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Scarring effects of youth unemployment and informality

Evidence from Argentina and Brazil*

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Abstract

This paper studies the effects of youth unemployment and informality on adult labor market outcomes in Argentina and Brazil. We propose an econometric strategy based on cross-cohort differences in youth labor market experiences in order to identify the effects of interest. The main findings indicate strong and significant scarring effects: cohorts exposed to higher levels of unemployment and informality in their youth fare systematically worse in the labor markets as adults. However, the persistence and wage penalty effects are mainly present in the early years of adulthood, and tend to dissipate with the passage of time. We also find that adverse effects are stronger for workers with lower skills. The main contribution of these results is to add a further dimension specific to developing and middle income countries – informality – to previous studies of unemployment scarring in advanced economies.

JEL Classification: J24, J31, J64, O17

Key words: youth, unemployment, informality, scarring, Latin America

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1. Introduction

Previous research on the labor market outcomes for young individuals is suggestive that these workers tend to fare worse than adults. In particular, young workers earn lower wages, face higher unemployment and have less access to formal jobs (Freeman and Wise, 1982; Weller, 2007; Bassi and Galiani, 2009). These results are not unusual at the beginning of the labor market career when workers go to a search process that may result in high job turnover and spells of unemployment. However, these findings have generated substantial interest in determining whether these conditions have lasting effects into adulthood (usually referred to as ‘scarring’), or whether they gradually fade away and only temporarily ‘blemish’ working lives (Ruhm, 1991).

Possible explanations for the scarring effect of past labor market experiences can be found in the human capital theory (Becker, 1994). The depreciation of firm-specific human capital and the deterioration of general skills associated to a spell of unemployment can lead to lower future wages and lower chances of finding employment. Since productivity is not perfectly observable, those individuals with a history of unemployment may face a reduced probability of matching or a lower wage offer if the employer uses this information as signaling low productivity (Lockwood, 1991). Theories of job matching maintain that the unemployed may face an increased probability of return to the labor market in a lower paid position suffering a cost-of-job loss (Pissarides, 1994). Other explanations for the scarring effect are related to psychological discouragement or habituation effects (Clark et al., 2001).

Most of the scarring literature has focused on the consequences of youth unemployment on developed countries, finding that prolonged exposure to unemployment is associated with higher future unemployment and lower wages¹. However, in Latin American countries the unfavorable conditions faced by young workers are not necessarily limited to unemployment. For instance, most young workers begin their labor market experience in informal jobs (Hemmer and Mannel, 1989). These jobs have lower wages and are exempt from labor regulations and workplace benefits when compared to the formal sector (Maloney, 2004). Notably, while informality may be expected to be scarring based on these stylized facts, recent evidence has suggested that this sector may actually serve as some sort of informal job training. Therefore, early experiences in

¹ Section 2 reviews the literature on the relationship between youth labor market experiences and adult outcomes.

the informal sector need not harm an individual's career path in terms of employment prospects or wages (Bosch and Maloney, 2010; Cunningham and Bustos, 2011).

In this context, this study aims to contribute to the literature on the role of the early career labor market experiences on adult outcomes by analyzing how unemployment and informality during youth are related to adult unemployment, informality and wages in Argentina and Brazil. The estimates will provide empirical evidence on scarring from youth in a region where less work has been carried out. This lack of evidence mostly responds to the requirement of long-term panel data to measure scarring. However, this information is not widely available in Latin America. This study proposes a suitable alternative, since the analysis may be feasibly conducted using pseudo-panels which track birth cohorts. Thus, we use cross-cohort differences as the main source of variability for identification, in contrast to previous studies that rely on different individual labor market experiences within a single cohort.

The main findings show that youth unemployment and informality do have effects on adult labor market outcomes. The state dependence and wage penalty effects are mainly present in the early years of adulthood and tend to disappear with the passage of time. These results are also different for adult individuals of different skill levels. Those with lower skills experience higher wage losses and larger persistence effects.

The rest of this paper is organized as follows. The next section reviews the available literature on the relationship between youth labor market experiences and adult outcomes. Section 3 introduces the data and Section 4 the estimation framework. Section 5 presents a descriptive analysis of the main labor market trends for the selected cohorts. Section 6 tests for evidence of an empirical relationship between youth unemployment and informality on several adult labor market outcomes. The last section concludes by drawing together the findings and discussing their potential policy implications.

2. Literature Review

The school-to-work transition remains an important issue in developed and developing countries. In general, this research suggests that early experiences in the labor market shape individuals' paths when they become full-time employed adults (Nordstrom, 2011). In particular, the majority of studies have focused on the effect of job stability (or 'churning'), unemployment,

and more recently, the type of employment into which young workers are generally inserted – formal or informal– on adult outcomes such as wages and employment (or unemployment) prospects.

Job stability during the initial years of employment and its consequences have been studied by Holzer and LaLonde (1999), who find that increased tenure has a positive short-term effect on employment for young workers, since instability usually declines as workers grow older. They argue that churning amongst young workers is mostly due to the difficulty of finding a proper employment match in the first job. In fact, Neumark (2002) suggests that the earnings gain associated with one additional year of experience for young workers lies between 7-13% for men and 12-24% for women in the US, which may reveal that obtaining a good match instead of shopping around has its advantages.

Several studies have also focused on the consequences of unemployment on future unemployment and subsequent earnings at all ages, with mixed evidence.² For instance, Ruhm (1991) initially found no evidence of unemployment scarring using data from the Panel Study of Income Dynamics (PSID) for all workers. However, Jacobson et al. (1993) do find that displaced workers present evidence of scarring and that this effect is relatively stable across the age locus. However, since unemployment is higher during youth, several authors have questioned whether scars from joblessness in this period are more relevant.

This research has found significant evidence of a relationship between youth unemployment and future labor market outcomes. However, Gregory and Jukes (2001) make the distinction that unemployment by itself is not the most relevant cause of lower future earnings, but unemployment duration. In particular, they find that a one-year spell implies a wage penalty of 10 percentage points for British men, which is also found by Gregg (2001). Arulampalam (2000) looks at the effects of unemployment on re-employment wage using the British Household Panel Survey. He finds that an unemployed individual on returning to work will earn about 6% less in the first year and 14% less in the fourth year. Fairlie and Kletzer (2003) estimate the (annual) wage loss from exposure to unemployment for men and women using the National Longitudinal Survey of Youth and they show that it is 9% and 12.5%, respectively. Gregg and Tominey (2005) find more pessimistic results: that longer spells of unemployment in Britain have a wage penalty of 9-21% up to twenty years later. Mroz and Savage (2006) show

² See Arulampalam et al. (2001) for a review of unemployment scarring.

that early unemployment affects both future job displacement and earnings up to ten years after youth in the US. Using a multivariate duration model that controls for selection on observables and unobservables, Cockx and Picchio (2011) find that prolonging unemployment drastically decreases the chances of finding employment, but hardly affects the wage in subsequent employment among young individuals who are already long term unemployed in Belgium.

Nilsen and Reiso (2011) analyze the relationship between past unemployment and future labor market status (unemployed or out of the labor force) using a panel data of young workers from Norway. They use a nearest-neighbor propensity score matching method to balance their treatment and control groups and find that unemployment leaves young workers with long term scars that decrease over time. Burgess et al. (2003) examine whether aggregate unemployment at entry into the labor market impacts on later unemployment in Britain. Using a pseudo-panel approach they find evidence of adverse effects for the unskilled and small beneficial effects for the more skilled individuals.

The scarring effects from youth are not limited to instability and unemployment. A series of recent studies have also begun to place attention on the effects of the first job held during youth. Mainly, this literature has focused on the effect of having an informal job on future employment prospects and wages. Young workers (mostly in developing countries), usually begin their labor market experience in informal jobs (Hemmer and Mannel, 1989). In theory, expectations would lead to assume that an initial employment experience in the informal sector may perpetuate informality and hinder future earnings, since the probability of migration to the formal sector is generally low as are the wages paid in that sector (Perry et al., 2007). However, the evidence remains inconclusive on this matter and has been identified as a key area for further research (Maloney, 2004). Some of the studies in this direction include Bosch and Maloney (2010), who find that the informal sector provides young workers with training and experience for better jobs that they could not obtain right out of school. Cunningham and Bustos (2011) support this claim, arguing that young workers are only temporarily employed in the informal sector and then move on to formal jobs once the premiums placed on health benefits and job stability increase as they establish families. Moreover, they find that initiating the labor market experience in the informal sector does not necessarily imply that workers will remain in that sector, at least not permanently.

In summary, the previous literature suggests that early labor market experiences matter. However, there are still some topics to address. First, while there is predominant evidence of scarring for developed countries, evidence for developing countries and mainly Latin America is less available. Youth experiences are particularly important in Latin America, since the population in this region is relatively young on average (Brea, 2003). Second, while informality may not be a significant concern in the US and OECD countries, Latin America has experienced a large increase of the informal sector in the last decades (Gasparini and Tornarolli, 2009). Third, the potential effects of youth insertion into the labor market are even more interesting in the aftermath of the global recession, which some argue may have lasting consequences on those currently entering the labor market (Bell and Blanchflower, 2010). This paper contributes to these discussions by analyzing unemployment and informality scarring for two Latin American countries, Argentina and Brazil. The findings will provide evidence on the labor market experience of the youth and its future outcomes as adults, providing a backdrop to frame the potential effects of the current aggregate labor conditions in the region on those currently entering the labor force.

3. Data

3.1 Household surveys

The estimates in this paper are drawn from a large database of household surveys, the Socio-Economic Database for Latin America and the Caribbean-SEDLAC (CEDLAS and World Bank, 2011), compiled and homogenized by CEDLAS (Universidad Nacional de La Plata) and the World Bank's LAC poverty group (LCSPP).³ These surveys have the advantage of being comparable between countries, since most of the variables are homogenized using the methodology in Gasparini (2011).⁴ For this study, we select a time series of household surveys from Argentina and Brazil that include complete information on labor market variables such as informality⁵, employment status and wages since the early 1980s.

³ See < <http://sedlac.econo.unlp.edu.ar/eng/index.php>>.

⁴ The methodology aims to generate maximum homogeneity, although some surveys are not entirely comparable. In this paper, all variables used are comparable unless otherwise noted.

⁵ We use the legalistic perspective of informality and classify a worker as informal when he does not possess the right to receive a pension when retired.

Argentina and Brazil provide an excellent framework to study the role of early labor market experiences on adult outcomes in Latin America. First, the availability of an extended time series of household surveys allows us to construct birth-cohorts from youth into adulthood, covering a large part of adult working life. Second, in these countries young individuals have experienced high levels of unemployment and informality. Therefore, the evaluation of the potential effects of youth insertion into the labor market is an interesting topic of analysis from a policy perspective. The prevention of youth unemployment and informality may have a long lasting effect, preventing actual and future unemployment or informality for young individuals if it succeeds or generating long run costs if it fails.

Table 1 lists the specific surveys used in the analysis spanning from 1980 (1981) to 2010 (2009) in Argentina (Brazil). This framework, which comprises 25 years for each of the countries, provides the opportunity to assess both short and long term consequences of youth labor market experiences on adult outcomes.

Since the Argentinean household survey was conducted only in the Greater Buenos Aires area during the eighties, we restrict the analysis to this geographic region for the whole period. The number of surveyed individuals went from 12,355 in 1980 to 16,505 in 2010 in the Greater Buenos Aires. In Brazil, the number of individuals covered by the survey was of 482,198 in 1981 and 399,387 in 2009.

3.2 Constructing cohorts

The analysis of the relationship between past labor market experiences on adult labor market outcomes requires tracking individuals over time. Although the available data does not have a panel structure, we can track cohorts of individuals, with cohorts defined according to their year of birth, or more conveniently, by their age in 1980 (Argentina) or 1981 (Brazil).

Table 2 defines the selected cohorts and describes their aging process throughout the timeframe. The first cohort is comprised of individuals born in 1965 (Argentina) or 1966 (Brazil), who are aged 15 in the first available survey (1980 in Argentina and 1981 in Brazil). The second cohort contains individuals born in 1966 (Argentina) or 1967 (Brazil) who are aged 15 in the second available survey. The following cohorts are defined in the same manner as more data become available. In the last period of observation we have individuals between 35 and 45 years old in the case of Argentina or between 34 and 44 in the case of Brazil. We define youth as

ages 15-24, and adulthood as 25 or older. Therefore, we can learn about youth labor market experiences for individuals in each birth cohort. Table 3 presents the number of individuals in some of the cohort/year cells.

To avoid potential biases from individuals still in school, the sample does not include those who are still attending formal education, who do not earn wages and individuals with incomplete or invalid data on the variables of interest. We also restrict the sample excluding those who are self-employed due to the potential problems associated to the measurement of hourly wages and their informality status for this employment category. Following Deaton and Paxson (1994), we average the variables of interest by age of individuals for each year of data, and then track the sample one year older in the next survey according to the aging process shown in Table 2. In this way, we can follow cohort means for twenty five years for each birth cohort of individuals.

3.3 Between-cohort identification

This data allows identifying whether the experiences of each cohort in their youth show evidence of lasting impact on adult labor market outcomes. Certainly, while observing trajectories on individual-level panel data would be ideal, the availability of this kind of information in the region is limited. In turn, cross-sectional data are recollected periodically in most Latin American countries, regularly twice a year or at least annually. Therefore, repeated cross-sections for a long timeframe present a unique opportunity to study the dynamic process of scarring from youth experiences in Argentina and Brazil. To this end, we use between-cohort variation for identification in contrast to previous studies that rely on different individual labor market experiences within a single cohort.

The use of variation in labor market experiences at cohort level as the main source of variability relies on the assumption that employers can substitute between individuals of different ages at each point in time. Note that this assumption does not apply to a labor market that exclusively employs a single cohort like the youth labor market (Burgess et al., 2003). However, in this paper we define youth from 15 to 24 years old and the cohorts are defined as just 1-year band, allowing the substitution in this age range in the youth labor market.

Another important feature of the cohort analysis is the response of labor market outcomes to cohort size. For instance, smaller cohorts have incentives to increase their human capital

investment because the returns will be higher. On the contrary, those belonging to a large generation are likely to find a depressant effect on earnings when entering to the labor force (Ermisch, 1995). Given that our cohorts are defined at the most disaggregated level, we do not expect that our findings are explained by this cohort size effect.

Using this data provides other advantages over traditional panel data (Antman and McKenzie, 2007). First, in a long-term analysis, longitudinal data has the common problem of sample attrition since it is difficult at best (and costly) to track individuals for long periods of time. In this paper, scarring is evaluated throughout most of the adult life and also by short and long term periods. Second, repeated cross-sections provide more stability for analyzing long-term outcomes, omitting biases due to transitory shocks and short-run movements.

However, using repeated cross-sections also has some limitations. On the one hand, pseudo-panels do not provide information on intra-cohort dynamics (Deaton, 1997). On the other hand, since using this data implies estimating relationships at cohort level, this aggregation may be a potential source of bias. We do not expect this to be a significant problem here, since cohorts are tracked for a long period of time and the assumption that events like migration and death do not alter the representativeness of each of the independent survey samples seems likely to hold.

4. Empirical strategy

The birth cohort data previously described is used to obtain parameter estimates of two youth labor market outcomes -unemployment and informality- on diverse adult outcomes – unemployment, informality and wages-. Youth labor outcomes are captured by the average level of unemployment or informality faced by each cohort during their youth (ages 15-24). Our main model for adult people is given by the following equation

$$Y_{ct} = X_{ct}\beta + Z_c\delta + T_t\gamma + \eta_c + \varepsilon_{ct} \quad (1)$$

where Y_{ct} is the adult labor market outcome of interest (unemployment rate, informality rate or log of hourly wages) at time t ; X_{ct} contains the average of individual characteristics within each cohort/year cell such as gender, age and its squared, years of education, civil status, the average

of individuals that are household heads, and the mean number of children under 15 at home; Z_c captures the youth labor market experience faced by each birth cohort; T_t accounts for time effects and η_c is the cohort unobserved heterogeneity (e.g. unobserved cohort propensity to remain unemployed). ε_{ct} is the idiosyncratic error where

$$E(\varepsilon_{ct}|X_{ct}, Z_c, \eta_c) = 0 \quad t=1, \dots, T \quad (2)$$

In order to estimate the parameter of interest δ we face three econometric issues. First, the identification of the causal effect of past unemployment or informality on adult labor market outcomes is hard due to the cohort unobserved heterogeneity. Then, we cannot be confident about the estimated parameters by an ordinary least squared (OLS) regression if we expect the youth labor market variable Z_c to be correlated to the unobserved heterogeneity at the cohort level η_c .

Although the inclusion of birth cohorts fixed effects would allow us to control for characteristics that are time-constant within each cohort, we have to consider that the variable of interest has the same level of aggregation. This brings us to the second issue: there is no way to distinguish the effect of the time-constant observable Z_c from the time-constant unobservable η_c .

Finally, the third problem is related to the nature of our constructed data set. Age, cohort and time are linearly dependent variables and the associated coefficients are not identified, even when one category is dropped from each set of dummies (Deaton and Paxson, 1994). To deal with this last issue we assume that time-effects impact proportionally on all age/cohorts cells. In this way, we redefine the dependent variable Y_{ct} as in Burgess et al. (2003) where Y_{ct} is normalized by the observed value of Y at date t . We rename this variable as \tilde{Y}_{ct} , thus equation (1) becomes

$$\tilde{Y}_{ct} = X_{ct}\beta + Z_c\delta + \eta_c + \varepsilon_{ct} \quad (3)$$

In light of this discussion we proposed two alternative estimation strategies. First, we define a composite error term $\nu_{ct} = \eta_c + \varepsilon_{ct}$, and estimate equation (3) by pooled OLS assuming

$$E(Z_c' \eta_c) = 0 \quad (4)$$

Even when (4) holds, the composite errors will be serially correlated due to the presence of the time-constant term η_c . Therefore, we make inference based on a robust variance matrix and robust test statistics. Note that this first empirical strategy deals with the second econometric issue defining a composite error term, while the first one is set aside at the price of making an additional assumption. If (4) does not hold we expect a positive bias in our estimations. The reasoning is as follows: the effect that the unobserved birth-cohort effect would have on the explained variable (e.g. adult unemployment rate) should be of the same sign that the correlation between the cohort effect and the explanatory variable of interest has (youth cohort unemployment in this example).

The second strategy follows a two step estimation technique as in Burgess et al. (2003). In the first step we estimate (3) excluding the variable of interest Z_c but allowing the presence of time-constant birth cohort effects η_c . The exclusion of the variable of interest allows us to control for the first and the second econometric issues estimating the following model

$$\tilde{Y}_{ct} = X_{ct} \beta + \eta_c \rho + \varepsilon_{ct} \quad (5)$$

In the second step we regress the estimated birth-cohort fixed effects on the variable of interest Z_c . The estimated birth-cohort fixed effects capture the part of the variation on adult labor market outcomes that can be explained by time-constant factors. The estimation of λ in the second step isolates the part of that birth-cohort component that is correlated with youth labor market experiences

$$\hat{\rho}_c = Z_c \lambda + \vartheta_c \quad (6)$$

Because the dependent variable in this second step is estimated, we estimate equation (6) by the method of weighted least squares, using the inverse of the estimates of the variance of the birth-cohort fixed effects from the first step as weights.

It is worth noticing that the estimation strategy just described faces the unobserved heterogeneity problem by means of a two step estimation technique. This feature leads us to

contrast these results with that obtained with the first estimation strategy, where we made the no correlation assumption (4). If we observe the same relationship between youth and adult labor market outcomes, this would be suggesting that cohort effects are not confounding factors affecting the results in the analyzed countries.

An important point of the empirical strategy is that the analysis assumes that youth labor market experiences have an average effect over the entire adult life. This is a simplifying assumption, since it is possible that while youth experiences may have no effect when considering an individual's entire adult life, they may temporarily affect labor market outcomes. Therefore, the setup needs to be expanded to include potential heterogeneities across the life cycle. A categorical variable was created to capture these potential adverse effects across adulthood. This variable has two categories which denote the passage of time: up to 10 years after youth and between 10 and 20 years after youth. Indicator variables for each of these categories were interacted with the youth labor market experience variable (Z_c) to estimate equation (3) above. These results will provide an indication of the short and long term consequences of youth experiences on adult outcomes to determine whether youth unemployment and informality represent temporary penalties or if the effect is observed many years later.

The effect of youth labor market experiences could also be different for adult individuals of different skill levels. We carry out this analysis allowing the effect of the variable of interest to vary according to the years of education of adult individuals. We expect that any scarring effect will be less for those individuals with higher skills.

5. Youth labor market outcomes: A descriptive analysis

Before moving on to the econometric results, we observe the evolution of the normalized labor market outcomes of interest for some selected cohorts against age groups, separately for males and females. In order to illustrate more clearly the patterns, we only include three cohorts in the figures: the first, the last and the middle cohort. The averages are presented in Table 4 and the same information is plotted in Figures 1 through 3.

Figure 1 presents the trends in the normalized unemployment rate. The male unemployment rate falls rapidly with age and stabilizes around the thirties. This pattern is less

marked in Brazil where the normalized unemployment during youth is not as high as in Argentina. It is important to note that individuals in the 15-19 age range in this country experienced an average unemployment rate seven times higher than the economy wide average. This value corresponds to the oldest cohort that entered the labor market at the early eighties when the economy wide unemployment was around 5%. By contrast, the youngest cohort entered into the labor market at the early nineties with a total unemployment rate over 10%. That means that young individuals in the newest cohort experienced higher unemployment levels in a context of high economy wide unemployment.

The age-decreasing unemployment pattern is less marked for females in both countries. While women in Argentina reach an unemployment rate similar to the national average around 30-34 years old (like Argentinean men), in Brazil female unemployment rate is over the national value until the 40-45 age range. This last result reveals that the distribution of the normalized unemployment rate for women is over that of men in Brazil.

In summary, the trends in the normalized unemployment rate show very different youth experiences across cohorts, especially in Argentina, and signs of convergence as individuals get older. But those cohorts with higher normalized unemployment during youth tend to show higher normalized unemployment during adulthood, with smaller differences across cohorts around adult age ranges.

The normalized informality rate also displays an age-decreasing pattern both for males and females, in Argentina and Brazil (Figure 2). The behavior of this labor market outcome is very similar across cohorts in Brazil. Men and women reach the national average rate around the 25-29 age range, but while men continue in an age-decreasing informality pattern, women stabilize near the national value as they age. In Argentina, the oldest cohort shows a higher informality rate for the 15-19 age range among men. This pattern can be explained by the relatively low informality level at the early eighties –when the oldest cohort entered into the labor market- in comparison with the rest of the period.

As in the normalized unemployment rate case, we find that cross-cohort differences in the normalized informality rate are more marked in youth and they get reduced as people age.

Finally, Figure 3 plots the trends in normalized hourly wages. Hourly wages clearly increase with age and stabilize around the 40-44 age range. The youngest cohort shows lower normalized wages across the age locus for males and females in Brazil and males in Argentina.

While in Argentina the normalized wage of the youngest cohort of men shows signals of a catching-up response, this is not true in Brazil where the wage gap between the youngest and the oldest cohort widened over time. In contrast to previous labor outcomes, wage differences across cohorts get larger with age, and this behavior is particularly marked in Brazil.

All these findings provide a description on the relationships this paper seeks to study. On the one hand, normalized unemployment and informality showed signs of convergence as individuals get older, and in some cases those cohorts with higher normalized unemployment/informality rates during youth tend to show higher normalized unemployment/informality rates during adulthood. A different pattern was found in the case of normalized hourly wages. While cross-cohort differences got larger with age in Brazil, the behavior is not clear in Argentina. On the other hand, we observed very different youth experiences across cohorts, reinforcing the use of between-cohort variation for identification.

Figures 4 through 7 provide some additional preliminary evidence on the relationship between youth and adult labor market outcomes. They show a positive association between youth normalized unemployment/informality at the cohort level and these labor market outcomes for adult individuals. The opposite association is found when we use hourly wages as the adult labor market outcome of interest.

6. Findings

6.1 Pooled OLS estimation

The consequences of youth unemployment and informality will be assessed on several outcome variables. For the first, these will be: normalized unemployment and the logarithm of normalized hourly wages. For youth informality, the analysis will concentrate on normalized adult informality and the logarithm of normalized wages.

Table 5 presents the estimated coefficient associated to the early career variable in equation (3) above. Following the standard practice, we present separate results for males and females. All regressions are weighted by the square root of the number of observations in each cohort. The estimations show evidence of unemployment persistence for men, both in Argentina and Brazil. In particular, an additional percentage point in the unemployment rate during youth is associated to an increase of 0.5 (Argentina) to 0.9 (Brazil) percentage points in the adult normalized

unemployment rate. We also find a wage scarring effect that is statistically significant only in the case of Argentina. The results associated to youth unemployment among women are significant only in that country. The increase in adult unemployment in response to a one percentage point increase in youth unemployment is of 0.3 percentage point, while the wage penalty is of 0.3%.

The estimated impact of early informality shows similar effects both for men and women in Argentina and Brazil. The results show signals of informality persistence that range from 0.2 (women in Argentina) to 0.7 (men in Brazil) percentage points. The wage penalty is higher in Brazil where the exposure to informality during youth reduces adult normalized wages in 1%.

While illustrative, these results assume that youth unemployment and informality have an average effect during the entire adult life. Nevertheless, it may be that these experiences have either short or long term consequences, which may not be properly captured by averaging out across adulthood. Therefore, we obtain estimates allowing the presence of heterogeneities across adult working lives.

Table 6 shows the results obtained when we include interaction effects in order to capture heterogeneities in the effect from youth unemployment and informality in the short and long term. We find that youth unemployment in Argentina impacts on adult normalized unemployment in the short term, but then the persistence effect disappears both for men and women 10 years after youth. The wage penalty is of 0.5% for men and 0.4% for women in the first ten years of adulthood, but then falls to 0.3% and 0.2% with the passage of time. These results suggest a catch-up response that could be explained by the on-the-job training for those workers with a history of youth unemployment. In Brazil the persistence effect is significant only for men in the first ten years of the adult working life. The effect reverses between ten to twenty years after youth.

The results are similar when we evaluate the effect of youth informality. The persistence effect and the wage penalty appear at the beginning of the adult working life, and then decrease or fade away with the passage of time, both for men and women in Argentina and Brazil.

We finally evaluate the presence of heterogeneous effects for adult individuals of different skill levels. The results are shown in Table 7 and reveal that unemployment persistence does not vary by skill level. On the contrary, the wage loss associated to youth unemployment is higher the lower the years of education for the group of men. For instance, the wage penalty for an individual with no education is of 11% in Brazil, while it is of 2% for someone with complete

primary education; the effect reverses when an individual with complete secondary education or higher is considered.

The same pattern is observed for informality persistence results among men. The expected increase in the normalized informality rate is of 1.2 percentage points for an individual with no education in Argentina. The increase is of 0.5 percentage points for someone with complete primary education and the estimated effect is negative for an individual with complete secondary education or higher. The informality persistence result among women is significant only in the case of Brazil. These results may reflect the effect of informal work as a pathway to obtain experience and tenure in different jobs for those with higher skills, which may enhance an individual's chances to acquire a formal job as he ages. Therefore, the evidence does seem to fall in line with the results from Bosch and Maloney (2010) and Cunningham and Bustos (2011) at least for those individuals with secondary level or higher.

The wage penalty associated to youth informality by skill level is confirmed both in Argentina and Brazil among men, while the result among women is significant only in Brazil. The wage loss is lower in comparison with the wage scarring associated to youth unemployment. An adult man earns 3.8% less when he has no education, and the penalty disappears for someone with complete primary education or higher.

6.2 Two step estimation

This section presents the results obtained from the two stage estimation strategy described in Section 4. More precisely, Table 8 shows the coefficient associated to the youth unemployment or informality variable in equation (6).

The estimated effects of youth labor market variables on adult outcomes do not substantially differ from that obtained with the pooled OLS regressions. In most of the cases we obtain the same or a lower coefficient. These results suggest that birth-cohort effects are not confounding factors in pooled OLS regressions for some of the labor outcomes, and that the bias is positive (as expected) when the estimated coefficient is lower.

We can conclude that there exists evidence of state dependency in unemployment and informality histories for men, both in Argentina and Brazil. The persistence effect of unemployment is significant only in Argentina, as is the informality effect in Brazil among women. Youth unemployment and informality also generates wage penalties in the future both

for men and women, in Argentina and Brazil. The only exception is the non significant effect of youth unemployment in Brazil among women.

7. Discussion

This paper studied the relationship between the levels of youth unemployment and informality and adult labor market outcomes in Argentina and Brazil using an extended time series of household surveys spanning from the early 1980s to late 2000s.

In light of the econometric issues generally associated to the estimation of this type of relationships, and those that arise using a pseudo-panel design, we proposed two alternative empirical strategies relying on cross-cohort differences as the main source of variability.

The main findings indicate that youth unemployment and informality do have effects on adult labor market outcomes both for males and females, and these results are robust to both estimation strategies. The persistence effect and the wage penalty are mainly present in the early years of adulthood and tend to decrease or disappear with the passage of time. These results are also different for adult individuals of different skill levels. Those with lower skills experience higher wage losses and larger persistence effects. When we allow for the presence of birth-cohorts effects that differ from youth labor market experiences, the results also show state dependency and wage penalties associated to youth unemployment and informality.

The main contribution of these results is to add a further dimension specific to developing and middle income countries – informality – to the copiously documented scarring effects of unemployment in advanced economies. These results are particularly relevant for policy making in developing countries' labor markets. The detrimental effects of informality add a further layer of complexity: active labor market policies for the young should not only aim at promoting employment per se, but preferably formal employment. These results challenge the view that an informal job still provides training and experience for better jobs that may not be obtained right out of school. In this sense, measures such as the introduction of lower minimum wage levels for youth in developed countries could, for instance, translate into lower levels of social security contributions or payroll taxes for young workers. This would create a further incentive for employers to register young workers. The importance of measures along these lines is

emphasized by the results on informality dependence, which only hold for workers with lower levels of qualifications.

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9. Tables and Figures

Table 1
Countries and surveys in the sample

Country	Name of survey	Years
Argentina	Encuesta Permanente de Hogares	1980, 1985-1986, 1988, 1990-2010
Brazil	Pesquisa Nacional por Amostra de Domicilios	1981-1990, 1992-1993, 1995-1999, 2001-2002, 2004-2009

Source: SEDLAC (CEDLAS and the World Bank, 2012)

Table 2
Cohort definitions and aging patterns

Argentina

Year of birth	Age in 1980	Age in 1985	Age in 1990	Age in 1995	Age in 2000	Age in 2005	Age in 2010
1965	15	20	25	30	35	40	45
1966		19	24	29	34	39	44
1967		18	23	28	33	38	43
1968		17	22	27	32	37	42
1969		16	21	26	31	36	41
1970		15	20	25	30	35	40
1971			19	24	29	34	39
1972			18	23	28	33	38
1973			17	22	27	32	37
1974			16	21	26	31	36
1975			15	20	25	30	35

Brazil

Year of birth	Age in 1981	Age in 1985	Age in 1990	Age in 1995	Age in 2000	Age in 2005	Age in 2010
1966	15	19	24	29	34	39	44
1967		18	23	28	33	38	43
1968		17	22	27	32	37	42
1969		16	21	26	31	36	41
1970		15	20	25	30	35	40
1971			19	24	29	34	39
1972			18	23	28	33	38
1973			17	22	27	32	37
1974			16	21	26	31	36
1975			15	20	25	30	35
1976				19	24	29	34

Source: SEDLAC (CEDLAS and the World Bank, 2012)

Table 3
Number of observations

Argentina

Year of birth	1980	1985	1990	1995	2000	2005	2010
1975			23	95	117	135	149
1974			26	95	96	120	164
1973			32	101	107	100	134
1972			46	90	110	121	138
1971			55	115	90	106	141
1970		34	80	86	95	118	155
1969		50	74	96	100	102	107
1968		53	54	74	84	97	152
1967		52	62	88	92	106	120
1966		81	52	88	89	84	143
1965	47	108	64	81	90	93	121

Brazil

Year of birth	1981	1985	1990	1995	2001	2005	2009
1976				2612	3655	4041	3833
1975			1442	2868	3609	4093	3801
1974			1814	2916	3503	3605	3721
1973			1982	3091	3503	3737	3547
1972			2405	3187	3351	3806	3562
1971			2554	3202	3526	3484	3470
1970		2697	2781	3360	3388	3668	3582
1969		3214	2909	3195	3380	3493	3666
1968		3795	3066	3229	3342	3562	3165
1967		4424	2839	3045	3243	3370	3261
1966	2567	4936	3022	3151	3353	3364	3332

Source: SEDLAC (CEDLAS and the World Bank, 2012)

Table 4
Trends and patterns in labor market outcomes, by age groups and cohorts

Normalized unemployment rate												
Year of birth	Males						Females					
	[15,19]	[20,24]	[25,29]	[30,34]	[35,39]	[40,45]	[15,19]	[20,24]	[25,29]	[30,34]	[35,39]	[40,45]
<i>Argentina</i>												
1965	7.33	3.01	1.30	0.80	0.74	0.52	3.08	1.38	1.38	0.96	0.99	1.20
1966	3.72	2.16	1.29	0.88	0.83	0.52	4.41	2.62	1.21	1.10	1.00	0.90
1967	5.39	1.39	1.13	0.96	0.51	0.29	1.73	2.12	0.85	1.13	0.88	1.51
1968	2.87	2.37	1.00	0.60	0.41	0.00	3.22	2.80	1.55	0.68	1.37	0.76
1969	3.88	1.85	0.96	0.90	0.28	0.95	3.48	1.86	1.10	1.18	1.12	0.75
1970	5.40	1.73	0.78	0.95	0.67	1.00	4.96	1.98	1.17	0.66	1.10	1.43
1971	3.82	2.00	1.10	1.05	0.29		4.73	1.89	1.32	1.05	0.70	
1972	4.37	1.51	1.19	0.87	0.71		6.69	1.87	1.08	1.22	0.97	
1973	4.44	1.42	1.10	0.53	0.68		4.33	1.65	0.96	1.01	0.96	
1974	3.73	1.40	1.03	0.82	0.31		4.28	1.78	1.63	1.33	1.26	
1975	3.95	1.47	0.99	0.58			3.67	1.87	1.33	1.08		
<i>Brazil</i>												
1966	1.78	1.53	0.92	0.76	0.64	0.60	2.20	2.28	1.51	1.39	1.16	0.92
1967	1.78	1.61	1.06	0.79	0.62	0.51	2.24	2.39	1.47	1.27	1.03	0.91
1968	1.68	1.58	1.02	0.83	0.65	0.48	2.19	2.07	1.60	1.33	1.13	0.99
1969	1.58	1.54	0.99	0.81	0.61	0.61	2.35	2.14	1.58	1.32	1.11	0.85
1970	1.69	1.59	0.94	0.64	0.57		2.26	2.02	1.63	1.29	1.09	
1971	1.75	1.47	0.96	0.69	0.56		2.16	1.96	1.59	1.28	1.08	
1972	1.55	1.42	0.96	0.64	0.61		2.13	2.09	1.66	1.24	1.19	
1973	1.67	1.33	0.93	0.66	0.58		2.23	2.02	1.64	1.20	1.36	
1974	1.56	1.28	0.88	0.64	0.65		2.20	1.97	1.63	1.36	1.01	
1975	1.55	1.35	0.89	0.66			1.95	2.01	1.58	1.35		
1976	1.46	1.26	0.89	0.69			2.10	2.10	1.65	1.42		
Normalized informality rate												
Year of birth	Males						Females					
	[15,19]	[20,24]	[25,29]	[30,34]	[35,39]	[40,45]	[15,19]	[20,24]	[25,29]	[30,34]	[35,39]	[40,45]
<i>Argentina</i>												
1965	3.26	1.38	0.82	0.82	0.76	0.83	2.83	1.39	0.97	0.87	1.05	1.21
1966	1.07	1.25	0.77	0.76	0.72	0.51	1.85	1.61	1.28	0.73	1.15	1.05
1967	1.94	1.13	0.84	0.84	0.82	0.56	1.64	1.34	1.08	0.97	1.06	0.94
1968	2.38	1.11	0.93	0.88	0.84	0.68	3.37	1.63	1.24	0.80	1.24	1.14
1969	2.36	1.06	0.82	0.78	0.83	0.93	2.56	1.16	0.96	0.84	1.33	1.27
1970	2.78	1.26	0.96	0.87	0.75	0.77	2.86	1.13	0.97	1.42	0.90	1.41
1971	2.39	1.37	1.09	0.97	0.73		2.93	1.19	1.10	1.13	1.42	
1972	2.48	1.18	0.99	0.77	0.77		2.16	1.42	0.93	1.19	1.04	
1973	2.13	1.27	1.14	0.80	0.87		2.42	1.23	0.89	1.01	1.11	
1974	2.35	1.45	1.06	0.88	0.72		2.34	1.16	0.84	1.15	0.85	
1975	2.33	1.34	1.14	0.95			1.63	1.43	1.27	1.07		
<i>Brazil</i>												
1966	1.92	1.13	0.88	0.81	0.75	0.64	1.87	1.07	0.95	0.91	0.93	0.86
1967	1.91	1.12	0.90	0.82	0.76	0.65	1.87	1.03	0.96	0.92	0.91	0.91
1968	1.91	1.12	0.87	0.79	0.76	0.66	1.89	1.10	0.93	0.92	0.93	0.92
1969	1.94	1.13	0.89	0.84	0.73	0.59	1.87	1.09	0.95	0.92	0.94	0.78
1970	1.93	1.16	0.92	0.82	0.73		1.91	1.15	0.98	0.95	0.96	
1971	1.94	1.06	0.91	0.78	0.70		1.85	1.15	0.98	0.93	0.94	
1972	2.07	1.14	0.92	0.79	0.70		2.03	1.15	0.96	0.94	0.87	
1973	1.97	1.15	0.97	0.79	0.67		2.05	1.14	0.93	0.95	0.89	
1974	1.87	1.15	0.92	0.83	0.56		1.85	1.11	1.03	0.98	0.80	
1975	2.01	1.14	0.94	0.77			2.01	1.13	0.95	0.92		
1976	1.83	1.25	0.90	0.73			1.84	1.15	0.98	0.91		

Normalized hourly wages

Year of birth	Males						Females					
	[15,19]	[20,24]	[25,29]	[30,34]	[35,39]	[40,45]	[15,19]	[20,24]	[25,29]	[30,34]	[35,39]	[40,45]
<i>Argentina</i>												
1965	0.40	0.66	0.86	0.92	1.03	0.99	0.36	0.62	0.67	0.63	0.72	1.00
1966	0.51	0.68	0.96	0.91	0.92	1.49	0.60	0.72	0.49	0.52	0.70	1.04
1967	0.54	0.84	0.96	1.00	1.13	1.17	0.57	0.66	0.61	0.58	0.79	1.04
1968	0.49	0.68	0.88	1.04	1.12	1.11	0.41	0.54	0.75	0.53	0.93	1.07
1969	0.51	0.73	0.84	0.96	1.03	1.13	0.52	0.64	0.72	0.49	1.05	1.15
1970	0.47	0.70	0.74	0.96	0.99	1.04	0.39	0.67	0.54	0.51	0.79	1.07
1971	0.52	0.63	0.82	0.85	1.11		0.47	0.50	0.58	0.69	0.90	
1972	0.64	0.68	0.69	0.96	1.04		0.35	0.48	0.61	0.85	0.97	
1973	0.47	0.64	0.65	1.03	1.06		0.47	0.57	0.42	0.91	0.96	
1974	0.46	0.57	0.64	1.08	1.27		0.33	0.49	0.45	0.98	1.23	
1975	0.46	0.51	0.63	0.98			0.31	0.40	0.52	0.93		
<i>Brazil</i>												
1966	0.37	0.60	1.03	1.19	1.24	1.30	0.28	0.53	0.84	0.97	1.01	1.06
1967	0.36	0.60	0.92	1.15	1.19	1.37	0.28	0.49	0.81	0.97	1.01	1.00
1968	0.36	0.66	0.86	1.10	1.20	1.25	0.28	0.54	0.81	0.95	1.06	1.15
1969	0.36	0.63	0.87	1.01	1.20	1.16	0.27	0.56	0.79	0.92	0.95	1.02
1970	0.34	0.62	0.86	1.05	1.17		0.27	0.55	0.77	0.91	0.92	
1971	0.33	0.68	0.84	1.08	1.16		0.27	0.54	0.76	0.97	0.93	
1972	0.29	0.63	0.83	1.00	1.09		0.25	0.54	0.79	0.91	0.94	
1973	0.37	0.58	0.84	1.20	1.09		0.30	0.54	0.79	0.93	0.93	
1974	0.36	0.59	0.84	1.05	1.09		0.31	0.55	0.74	0.94	0.90	
1975	0.33	0.60	0.86	0.99			0.28	0.55	0.84	0.95		
1976	0.36	0.56	0.85	0.98			0.31	0.50	0.80	0.92		

Source: Author's calculations from pseudo-panel data for each country.

Table 5
Pooled OLS estimation
Mean effects

Males

	Adult unemployment		Adult informality		Adult wages		Adult wages	
	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil
Youth unemployment	0.005	0.009			-0.005	-0.009		
	[0.002]**	[0.005]*			[0.000]***	[0.006]		
Youth informality			0.006	0.007			-0.004	-0.012
			[0.001]***	[0.001]***			[0.000]***	[0.002]***
Observations	176	128	176	128	176	128	176	128
R ²	0.10	0.41	0.40	0.71	0.35	0.59	0.36	0.81

Females

	Adult unemployment		Adult informality		Adult wages		Adult wages	
	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil
Youth unemployment	0.003	0.001			-0.003	0.001		
	[0.001]*	[0.002]			[0.001]***	[0.003]		
Youth informality			0.002	0.006			-0.004	-0.011
			[0.001]*	[0.001]***			[0.001]***	[0.002]***
Observations	176	128	176	128	176	128	176	128
R ²	0.04	0.69	0.18	0.45	0.23	0.50	0.21	0.74

Source: Author's calculations from pseudo-panel data for each country.

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6
Pooled OLS estimation
Heterogeneous effects by age

Males

	Adult unemployment		Adult informality		Adult wages		Adult wages	
	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil
<i>Unemployment</i>								
Aged [25,35)	0.005 [0.002]**	0.009 [0.004]**			-0.005 [0.001]***	-0.009 [0.005]		
Aged [35,45]	0.004 [0.005]	-0.007 [0.003]***			-0.003 [0.001]**	0.002 [0.004]**		
<i>Informality</i>								
Aged [25,35)			0.006 [0.001]***	0.007 [0.001]***			-0.005 [0.000]***	-0.011 [0.002]***
Aged [35,45]			0.005 [0.001]**	0.006 [0.001]			-0.003 [0.001]**	-0.008 [0.001]**
Observations	176	128	176	128	176	128	176	128
R ²	0.12	0.46	0.40	0.72	0.36	0.64	0.38	0.83

Females

	Adult unemployment		Adult informality		Adult wages		Adult wages	
	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil
<i>Unemployment</i>								
Aged [25,35)	0.004 [0.001]***	0.002 [0.002]			-0.004 [0.001]***	0.002 [0.003]		
Aged [35,45]	-0.001 [0.002]**	0.001 [0.005]			-0.002 [0.001]*	-0.003 [0.005]		
<i>Informality</i>								
Aged [25,35)			0.002 [0.001]	0.006 [0.001]***			-0.004 [0.001]***	-0.012 [0.002]***
Aged [35,45]			0.001 [0.002]	0.004 [0.001]**			-0.002 [0.001]	-0.009 [0.001]***
Observations	176	128	176	128	176	128	176	128
R ²	0.07	0.69	0.18	0.47	0.25	0.51	0.23	0.76

Source: Author's calculations from pseudo-panel data for each country.

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7
Pooled OLS estimation
Heterogeneous effects by years of education

Males

	Adult unemployment		Adult informality		Adult wages		Adult wages	
	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil
Youth unemployment	0.036	0.035			-0.017	-0.111		
	[0.024]	[0.028]			[0.005]***	[0.040]**		
Youth unemployment * years of educ	-0.003	-0.003			0.001	0.013		
	[0.002]	[0.003]			[0.001]**	[0.005]**		
Youth informality			0.012	0.033			-0.015	-0.038
			[0.004]**	[0.003]***			[0.005]**	[0.005]***
Youth informality * years of educ			-0.001	-0.004			0.001	0.004
			[0.000]	[0.000]***			[0.000]*	[0.001]***
Observations	176	128	176	128	176	128	176	128
R ²	0.10	0.41	0.40	0.81	0.36	0.64	0.38	0.83

Females

	Adult unemployment		Adult informality		Adult wages		Adult wages	
	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil
Youth unemployment	0.014	-0.041			0.001	0.031		
	[0.012]	[0.027]			[0.007]	[0.046]		
Youth unemployment * years of educ	-0.001	0.005			0.000	-0.004		
	[0.001]	[0.003]			[0.001]	[0.005]		
Youth informality			0.006	0.028			0.007	-0.035
			[0.009]	[0.006]***			[0.010]	[0.010]***
Youth informality * years of educ			0.000	-0.003			-0.001	0.003
			[0.001]	[0.001]***			[0.001]	[0.001]**
Observations	176	128	176	128	176	128	176	128
R ²	0.04	0.70	0.18	0.52	0.23	0.50	0.21	0.77

Source: Author's calculations from pseudo-panel data for each country.

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8
Two step estimation
Second stage results

Males

	Adult unemployment		Adult informality		Adult wages		Adult wages	
	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil
Youth unemployment	0.005	0.018			-0.005	-0.027		
	[0.002]**	[0.004]***			[0.000]***	[0.007]***		
Youth informality			0.005	0.007			-0.004	-0.012
			[0.000]***	[0.000]***			[0.000]***	[0.001]***
Observations	10	10	10	10	10	10	10	10
R ²	0.40	0.70	0.94	0.98	0.92	0.68	0.94	0.98

Females

	Adult unemployment		Adult informality		Adult wages		Adult wages	
	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil	Argentina	Brazil
Youth unemployment	0.003 [0.002]*	0.006 [0.008]			-0.003 [0.001]***	-0.011 [0.013]		
Youth informality			0.001 [0.001]	0.006 [0.000]***			-0.003 [0.001]***	-0.012 [0.001]***
Observations	10	10	10	10	10	10	10	10
R ²	0.36	0.07	0.19	0.98	0.73	0.09	0.65	0.98

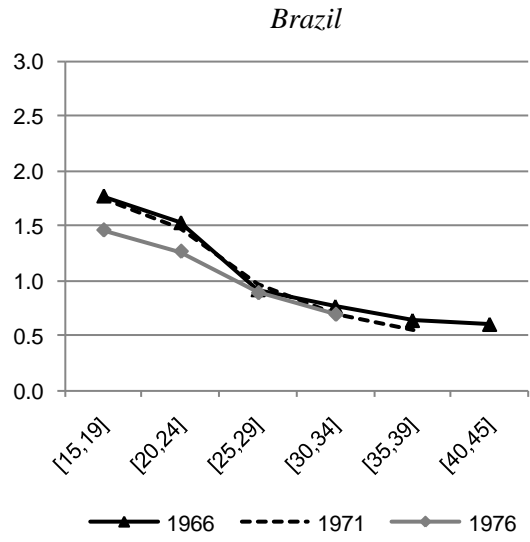
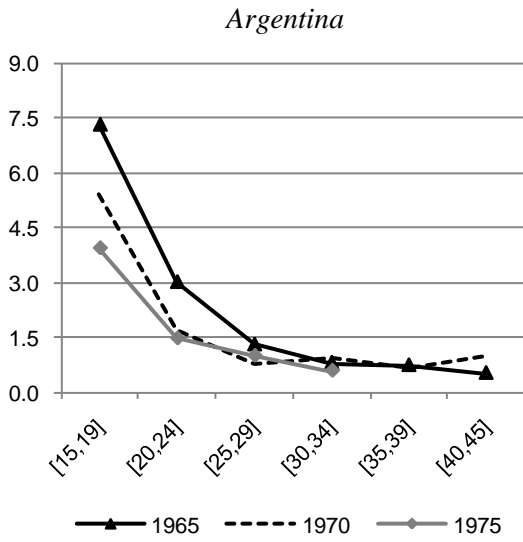
Source: Author's calculations from pseudo-panel data for each country.

Robust standard errors in parentheses.

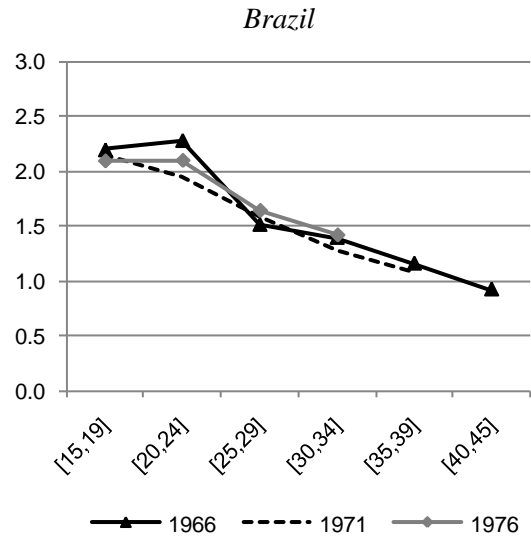
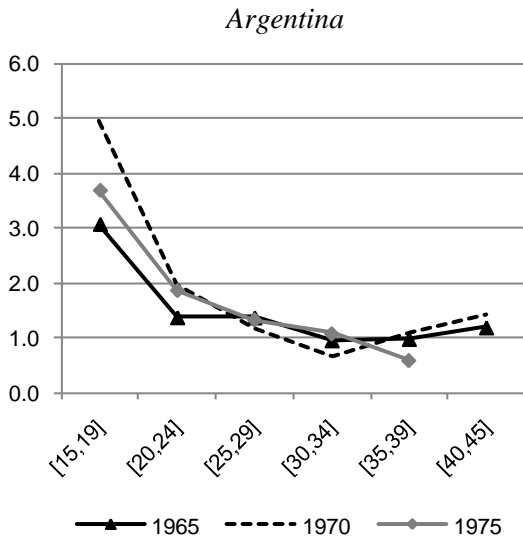
* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1
Normalized unemployment rate by cohort

Males



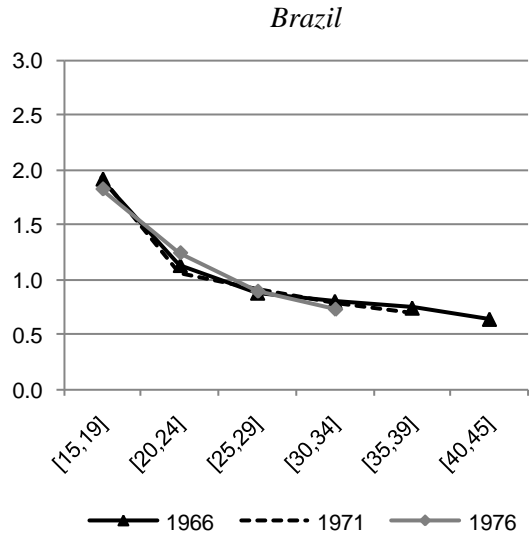
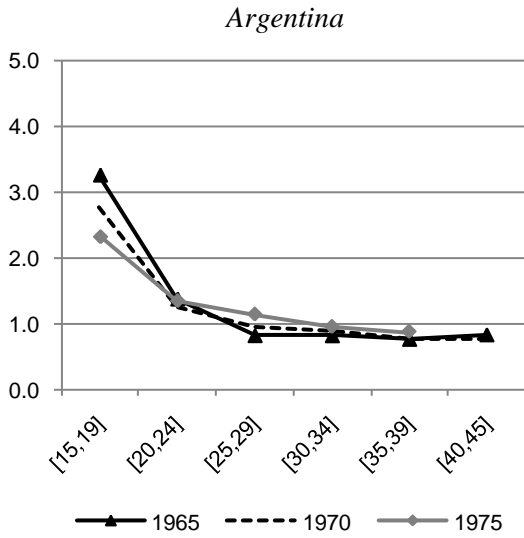
Females



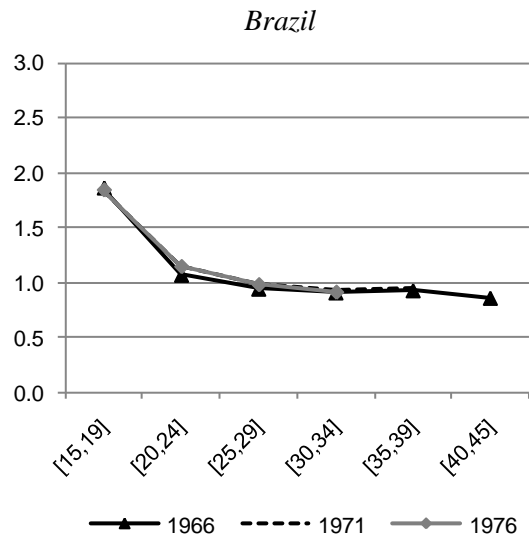
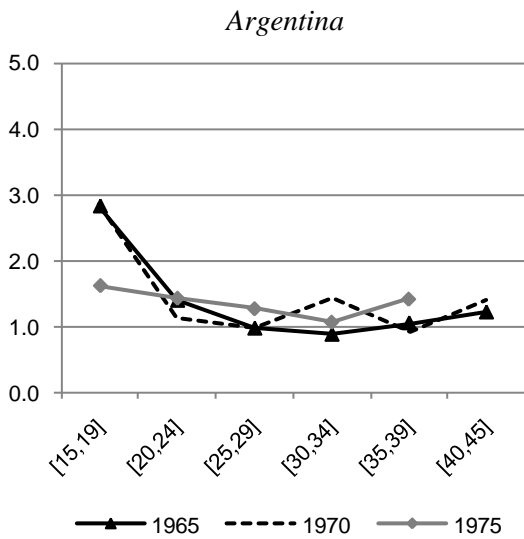
Source: Author's calculations from pseudo-panel data for each country.
 Note: Legend indicates year of birth.

Figure 2
Normalized informality rate

Males



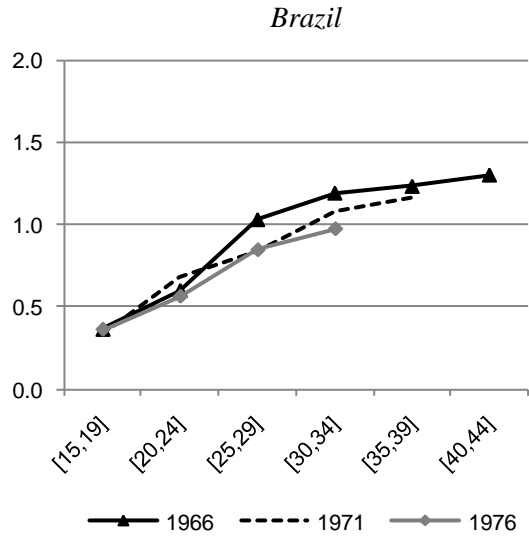
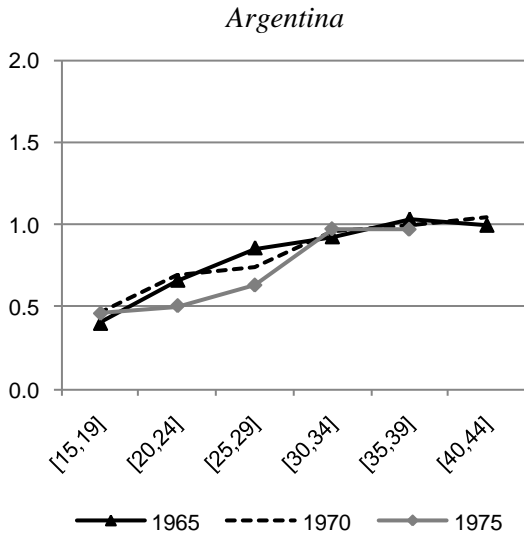
Females



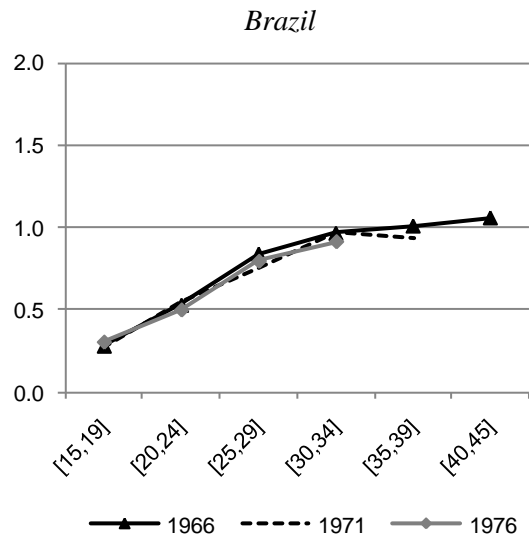
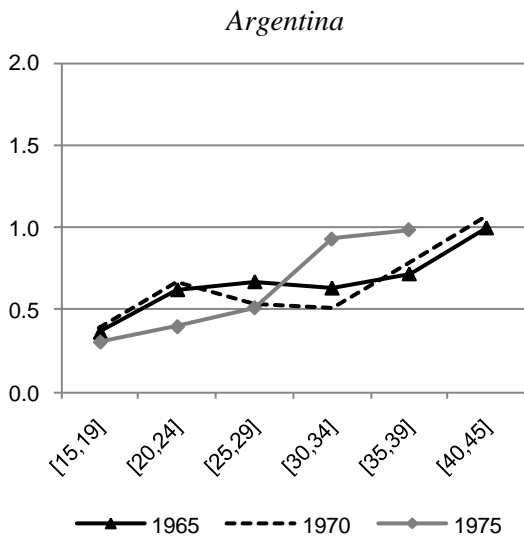
Source: Author's calculations from pseudo-panel data for each country.
 Note: Legend indicates year of birth.

Figure 3
Normalized hourly wages

Males



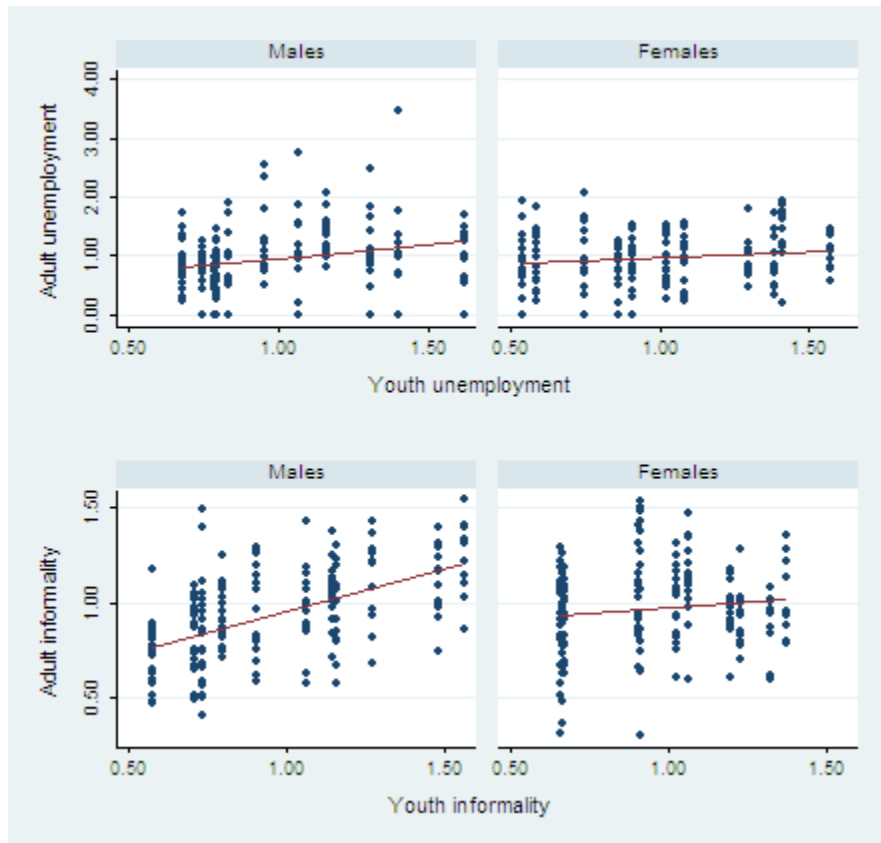
Females



Source: Author's calculations from pseudo-panel data for each country.
 Note: Legend indicates year of birth.

Figure 4
Relationship between adult and youth labor market outcomes

Argentina

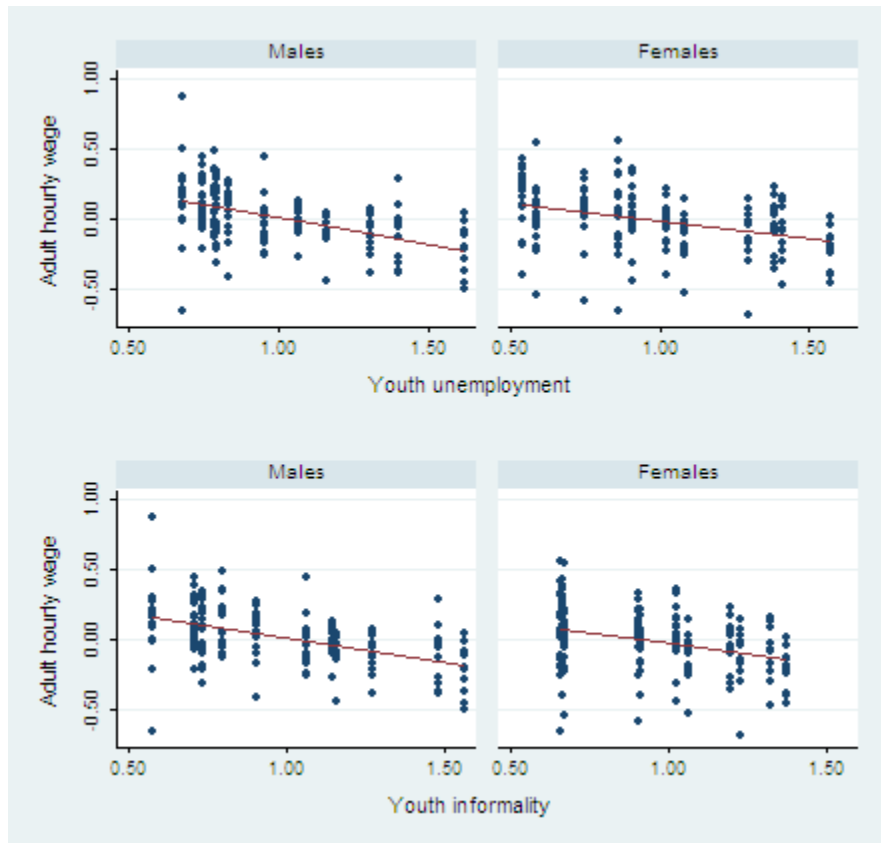


Source: Author's calculations from pseudo-panel data for each country.

Note: Adult unemployment/informality and youth unemployment/informality are normalized by the aggregate unemployment/informality rate.

Figure 5
Relationship between adult hourly wages and youth unemployment/informality

Argentina

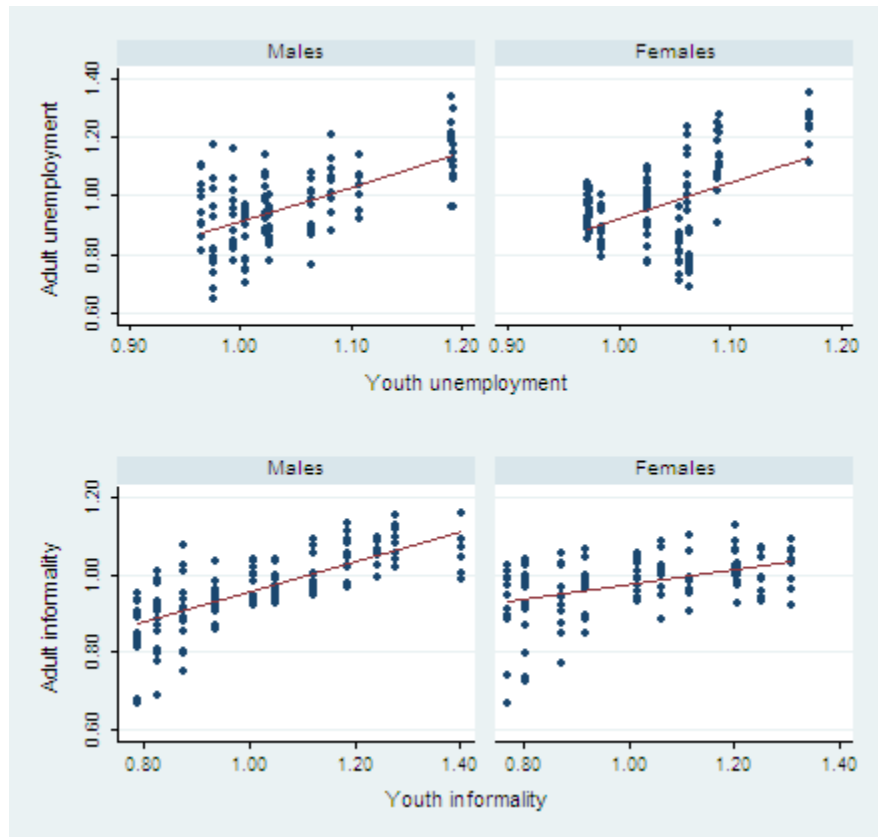


Source: Author's calculations from pseudo-panel data for each country.

Note: Adult hourly wages and youth unemployment/informality are normalized by the aggregate hourly wage or unemployment/informality rate.

Figure 6
Relationship between adult and youth labor market outcomes

Brazil

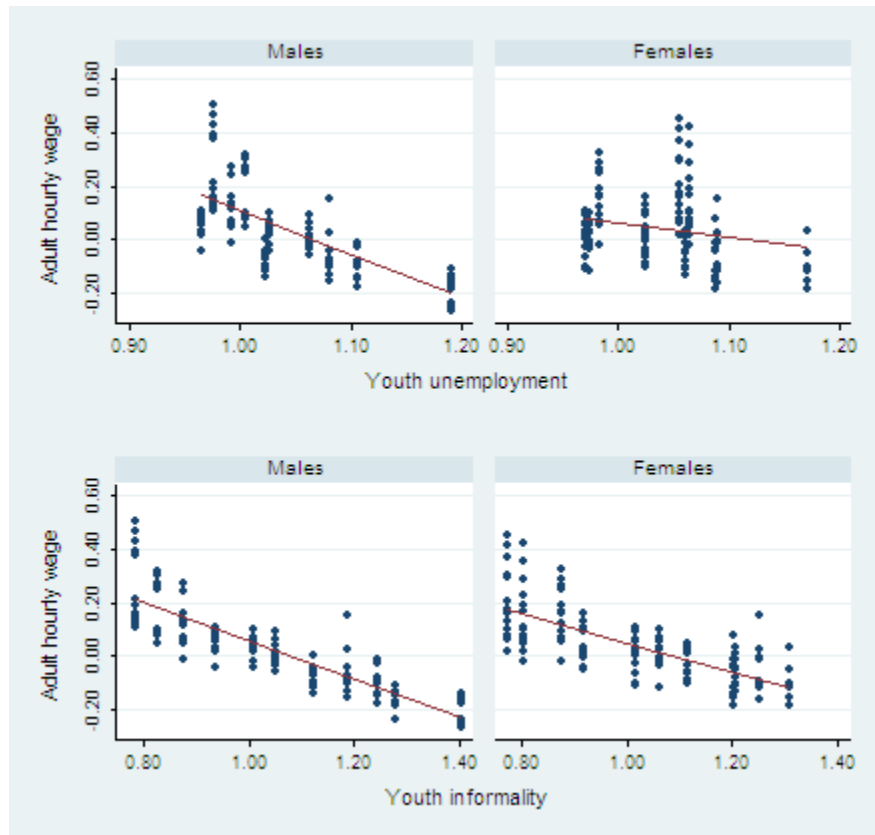


Source: Author's calculations from pseudo-panel data for each country.

Note: Adult unemployment/informality and youth unemployment/informality are normalized by the aggregate unemployment/informality rate.

Figure 7
Relationship between adult hourly wages and youth unemployment/informality

Brazil



Source: Author's calculations from pseudo-panel data for each country.

Note: Adult hourly wages and youth unemployment/informality are normalized by the aggregate hourly wage or unemployment/informality rate.