ***
$Q3_t \times Unregistered_t = 1$	0.3260 ***	1.6573 ***	2.9079 ***	1.6268 ***	0.9776 ***
$Q4_t \times Unregistered_t = 1$	0.6433 ***	1.9147 ***	2.8454 ***	1.2575 ***	0.6352 ***
$Unemployed_t = 1$	0.6721 ***	1.1013 ***	1.2240 ***	Ref.	2.1579 ***
$Unemployed_t = 0$				-3.4959 ***	
$Inactive_t = 1$		0.5522 ***	0.1422 ***	1.6644 ***	Ref.
$Inactive_t = 0$					-4.3708 ***
AUC training dataset	0.9449	0.9055	0.8734	0.8019	0.9413
AUC validation dataset	0.9444	0.9129	0.8717	0.7918	0.9456
Observations	249750	249750	249750	249750	249750

Qk_t is the kth sectoral labour-income quartile. It is computed separately among wage-earners, independent and unregistered (informal) workers. Reading example: a man who belongs today to the 25% richest (formal) wage-earners sees his odds ratio of having been a (formal) wage-earner in the previous quarter increase by $\exp(-4.1889 + 5.1321) - 1 = 156.82\%$ as compared to the reference individual.

Source: Author's Calculation based on EPHc microdata, 2003-2015. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Behavioural equations: women aged 16-59, 2003-2015.

Dependent variable	$Wage-earner_{t-1}$	$Independent_{t-1}$	$Unregistered_{t-1}$	$Unemployed_{t-1}$	$Inactive_{t-1}$
Intercept	0.9117 ***	0.0710	-0.8740 ***	-0.5057 ***	1.9847 ***
$F_{1,t-1}$	-1.0687 ***	-1.8104 ***	0.7518 ***	-0.4810 ***	0.7347 ***
$F_{2,t-1}$	-0.5266 ***	-0.8234 ***	0.4697 ***	-0.2163 ***	0.6387 ***
$F_{3,t-1}$	Ref.	Ref.	Ref.		Ref.
$Age_{t-1} \in [16;20[$	Ref.	Ref.	Ref.	-0.4367 ***	Ref.
$Age_{t-1} \in [20;25[$	0.7446 ***	0.4529 ***	0.6790 ***	Ref.	-0.7280 ***
$Age_{t-1} \in [25;30[$	1.0748 ***	0.9768 ***	0.9225 ***	0.0465	-1.1279 ***
$Age_{t-1} \in [30;35[$	1.2476 ***	1.2556 ***	0.9962 ***	-0.1519 ***	-1.2130 ***
$Age_{t-1} \in [35;40[$	1.3067 ***	1.3232 ***	0.9831 ***	-0.1713 ***	-1.2309 ***
$Age_{t-1} \in [40;45[$	1.3424 ***	1.4439 ***	0.9416 ***	-0.3789 ***	-1.1517 ***
$Age_{t-1} \in [45;50[$	1.4295 ***	1.5279 ***	0.8624 ***	-0.3910 ***	-1.1192 ***
$Age_{t-1} \in [50;55[$	1.4181 ***	1.4588 ***	0.7539 ***	-0.5601 ***	-0.9028 ***
$Age_{t-1} \in [55;60[$	1.3596 ***	1.6578 ***	0.6860 ***	-0.8796 ***	-0.7452 ***
$Single_{t-1}$	Ref.		0.0184	Ref.	-0.4117 ***
$Married_{t-1}$	-0.1126 *		-0.0865 ***	-0.3948 ***	Ref.
$Divorced_{t-1}$	-0.0928 ***		0.2688 ***	0.1582 ***	-0.8717 ***
$Common-law_{t-1}$	0.0200		Ref.	-0.3482 ***	-0.1798 ***
$Widowed_{t-1}$	-0.1743 ***		0.1413 ***	-0.1309 *	-0.3264 ***
$No\ partner_{t-1}$	-0.1129 *	-0.9384 ***	-0.1654 ***	0.3312 ***	0.2823 ***
$Wage-earner\ partner_t$	Ref.	-0.9982 ***	-0.5137 ***	0.2955 ***	Ref.
$Independent\ partner_t$	-0.4831 ***	Ref.	-0.4775 ***	-0.2036 **	0.1974 ***
$Unregistered\ partner_t$	-0.4768 ***	-1.3144 ***	Ref.	0.3378 ***	-0.0270
$Unemployed\ partner_t$	0.0181	-1.4437 ***	-0.1744 ***	1.0351 ***	-0.3470 ***
$Inactive\ partner_t$	-0.0960 *	-1.1126 ***	-0.2448 ***	Ref.	0.1532 ***
$Children_{t-1}\ aged \leq 4 = 0$	0.0377	0.1532 ***	0.1684 ***	0.1824 ***	-0.2780 ***
$Children_{t-1}\ aged \leq 4 = 1$	Ref.	Ref.	Ref.	Ref.	Ref.
$Children_{t-1}\ aged \leq 4 = 2+$	-0.2016 ***	0.3316 ***	-0.1474 ***	-0.1773 ***	0.1616 ***
$Q1_t \times Wage-earner_t = 1$	Ref.		-0.1784 **	1.0684 ***	1.4800 ***
$Q1_t \times Wage-earner_t = 0$	-3.9787 ***				
$Q2_t \times Wage-earner_t = 1$	4.6610 ***		-1.0235 ***	0.4336 ***	0.8679 ***
$Q3_t \times Wage-earner_t = 1$	4.9330 ***		-1.4999 ***		0.3653 ***
$Q4_t \times Wage-earner_t = 1$	4.9772 ***	0.2255 ***	-1.9122 ***		
$Q1_t \times Independent_t = 1$	-0.7071 ***	Ref.	0.8153 ***	2.1303 ***	2.9344 ***
$Q1_t \times Independent_t = 0$		-4.5988 ***			
$Q2_t \times Independent_t = 1$		4.8289 ***	0.6640 ***	0.7832 ***	2.2431 ***
$Q3_t \times Independent_t = 1$		4.9404 ***	0.4175 ***	1.1695 ***	1.5071 ***
$Q4_t \times Independent_t = 1$		5.0694 ***			1.6539 ***
$Q1_t \times Unregistered_t = 1$	-0.7806 ***	1.3261 ***	Ref.	2.6266 ***	3.2023 ***
$Q1_t \times Unregistered_t = 0$			-2.0774 ***		
$Q2_t \times Unregistered_t = 1$	-0.0913 **	1.4622 ***	2.4738 ***	2.2341 ***	2.6699 ***
$Q3_t \times Unregistered_t = 1$	0.2553 ***	1.7198 ***	2.5947 ***	2.0115 ***	2.3591 ***
$Q4_t \times Unregistered_t = 1$	0.7296 ***	2.2551 ***	2.3995 ***	1.8154 ***	2.1664 ***
$Unemployed_t = 1$		1.2488 ***	0.3574 ***	Ref.	3.7807 ***

Source: Author's Calculation based on EPHc microdata, 2003-2015. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Behavioural equations: women aged 16-59, 2003-2015.

Dependent variable	$Wage-earner_{t-1}$	$Independent_{t-1}$	$Unregistered_{t-1}$	$Unemployed_{t-1}$	$Inactive_{t-1}$
$Unemployed_t = 0$				-4.2678 ***	
$Inactive_t = 1$	-0.9808 ***	0.5859 ***	-0.3995 ***	2.4214 ***	Ref.
$Inactive_t = 0$					-5.5474 ***
AUC training dataset	0.9611	0.9090	0.8509	0.7839	0.9098
AUC validation dataset	0.9631	0.9034	0.8565	0.7747	0.9135
Observations	256158	256158	256158	256158	256158
Reading example: a woman who belongs today to the 25% richest (formal) wage-earners sees her odds ratio of having been a (formal) wage-earner in the previous quarter increase by $\exp(-3.9787 + 4.9772) - 1 = 171.42\%$ as compared to the reference individual.					
Source: Author's Calculation based on EPHc microdata, 2003-2015. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.					

Appendix 2: Mincer wage equations

Our Mincer wage equations are 10-fold cross-validated (Kohavi *et al.*, 1995) OLS regressions estimated separately by gender on working individuals of working age. They are subjected to a stepwise selection procedure with a significance level for entry (SLE) and to stay (SLS) of 0.10. This ensures we select a model that has both the most significant explanatory variables while at the same time not being overfitted to the estimation data. This last element is crucial as although we estimate our Mincer wage equations in the 2003-2015 period, we use them to depict individual behaviour up until 1954. The equations, inspired from TRAJECTOIRE's wage module(Duc *et al.*, 2013), have the following form, for each individual i, period t and gender $g \in \{m; f\}$ (for men m and women f) :

$$\ln\left(\frac{ITL_{i,t}}{RIPTE_t \times structure_{g,t}}\right) = \alpha + \sum_{j=1}^{k}\sum_{l=1}^{3}\beta_{j,l} \times age_{i,j} \times for_{i,l} + \sum_{j=1}^{k}\sum_{l=1}^{3}\gamma_{j,l} \times age_{i,j} \times LMS_{i,l,t} + \hat{\epsilon_{i,t}}$$

$ITL_{i,t}$ is individual i's Total Labour Income at time t, $RIPTE_t$ the value of the (gross) wage index RIPTE at time t, $age_{i,j}$ a dummy for belonging to 5-years age groups that range from 16 to 60 for women and 65 for men, $for_{i,l}$ a polytomous variable depicting individual i's education level (Primary, Secondary or complete Tertiary education) and $LMS_{i,l,t}$ individual i's labour-market state at time t (formal dependent employment, formal independent labour and informal employment). Education is used as a proxy for human capital and the labour-market state variable tells of Argentina's labour market segmentation. The rationale between crossing both labour-market state and education level with discretised age groups is to capture the non-linear effect of age on labour income and how it interacts with these two variables. $\hat{\epsilon_{i,t}}$ is the estimated error term for each surveyed individual that was working when he was surveyed, which we input in our dynamic microsimulation model. Finally,

our dependent variable is the working individual's position in the income scale, that is, his nominal net income as a percentage of the period's mean wage. However, the RIPTE mixes both men and women. We thus modify it with a structural coefficient as in TRAJECTOIRE's microsimulation model (Duc *et al.*, 2013, p. 29), where for each period t $structure_{f,t} = (ITL_t - (ITL_{m,t} * N_{m,t}/N_t)) * N_t/N_{f,t}$. $N_{f,t}$ stands for the number of working women at time t and N_t for the number of working individuals at time t, while $ITL_{m,t}$ and ITL_t respectively stand for men's mean labour income and total worker's mean income at time t. We thus adjust it with coefficients computed from the EPHc (2003-2015) to obtain average labour income by gender (as in Duc *et al.* (2013)). The results are listed in the tables below.

Mincer wage equations: men aged 16-64, 2003-2015.

Agegroup	Labour-market state			Formation		
	Wage-earner	Own-account worker	Unregistered worker	Incomplete secondary	Complete secondary	University degree
$Age \in [16;20[$	-0.22081***	-0.92262***	-1.06165***	-0.16416***		
$Age \in [20;25[$	0.07210***	-0.45000***	-0.65022***	-0.28643***	-0.19860***	
$Age \in [25;30[$		-0.24835***	-0.65936***	-0.14418***		0.20671***
$Age \in [30;35[$		-0.17436***	-0.68685***	-0.02508***	0.13625***	0.38772***
$Age \in [35;40[$		-0.12457***	-0.69248***		0.19693***	0.43435***
$Age \in [40;45[$	0.03102***	-0.07676***	-0.68583***		0.18945***	0.41955***
$Age \in [45;50[$	0.02942***	-0.08012***	-0.71130***		0.21706***	0.46477***
$Age \in [50;55[$		-0.09456***	-0.73846***		0.26747***	0.49372***
$Age \in [55;60[$		-0.12233***	-0.77626***		0.25691***	0.50004***
$Age \in [60;65[$		-0.12250***	-0.80773***	-0.01624**	0.25760***	0.48075***
Intercept -0.5211***						

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Reading example: a male (formal) own-account worker aged 33 with a complete secondary education has a net labour income equal to $\exp(-0.5211 - 0.17436 + 0.13625) \approx 57\%$ of the period's RIPTE adjusted by the gender coefficient. If he was interviewed during the first quarter of 2015, this means his net monthly labour income was equal to $12,426 \times 1.074 \times 0.57 \approx 7629$ pesos, approximately 878 US dollars at the time.

Mincer wage equations: women aged 16-59, 2003-2015.

Agegroup	Labour-market state			Formation		
	Wage-earner	Own-account worker	Unregistered worker	Incomplete secondary	Complete secondary	University degree
$Age \in [16;20[$		-0.9273***	-0.9697***	-0.5956***	-0.3489***	
$Age \in [20;25[$		-0.7621***	-0.8769***	-0.4426***	-0.2600***	
$Age \in [25;30[$	-0.1481***	-0.5798***	-1.0432***	-0.2678***		0.2472***
$Age \in [30;35[$	-0.0692***	-0.3957***	-1.0420***	-0.2451***		0.2726***
$Age \in [35;40[$	-0.0295***	-0.2875***	-0.9870***	-0.2658***		0.2399***
$Age \in [40;45[$	-0.0297***	-0.2444***	-0.9822***	-0.2552***		0.2651***
$Age \in [45;50[$		-0.2126***	-0.9714***	-0.2587***		0.2799***
$Age \in [50;55[$		-0.2254***	-0.9494***	-0.2861***		0.3304***
$Age \in [55;60[$		-0.2527***	-0.9759***	-0.2957***		0.3085***
Intercept -0.3385 ***						

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Reading example: a female (formal) wage-earner aged 33 with a university degree has a net labour income equal to $\exp(-0.3385 - 0.0692 + 0.2726) \approx 93\%$ of the period's RIPTE adjusted by the gender coefficient. If she was interviewed during the first quarter of 2015, this means her net monthly labour income was equal to $12,426 \times 0,893 \times 0.93 \approx 10,312$ pesos, approximately 1187 US dollars at the time.

Appendix 3: Descriptive statistics, treatment and control group (women aged 49 to 58 and men aged 54 to 63)

	Treatment group, men	**Control group, men**	**Treatment group, women**	**Control group, women**
		Level of education		
Primary	309,188 (88.92%)	164,972 (39.42%)	543,619 (63.29%)	10,021 (5.77%)
Secondary	34,151 (9.82%)	160,049 (38.24%)	230,550 (26.84%)	60,370 (34.76%)
Tertiary	4,393 (1.26%)	93,527 (22.35%)	84,720 (9.86%)	103,280 (59.47%)
		Labour-market state		
Formal wage-earner	91,588 (26.34%)	168,912 (40.36%)	188,122 (21.90%)	110,378 (63.56%)
Formal independent	23,932 (6.88%)	54,988 (13.14%)	25,071 (2.92%)	17,569 (10.12%)
Informal worker	132,978 (38.24%)	108,122 (25.83%)	210,803 (24.54%)	27,457 (15.81%)
Unemployed	16,890 (4.86%)	14,710 (3.51%)	23,180 (2.70%)	3,600 (2.07%)
Inactive	82,344 (23.68%)	71,816 (17.16%)	411,713 (47.94%)	14,667 (8.45%)
		Region of residence		
Buenos Aires City	6,823 (1.96%)	26,317 (6.29%)	27,796 (3.24%)	14,404 (8.29%)
Greater Buenos Aires	42,710 (12.28%)	51,730 (12.36%)	105,858 (12.32%)	17,462 (10.05%)
Northwestern Argentina	74,970 (21.56%)	70,550 (16.86%)	171,685 (19.99%)	30,915 (17.80%)
Northeastern Argentina	44,348 (12.75%)	37,492 (8.96%)	103,568 (12.06%)	14,752 (8.49%)

	Treatment group, men	Control group, men	Treatment group, women	Control group, women
Cuyo	37,752 (10.86%)	41,388 (9.89%)	90,317 (10.52%)	15,703 (9.04%)
Pampeana	105,852 (30.44%)	139,308 (33.28%)	264,269 (30.77%)	56,671 (32.63%)
Patagonia	35,277 (10.14%)	51,763 (12.37%)	95,396 (11.11%)	23,764 (13.68%)
Length of unemployment				
$<$ 1 month	5,994 (35.64%)	4,206 (28.73%)	4,233 (18.42%)	487 (13.59%)
$\in$ [1;3] months	5,274 (31.36%)	3,926 (26.81%)	5,101 (22.20%)	779 (21.74%)
$\in$]3;6] months	1,969 (11.71%)	1,631 (11.14%)	2,257 (9.82%)	323 (9.01%)
$\in$]6;12] months	924 (5.49%)	1,056 (7.21%)	1,809 (7.87%)	331 (9.24%)
$\in$]1;3] years	1,292 (7.68%)	1,788 (12.21%)	3,512 (15.29%)	608 (16.96%)
$>$3 years	1,365 (8.12%)	2,035 (13.90%)	6,064 (26.39%)	1,056 (29.46%)
Curent job's seniority				
$\in$ [0;3] months	21,053 (8.50%)	12,387 (3.74%)	116,155 (27.82%)	7,985 (5.17%)
$\in$]3;6] months	6,373 (2.57%)	5,027 (1.52%)	6,795 (1.63%)	1,545 (1.00%)
$\in$]6;12] months	7,404 (2.99%)	6,356 (1.92%)	10,404 (2.49%)	2,516 (1.63%)
$\in$]1;5] years	44,657 (18.03%)	46,963 (14.18%)	74,138 (17.76%)	21,282 (13.79%)
$>$ 5 years	168,127 (67.90%)	260,413 (78.64%)	210,041 (50.31%)	121,039 (78.41%)
Civil state				
In a common-law union	53,120 (15.28%)	47,820 (11.43%)	92,940 (10.82%)	13,700 (7.89%)
Married	211,398 (60.79%)	309,982 (74.06%)	490,609 (57.12%)	87,791 (50.55%)
Divorced	28,588 (8.22%)	35,792 (8.55%)	119,113 (13.87%)	34,007 (19.58%)
Widowed	15,010 (4.32%)	12,830 (3.07%)	73,013 (8.50%)	11,007 (6.34%)
Single	39,610 (11.39%)	12,090 (2.89%)	83,180 (9.68%)	27,160 (15.64%)
Partner's labour-market status				
No partner	91,044 (26.18%)	69,416 (16.58%)	296,882 (34.57%)	76,378 (43.98%)
Formal wage-earner	39,765 (11.44%)	85,735 (20.48%)	207,816 (24.20%)	44,544 (25.65%)
Formal independent	5,386 (1.55%)	19,154 (4.58%)	53,176 (6.19%)	19,344 (11.14%)
Informal worker	62,474 (17.97%)	47,686 (11.39%)	175,353 (20.42%)	18,167 (10.46%)
Unemployed	4,843 (1.39%)	5,317 (1.27%)	22,188 (2.58%)	3,072 (1.77%)
Inactive	144,220 (41.47%)	191,240 (45.69%)	103,474 (12.05%)	12,166 (7.01%)
Income quartile				
No labour income	96,806 (27.84%)	86,034 (20.56%)	433,510 (50.47%)	19,670 (11.33%)
Bottom 25%	87,985 (25.30%)	17,175 (4.10%)	170,735 (19.88%)	6,025 (3.47%)
Second quarter	79,332 (22.81%)	59,828 (14.29%)	112,970 (13.15%)	19,650 (11.31%)
Third quarter	52,556 (15.11%)	94,464 (22.57%)	82,669 (9.63%)	40,471 (23.30%)
Top 25%	31,053 (8.93%)	161,047 (38.48%)	59,005 (6.87%)	87,855 (50.59%)

Source: see Appendix 1

Appendix 4: Effects of the moratoriums on transitions to and from formal labour: estimates and robustness checks

Effect of the 2006 moratorium on the probability of becoming formal, men

	(1)	(2)	(3)	(4)
Needs moratorium × after	0.0434	0.0899 ***	0.0015	-0.0298
	(0.0281)	(0.0288)	(0.0572)	(0.0591)
Needs moratorium	-0.667 ***	-0.1181 ***	-0.0859 ***	-0.1094 ***
	(0.0237)	(0.0258)	(0.0292)	(0.0311)
After	0.234 ***	0.2612 ***	0.3132 ***	0.3748 ***
	(0.0175)	(0.0203)	(0.0476)	(0.0488)
With controls	No	Yes	Yes	Yes
Split dataset	No	No	Yes	Yes
Excluding the unemployed	No	No	No	Yes
AUC validation dataset	0.5969	0.6682	0.676	0.6563
AUC training dataset	0.5984	0.6659	0.6718	0.6611
Observations	218,298	218,298	82,298	69,722
Robustness checks	(5)	(6)	(7)	(8)
Needs moratorium × after	-0.5608 ***	-0.0454	-0.0268	0.0182
	(0.1064)	(0.0599)	(0.0584)	(0.0582)
Needs moratorium	0.0006	-0.1029 ***	-0.1025 ***	-0.1194 ***
	(0.0536)	(0.0315)	(0.0307)	(0.031)
After	0.7272 ***	0.3795 ***	0.3748 ***	0.3569 ***
	(0.0908)	(0.0485)	(0.0493)	(0.0494)
With controls	Yes	Yes	Yes	Yes
Excluding the independent	Yes	No	No	No
Length of pre-1974 career	Average	Long	Short	Average
Lucas critique	No	No	No	Yes
AUC validation dataset	0.7106	0.6562	0.6564	0.656
AUC training dataset	0.7213	0.6611	0.661	0.6609
Observations	19,351	69,722	69,722	69,722

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Standard errors are in brackets.

Note 1: The data is restricted to men aged 54 to 63 that work in the informal sector. The dependent variable is equal to 1 when the respondent transits into the formal sector the following year and 0 otherwise. The dataset is split before and after the (fourth quarter of) 2008 crisis. Yearly transitions from or into the third quarter of 2007 or the second quarter of 2014 are excluded respectively due to missing data and impossibility to identify individual transitions.

Note 2: The control variables are annual GDP growth, region of residence, education level, age, civil state, seniority, sectoral labour income quartile, partner's labour-market state, number of children aged 4 or less and economic sector.

Effect of the 2014 moratorium on the probability of becoming formal, men

	(1)	(2)	(3)	(4)
Needs moratorium × after	0.0414	0.0006	-0.044	0.0568
	(0.0509)	(0.0519)	(0.0523)	(0.053)
Needs moratorium	-0.6334 ***	-0.0476 ***	-0.0071	0.0032
	(0.0132)	(0.0164)	(0.0208)	(0.0215)
After	-0.072 **	-0.0706 **	-0.0682 *	-0.1208 ***
	(0.033)	(0.0351)	(0.035)	(0.0362)
With controls	No	Yes	Yes	Yes
Split dataset	No	No	Yes	Yes
Excluding the unemployed	No	No	No	Yes
AUC validation dataset	0.5801	0.6644	0.6599	0.6501
AUC training dataset	0.5814	0.6625	0.6595	0.6517
Observations	218,298	218,298	136,069	123,106
Robustness checks	(5)	(6)	(7)	(8)
Needs moratorium × after	0.4465 ***	0.0894 *	0.0401	0.068
	(0.101)	(0.053)	(0.0529)	(0.0528)
Needs moratorium	0.0531	-0.0036	0.0116	-0.0257
	(0.0401)	(0.0215)	(0.0214)	(0.0217)
After	-0.3073 ***	-0.1349 ***	-0.1136 ***	-0.1269 ***
	(0.0726)	(0.036)	(0.0363)	(0.0371)
With controls	Yes	Yes	Yes	Yes
Excluding the independent	Yes	No	No	No
Length of pre-1974 career	Average	Long	Short	Average
Lucas critique	No	No	No	Yes
AUC validation dataset	0.718	0.6501	0.6501	0.6498
AUC training dataset	0.695	0.6517	0.6517	0.6516
Observations	28,213	123,106	123,106	123,106

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Standard errors are in brackets.

Effect of the 2006 moratorium on the probability of becoming formal, women

	(1)	(2)	(3)	(4)
Needs moratorium × after	0.3997 ***	0.4553 ***	0.3829 ***	0.3192 ***
	(0.0373)	(0.0002)	(0.084)	(0.086)
Needs moratorium	-1.193 ***	-0.3535 ***	-0.1644 ***	-0.148 ***
	(0.0307)	(0.0002)	(0.039)	(0.0403)
After	0.0882 ***	-0.0373 ***	0.1337	0.2733 ***
	(0.0321)	(0.0002)	(0.083)	(0.0854)
With controls	No	Yes	Yes	Yes
Split dataset	No	No	Yes	Yes
Excluding the unemployed	No	No	No	Yes
AUC validation dataset	0.5978	0.6998	0.738	0.7303
AUC training dataset	0.5935	0.6978	0.735	0.731
Observations	212,137	212,137	86,767	75,827
Robustness checks	(5)	(6)	(7)	(8)
Needs moratorium × after	0.5627 ***	0.3454 ***	0.2866 ***	0.6238 ***
	(0.1378)	(0.0852)	(0.0868)	(0.0835)

Needs moratorium	-0.1709 ***	-0.161 ***	-0.1546 ***	-0.2913 ***
	(0.055)	(0.0395)	(0.0409)	(0.0409)
After	-0.439 ***	0.2544 ***	0.2968 ***	0.0503
	(0.1265)	(0.0846)	(0.0861)	(0.0825)
With controls	Yes	Yes	Yes	Yes
Excluding the independent	Yes	No	No	No
Length of pre-1974 career	Average	Long	Short	Average
Lucas critique	No	No	No	Yes
AUC validation dataset	0.7515	0.7303	0.7302	0.7302
AUC training dataset	0.7633	0.731	0.731	0.7313
Observations	43,710	75,827	75,827	75,827

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Standard errors are in brackets.
Note 1: The data is restricted to women aged 49 to 58 that work in the informal sector. The dependent variable is equal to 1 when the respondent transits into the formal sector the following year and 0 otherwise. The dataset is split before and after the (fourth quarter of) 2008 crisis. Yearly transitions from or into the third quarter of 2007 or the second quarter of 2014 are excluded respectively due to missing data and impossibility to identify individual transitions.
Note 2: The control variables are annual GDP growth, region of residence, education level, age, civil state, seniority, sectoral labour income quartile, partner's labour-market state, number of children aged 4 or less and economic sector.

Effect of the 2014 moratorium on the probability of becoming formal, women

	(1)	(2)	(3)	(4)
Needs moratorium × after	0.2582 ***	0.2099 ***	0.1609 **	0.3386 ***
	(0.0649)	(0.0007)	(0.0685)	(0.074)
Needs moratorium	-0.9352 ***	-0.0683 ***	-0.0957 ***	-0.1381 ***
	(0.0182)	(0.0002)	(0.0284)	(0.0296)
After	0.3657 ***	0.239 ***	0.264 ***	0.0685
	(0.0575)	(0.0006)	(0.0611)	(0.0673)
With controls	No	Yes	Yes	Yes
Split dataset	No	No	Yes	Yes
Excluding the unemployed	No	No	No	Yes
AUC validation dataset	0.5711	0.6953	0.6751	0.6865
AUC training dataset	0.5706	0.6956	0.6714	0.6766
Observations	212,137	212,137	125,491	114,737
Robustness checks	(5)	(6)	(7)	(8)
Needs moratorium × after	0.6298 ***	0.3403 ***	0.3383 ***	0.4975 ***
	(0.1051)	(0.074)	(0.0741)	(0.0711)
Needs moratorium	-0.2676 ***	-0.1408 ***	-0.1379 ***	-0.1098 ***
	(0.043)	(0.0295)	(0.0297)	(0.0304)
After	-0.1216	0.0675	0.0684	-0.0474
	(0.0975)	(0.0673)	(0.0673)	(0.0639)
With controls	Yes	Yes	Yes	Yes
Excluding the independent	Yes	No	No	No
Length of pre-1974 career	Average	Long	Short	Average
Lucas critique	No	No	No	Yes
AUC validation dataset	0.666	0.6865	0.6865	0.6867
AUC training dataset	0.6718	0.6766	0.6766	0.6765
Observations	63,429	114,737	114,737	114,737

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Standard errors are in brackets.

Effect of the 2006 moratorium on the probability of becoming informal, men

	(1)	(2)	(3)	(4)
Needs moratorium × after	0.1676 ***	0.1147 ***	-0.2049 ***	-0.3022 ***
	(0.028)	(0.0305)	(0.0645)	(0.0682)
Needs moratorium	0.4456 ***	-0.0334	0.0161	0.0465
	(0.0241)	(0.0284)	(0.0338)	(0.0353)
After	-0.0433 **	-0.0949 ***	-0.0209	0.1539 ***
	(0.0169)	(0.0204)	(0.0519)	(0.0548)
With controls	No	Yes	Yes	Yes
Split dataset	No	No	Yes	Yes
Excluding the unemployed	No	No	No	Yes
AUC validation dataset	0.5755	0.7875	0.7798	0.7846
AUC training dataset	0.5785	0.7896	0.7763	0.7804
Observations	271,393	271,393	88,222	88,222
Robustness checks	(5)	(6)	(7)	(8)
Needs moratorium × after	0.246 **	-0.3038 ***	-0.3077 ***	-0.4341 ***
	(0.1232)	(0.069)	(0.0675)	(0.0673)
Needs moratorium	-0.1304 **	0.0641 *	0.0279	0.1184 ***
	(0.0524)	(0.0356)	(0.0351)	(0.0357)
After	-0.4251 ***	0.1502 ***	0.1607 ***	0.2137 ***
	(0.0769)	(0.0545)	(0.0551)	(0.0552)
With controls	Yes	Yes	Yes	Yes
Excluding the independent	Yes	No	No	No
Length of pre-1974 career	Average	Long	Short	Average
Lucas critique	No	No	No	Yes
AUC validation dataset	0.6973	0.7846	0.7848	0.7844
AUC training dataset	0.7049	0.7804	0.7803	0.78
Observations	67,992	88,222	88,222	88,222

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Standard errors are in brackets.
Note 1: The data is restricted to men aged 54 to 63 that work in the formal sector. The dependent variable is equal to 1 when the respondent transits into the informal sector the following year and 0 otherwise. The dataset is split before and after the (fourth quarter of) 2008 crisis. Yearly transitions from or into the third quarter of 2007 or the second quarter of 2014 are excluded respectively due to missing data and impossibility to identify individual transitions.
Note 2: The control variables are annual GDP growth, region of residence, education level, age, civil state, seniority, sectoral labour income quartile, partner's labour-market state, number of children aged 4 or less, labour-market state and economic sector.

Effect of the 2014 moratorium on the probability of becoming informal, men

	(1)	(2)	(3)	(4)
Needs moratorium × after	-0.1662 ***	-0.1707 ***	-0.2438 ***	-0.1051 *
	(0.0493)	(0.0526)	(0.0521)	(0.0581)
Needs moratorium	0.5826 ***	0.0622 ***	0.0622 ***	0.0838 ***
	(0.0127)	(0.0176)	(0.0213)	(0.0223)
After	-0.065 **	-0.0185	0.0433	-0.2299 ***
	(0.0317)	(0.0347)	(0.0343)	(0.0396)
With controls	No	Yes	Yes	Yes
Split dataset	No	No	Yes	Yes
Excluding the unemployed	No	No	No	Yes
AUC validation dataset	0.5737	0.7875	0.7949	0.8004

AUC training dataset	0.5772	0.7896	0.7947	0.8
Observations	271,393	271,393	183,058	183,058
Robustness checks	(5)	(6)	(7)	(8)
Needs moratorium × after	-0.5595 ***	-0.1216 **	-0.1145 **	-0.0697
	(0.1085)	(0.0582)	(0.0581)	(0.058)
Needs moratorium	0.4174 ***	0.1007 ***	0.0821 ***	0.0978 ***
	(0.0364)	(0.0223)	(0.0223)	(0.0229)
After	-0.0386	-0.224 ***	-0.2246 ***	-0.2451 ***
	(0.0733)	(0.0394)	(0.0397)	(0.0407)
With controls	Yes	Yes	Yes	Yes
Excluding the independent	Yes	No	No	No
Length of pre-1974 career	Average	Long	Short	Average
Lucas critique	No	No	No	Yes
AUC validation dataset	0.6957	0.8004	0.8003	0.8004
AUC training dataset	0.7182	0.8	0.8001	0.7999
Observations	141345	183058	183058	183058

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Standard errors are in brackets.

Effect of the 2006 moratorium on the probability of becoming informal, women

	(1)	(2)	(3)	(4)
Needs moratorium × after	0.1342 ***	-0.1193 ***	-0.1422	0.3099 ***
	(0.0411)	(0.0429)	(0.0893)	(0.1078)
Needs moratorium	0.9169 ***	0.2016 ***	0.1461 ***	0.1309 ***
	(0.0358)	(0.0394)	(0.0456)	(0.049)
After	0.1054 ***	0.284 ***	-0.1446	-0.6497 ***
	(0.0361)	(0.0386)	(0.0897)	(0.1085)
With controls	No	Yes	Yes	Yes
Split dataset	No	No	Yes	Yes
Excluding the unemployed	No	No	No	Yes
AUC validation dataset	0.6157	0.8241	0.8109	0.8219
AUC training dataset	0.6149	0.8274	0.8055	0.8175
Observations	272,778	272,778	83,261	83,261
Robustness checks	(5)	(6)	(7)	(8)
Needs moratorium × after	0.6802 ***	0.2485 **	0.3228 ***	0.2941 ***
	(0.1857)	(0.1053)	(0.1088)	(0.0989)
Needs moratorium	0.3136 ***	0.1403 ***	0.1287 ***	0.1114 **
	(0.0666)	(0.0486)	(0.0494)	(0.0521)
After	-0.9372 ***	-0.5971 ***	-0.661 ***	-0.6237 ***
	(0.1751)	(0.106)	(0.1095)	(0.0989)
With controls	Yes	Yes	Yes	Yes
Excluding the independent	Yes	No	No	No
Length of pre-1974 career	Average	Long	Short	Average
Lucas critique	No	No	No	Yes
AUC validation dataset	0.8034	0.8219	0.8218	0.8223
AUC training dataset	0.7985	0.8176	0.8175	0.8174
Observations	73,440	83,261	83,261	83,261

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Standard errors are in brackets.

Note 1: The data is restricted to women aged 49 to 58 that work in the formal sector. The dependent variable is equal to 1 when the respondent transits into the informal sector the following year and 0 otherwise. The dataset is split before and

after the (fourth quarter of) 2008 crisis. Yearly transitions from or into the third quarter of 2007 or the second quarter of 2014 are excluded respectively due to missing data and impossibility to identify individual transitions.
Note 2: The control variables are annual GDP growth, region of residence, education level, age, civil state, seniority, sectoral labour income quartile, partner's labour-market state, number of children aged 4 or less, labour-market state and economic sector.

Effect of the 2014 moratorium on the probability of becoming informal, women

	(1)	(2)	(3)	(4)
Needs moratorium × after	-0.2015 ***	-0.4172 ***	-0.307 ***	-0.4059 ***
	(0.0634)	(0.0664)	(0.0682)	(0.0731)
Needs moratorium	1.0372 ***	0.1408 ***	0.1581 ***	0.1661 ***
	(0.0183)	(0.0238)	(0.0286)	(0.0314)
After	0.164 ***	0.4964 ***	0.3791 ***	0.4389 ***
	(0.0562)	(0.0593)	(0.0611)	(0.0655)
With controls	No	Yes	Yes	Yes
Split dataset	No	No	Yes	Yes
Excluding the unemployed	No	No	No	Yes
AUC validation dataset	0.6058	0.8249	0.8395	0.8411
AUC training dataset	0.6059	0.8282	0.8325	0.8361
Observations	272,778	272,778	189,442	189,442
Robustness checks	(5)	(6)	(7)	(8)
Needs moratorium × after	-0.6464 ***	-0.4087 ***	-0.4075 ***	-0.4817 ***
	(0.1066)	(0.0731)	(0.0731)	(0.0678)
Needs moratorium	0.2858 ***	0.1713 ***	0.1682 ***	0.0971 ***
	(0.0511)	(0.0313)	(0.0314)	(0.0328)
After	0.6052 ***	0.4408 ***	0.4404 ***	0.4818 ***
	(0.0987)	(0.0655)	(0.0656)	(0.0591)
With controls	Yes	Yes	Yes	Yes
Excluding the independent	Yes	No	No	No
Length of pre-1974 career	Average	Long	Short	Average
Lucas critique	No	No	No	Yes
AUC validation dataset	0.8558	0.8411	0.8411	0.8412
AUC training dataset	0.8598	0.8361	0.8361	0.8362
Observations	169,770	189,442	189,442	189,442

Source: see Appendix 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Standard errors are in brackets.

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