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A Cohort Analysis of Labor Participation in Mexico, 1987-2008

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Abstract

This paper presents a cohort analysis of the participation in the labor force and in the formal and informal sectors of the economy. The participation rates are decomposed in age, cohort, and time effects. The life-cycle patterns in labor force participation and employment in the formal sector follow a standard inverted U-shape profile, although there are significant diferences in these profiles between men and women, and between women of diferent generations. Younger workers are more likely to participate in the informal salaried sector, while participation in informal self-employment monotonically increases with age. However, this pattern is changing for younger cohorts and participation in the informal salaried sector rises again for older workers. The cohort efects show a higher participation in the informal salaried sector among younger generations. Finally, the cyclical components indicate that the female labor force participation rate is countercyclical, as well as the employment rates in self-employment, and the ones at the informal salaried sector.

Keywords: Labor Supply, Informality, Cohort Analysis.

Resumen

Este artículo presenta un análisis de cohortes de la participación en la fuerza laboral y en los sectores formal e informal de la economía. Las tasas de participación se descomponen en efectos de edad, cohorte, y tiempo. Los patrones de ciclo de vida en la participación en la fuerza laboral y en el empleo en el sector formal siguen una forma estándar de U invertida, aunque persisten diferencias significativas entre los perfiles de hombres y mujeres, y entre mujeres de diferentes generaciones. Trabajadores jóvenes tienden a participar en el sector informal asalariado, mientras que la participación en el autoempleo informal crece monotónicamente con la edad. Sin embargo, estos patrones están cambiando para las nuevas generaciones, quienes muestran una creciente presencia de trabajadores mayores en el sector informal asalariado. Los efectos de cohorte también muestran una creciente participación en el sector informal asalariado para las nuevas generaciones. Finalmente, los componentes cíclicos indican que la participación en la fuerza laboral de las mujeres, así como las tasas de empleo generales en el sector informal son contracíclicas.

Palabras clave: oferta laboral, informalidad, análisis de cohortes.

A cohort analysis of labor participation in Mexico, 1987-2008

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*The views in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the institutions where they work.

This paper analyzes participation in the overall labor force, and in the formal and informal sectors of the economy in particular in urban Mexico over the past two decades.

While the academic literature has studied these topics in the past for developing countries, most studies are based on the analysis of cross-sectional databases or short-lived panels at best.

This paper uses a series of cross-sectional surveys to perform a cohort analysis of labor participation over a long period of time. The advantage of such approach is that it can give insights on the long-run dynamics of labor participation, while disentangling the life-cycle, generational, and cyclical patterns of this phenomenon. This presents an advantage over static studies based on cross-sectional data, or on those based on panels covering a small time span.

The age, cohort (i.e. generational) and cyclical (or temporal) decomposition of the participation rates are useful to gather a set of stylized facts that give an insight into the functioning of the labor markets in developing countries.

Section 1 presents a brief review of the literature relevant for Mexico. Section 2 discusses the methodology applied in the paper, as well as the data that will be used. Section 3 presents the results of the analysis and section 4 concludes.

1 Related Literature

The economics literature has studied extensively the labor participation in developing countries, not only focusing on the decision of entering the labor force, but also on the determinants of working in the formal versus the informal sector.

For the case of Mexico analyses on labor force participation have focused most of its attention on specific population groups like women, children and the elderly (see for instance García and de Oliveira, 1994; Wong and Levine, 1992; van Gameren, 2008). Studies documenting general trends in the overall labor force have

shown an increased participation in the market driven by a rapidly rising female workforce. On the contrary, the male labor force participation has remained relatively constant over the years. Also, it has been shown that the participation patterns over the life-cycle follow the traditional inversed-U shape, although for men this curve reaches its peak at much earlier ages than for women (see for instance Inter-American Development Bank, 2003).

Another area of recent research has been the response of labor force participation to macroeconomic shocks. In particular, some authors have argued that households increase their labor supply when facing a negative aggregate shock (Inter-American Development Bank, 2003). This usually comes in the form of increased labor supply of women and young adults not previously working. This phenomenon is known in the literature as the *Added Worker* effect. However, other studies have failed to find strong evidence supporting such response in the Mexican case (McKenzie, 2003). This remains an unsolved issue in the literature.

The study of participation in the formal versus the informal sector has been extensively studied too. In particular, the attention has been directed at trying to assess whether Mexican labor markets are segmented in formal and informal sectors, or whether these sectors are the product of the natural alignment of comparative advantage forces.

In a long series of papers, William Maloney and coauthors have questioned the segmented view of the labor markets for Mexico and Latin America (Maloney, 2004; Bosch and Maloney, 2007, are some examples). In Bosch and Maloney (2007) the authors present an analysis on the transitions between the formal and informal sectors of the economy over different phases of the business cycle. One of their main findings is that participation in the informal sector is counter-cyclical, mostly because the job finding rates in the formal sector are procyclical, and not so much because the formal sector is "expelling" workers into the informal sector during recessions.

Another study providing interesting evidence on sector transitions in Mexico is Gong *et al.* (2004). The

paper uses a dynamic Multinomial Logit to analyze the transition patterns between the informal and formal sectors, and between non-participation, in periods before and after the 1994 Peso crisis. The authors find that entry and exit rates for the formal sector are lower than those for the informal sector. Also the probability of formal sector employment increases with education, while that of working in the informal sector decreases with family income. The authors interpret these findings as providing support for the view that the informal sector is a temporary state for workers rationed out of the formal sector.

More recently Calderón-Madrid (2008) analyzes unemployment duration in Mexico and its relation with transitions into the formal and informal sectors. The author concludes that some workers displaced from the formal sector into unemployment eventually start reducing their formal sector reservation wage, as it becomes harder to find a formal sector job. Also, they start looking for jobs in the informal sector. These results support the view that, at least for some workers, the informal sector serves as a second-best option as segmentation models posit.

Finally, a set of studies related to this paper are those shedding light on the participation in the informal sector over the life-cycle. The main findings in this regard are that young individuals have higher participation rates in the informal salaried sector (i.e. informal workers who do not own their business), while older workers are more likely to participate as informal self-employed. In other words, many workers tend to start their work life as informal employees, to then become formal sector workers, and finally transit into informal self-employment (see for instance Maloney and Krebs, 1998; Maloney and Aroca, 1999; Maloney, 2004).

2 Methodology and Data

The present paper uses a cohort analysis to study the participation decisions in the workforce, as well as in the formal and informal sectors of the economy. The following section discusses the methodology followed and next we discuss the data used.

2.1 Methodology

Cohort analysis is based on the idea of following a group of individuals (i.e. a "cohort") over different points in time and tracking their behavior dynamically. The main difference between this methodology and a regular panel data study is that the latter follows each single individual or household over different periods (unless the individual unexpectedly leaves the sample), while the former only tracks population subgroups as a whole and not particular individuals/households.

If we have comparable cross-sectional surveys collected at different points in time it is possible to construct a "pseudo-panel" following dynamically specific groups of the population. For instance, the behavior of males born in 1977 can be tracked over time by means of cross-sectional surveys, even if the individuals in this cohort who appeared in the initial survey are not subsequently re-interviewed. In other words, cohort analysis assumes that on average the behavior of a group of individuals is well approximated at other points in time by the behavior of other individuals belonging to the same cohort, even if they are not necessarily the ones initially interviewed.

The use of pseudo-panels presents a clear advantage over the analysis of a single cross-sectional survey at a given point in time. For starters, pseudo-panel help studying the dynamic behavior of a subpopulation group, something impossible to do with a single cross-sectional survey. Secondly, when life-cycle profiles are generated with cross-sectional data the results confound age effects (i.e. the real life-cycle effects) with generational effects (i.e. cohort effects) because it is impossible to disentangle those two with only one observation over time.

In comparison with real panel data, the analysis of cohort data has the disadvantage of not tracking over time the same particular individuals or households, but only following groups of them. In practical terms however, pseudo-panels have an advantage over real panels spanning a short period of time, hence

preventing from capturing any significant long-run dynamics. Another advantage occurs if real panels have high levels of attrition between waves, something that could bias estimations performed on the remaining individuals/households. Since in developing countries (Mexico not being the exception) panel data are usually short-lived and have high attrition rates, the use of pseudo-panels is justified to analyze long run phenomena.[1]

The approach followed in this paper is to construct pseudo-panels tracking the labor force participation and the participation in the formal and informal sectors for population groups classified in cohorts according to their year of birth and their gender.

The analysis consists in decomposing the various participation rates in age, cohort and time effects. The age effects will capture the standard life-cycle patterns in the data. The cohort effects will illustrate the evolution of the rates across generations. Finally, the time effects capture the response of the rates to variations in aggregate macroeconomic conditions over the business cycle.

We perform the decomposition using two econometric models, one in which there are no interactions between age and cohort effects, and another one where that possibility is allowed. In other words, the first approach assumes that the life-cycle profiles are parallel for different generations, while the second allows for the possibility of such profiles differing in ways other than simple parallel shifts.

The first method is based on the decomposition proposed by Deaton (1997).[2] If we denote p^s_{jt} as the participation rate of the cohort j at time t in sector s, this method decomposes the rate in the aforementioned effects as

$$p^s_{jt} = \beta + \alpha_a + \kappa_c + \theta_t + \epsilon_{ct} \tag{1}$$

where α_a represents the age effect at age a, κ_c represents the cohort effect for generation c, and θ_t is the

[1] Examples of other studies using a cohort analysis for Mexico are Antman and Mckenzie (2007a) and Antman and Mckenzie (2007b).

[2] His method is in turn based on the decompositions illustrated in Hall (1971) and Deaton and Paxson (1994).

aggregate time effect at period t.

In order to allow for the greatest flexibility in the estimation of the model we use a full set of dummy variables for each age, cohort and period. Since there is perfect colinearity between the three effects an additional restriction is needed to identify the model.[3] The normalization imposed is that the time effects are orthogonal to a time trend, which in turn implies that all the growth in the dependent variable is attributed to age and cohort effects.

With a dataset like ours having numerous cross-sections over time, it is possible to estimate very flexible specifications of the age, cohort, and time effects. The main disadvantage of this method is that it imposes the restriction that there are no interactions between the age and cohort effects. As it will be seen below this assumption can be problematic.

The second decomposition addresses this drawback and allows for interactions between age and cohort effects. The method is similar to the one used by Beaudry and Lemieux (1999) to study the female labor force participation in Canada, and consists of estimating a regression of the participation rates as a high-order polynomial of age, cohort, age and cohort interacted with each other, as well as time effects.[4]

Instead of introducing a set of period dummies for the time effects, these are captured by using the aggregate unemployment rate as a proxy for cyclical macroeconomic shocks, and by adding to the predicted component of this variable a weighted sum of the residuals for each period t.

The model estimated is

$$ln(\frac{p^s_{jt}}{1-p^s_{jt}}) = \beta + \sum_{i=0}^{k} \alpha_i age^i + \sum_{h=0}^{l} \kappa_h coho^h + \gamma_1 age * coho + \gamma_1 age * coho^2 + \theta unemp + \epsilon_{ct} \qquad (2)$$

The participation rates are introduced in log-odds format because we make predictions of the age, cohort

[3]This is the case even after dropping the respective dummy variables to avoid the standard "dummy-variable trap". The colinearity occurs because we can express the age as a sum of time and cohort. For instance if we let the cohort variable *co* to be the year of birth, we can write *age=time-co*.

[4]The order of polynomials are selected by a specification search process based on the statistical significance of the variables.

and time profiles of such rates and this specification ensures that the linear predictions fall within the (0,1) range.[5] The model is estimated by weighted least-squares with the cohort population size as the weight.

2.2 Data

The data used comes from the National Survey of Urban Employment (in Spanish "Encuesta Nacional de Empleo Urbano" or ENEU) from 1987 to 2002, and its offsprings the National Survey of Employment (i.e. "Encuesta Nacional de Empleo" or ENE) from 2002-2004, and the National Survey of Employment and Occupation ("Encuesta Nacional de Ocupación y Empleo" or ENOE) from 2005 onwards.

These labor surveys are conducted on Mexican households first in urban areas, and more recently nation-wide. They gather information about socioeconomic characteristics such as age, gender, education, marital status, labor force participation, labor market earnings, sector of employment, occupation, hours worked in the market, among others. The surveys are geographically and socioeconomically representative of Mexico and they are used by the government to create employment statistics.[6]

Since the samples from 1987 to 2002 are urban, and informality is usually conceptualized as an urban phenomenon the analysis is limited to urban areas.

A cohort is defined by year of birth and gender. The analysis is restricted to individuals with ages between 15 and 70 years, in order to fully span the life-cycle labor participation.

Although the database is a rotating panel with quarterly data tracking individuals for one year, each quarterly survey is treated as a separate cross-section, because of the short time span of the panel and its high attrition rates.

The years available in the data go from 1987 to 2008. This means that each cohort is tracked for at most 86 periods.[7] These years include several periods of growth and the major recession following the 1994 Peso

[5] The predicted rates are obtained by transforming the predicted dependent variables $\hat{y}$ as $\hat{p} = \exp(\hat{y})/(1+\exp(\hat{y}))$.
[6] The survey stratifies the population according to wealth.
[7] Some cohorts are observed for less periods because they surpass age 70 or because they entered too recently into the labor

crisis. This period also coincides with the years of trade liberalization in Mexico.

The participation rates to be analyzed are: 1) Labor force participation rate, 2) Employment rate in the formal salaried sector, 3) Employment rate in the informal salaried sector, and 4) Employment rate in the informal self-employed sector.

In this paper we consider an individual to be in the informal sector if s/he lacks coverage at a social security institution or the job does not provide her/him with medical insurance coverage. This clearly is not the only possible definition of informality, but it is one closely related to the well-being of the workforce. Also, informal sector workers are separated into self-employed and salaried, depending on whether they own their business or work at firm that does not offer them social security coverage.[8]

3 Results

Figure 1 shows the labor force participation rate, the unemployment rate, as well as the employment rates in the formal, informal salaried and self-employed sectors.

The first graph in the figure illustrates that the female labor force participation has been increasing since the late nineties passing from slightly more than 35% of the population between 15 and 70 years of age in 1987 to 50% in 2008. On the contrary, the male labor force participation has been relatively stable around the 80% level.

The employment rate in the formal sector has been more or less stable at levels slightly above 50% of the employed population. Over the last years the levels of formality in the economy have been falling mainly driven by a fall in the formality rates among women, as figure A.11 in the appendix illustrates.

Employment rates in the informal salaried sector have fluctuated between 25% and 30% of the employed

market.

[8] While there are some self-employed reporting to be enrolled in social security institutions these are a clear minority (always less than 1% of the employed population) and hence they are excluded from the sample.

population, while the informal self-employed rate has fluctuated between 20% and 25%.

Finally, the unemployment rate portrays the aggregate cyclical fluctuations in the economy. From 1987 to 1991 the economy was in an expansive phase, after which a slowdown started until late 1994. From that point until 1997 the economy suffered high unemployment rates due to the 1994 Peso Crisis. Unemployment kept falling until 2001 when the economy started decelerating as a consequence of the recession in the US economy. From 2004 onwards the unemployment rate has stabilized at levels around 4% and 5%.

We next discuss the age and cohort effects. The discussion of the cyclical/time effects is postponed until section 3.2.

3.1 Age and Cohort Effects

Labor Force Participation

The decomposition of the labor force participation rate is presented separately by gender because the trends of these rates differ drastically between men and women. The rest of the analysis was performed for both the overall rates, and the rates per gender, but the results broken down by gender are relegated to the appendix, although the relevant differences will be discussed in the text.

The first graph in figure 2 illustrates the male participation rates over the life cycle for different cohorts. The age component has a standard inverse-U shape with a plateau in the participation rates between ages 25 and 50, after which it starts decreasing. The cohort component shows a very stable pattern except at the extremes of the graph (i.e. for very old and very young generations). The higher variability at the ends probably just reflects the fact that there are fewer observations available for such cohorts.[9]

A similar analysis for the female labor participation rates show that the observed life-cycle profile in the first graph in figure 3 display significant differences between cohorts, judging by the displacements in the

[9]The ordinate axes in the age and cohort decompositions under method I are the effects relative to the effect at age 15, and the effect for the cohort born in 1993.

line segments representing different cohorts. The life-cycle profile also has an inverted-U shape, but in this case participation grows rapidly until the age of 22, and continues growing at a slower rate until the age of 43, when it starts decreasing. The fact that female labor force participation continues increasing until late ages could probably indicate that some women are delaying their entrance to the labor force because of child-rearing. It is also interesting to see that the decrease in participation after age 43 is slower than that of men.

The cohort effect for women shows a clearly increasing trend confirming the fact that younger generations of women are participating more in the workforce.[10]

Informal Salaried

The observed and estimated age profiles for the informal salaried illustrated in figure 4 confirm that there is a higher participation in this sector among younger workers. This participation decreases until age 29 where it stabilizes to rise again after age 57. A closer look at these trends by gender (in figures A.12 and A.13 in the appendix) show that for men the decreasing trend continues until age 57, while for women it starts as soon as age 30 is reached.

Some researchers interested in whether labor markets are segmented have interpreted the fact that younger workers have a higher participation rate in the informal salaried as a product of the natural alignment of comparative advantage forces. In particular, it has been argued (see for instance Maloney, 2004) this corresponds to a natural "staging" phase whereby young workers are informal salaried because in exchange they acquire labor market experience, and hence they are voluntarily in the informal sector. While this hypothesis could be true for younger workers, it is harder to argue that elderly workers "prefer" the informal salaried sector where wages are lower and fringe benefits minimal or non existent.

[10] Again the variations observed at the tails of the cohorts should be taken with caution given the smaller number of observations of such cohorts.

Regarding the cohort effects of participating in the informal salaried sector, the bottom left of figure 4 shows that younger generations have become more prone to participate in this sector. If this tendency continues, the Mexican economy will witness an enlargement of this sector in the years to come.

Informal Self-Employed

When it comes to the observed and estimated life-cycle patterns among the informal self-employed, the opposite occurs. As the top panel of figure 5 shows, participation in the informal salaried sector is monotonically increasing in age. This finding is consistent with previous studies, and probably occurs because in order to become a successful entrepreneur it is necessary to have some labor market experience, as well as some accumulated capital.

The generational effects illustrated in the bottom-left panel of the figure indicate a slightly decreasing participation in this sector for newer generations. A more careful look at the same pictures by gender (figures A.14 and A.15 in the appendix) shows that this is mostly driven by the falling participation rates of women in the sector.

Formal Salaried

Finally, figure 6 contains the decompositions for the (salaried) formal sector. The graphs show that employment in this sector rises sharply between age 15 and 25, and then it starts decreasing first at a moderate pace, and then rapidly after age 60 because formal workers start retiring or becoming self-employed.

The graph containing the cohort effects shows a stable pattern (extremes excluded) indicating that for the most part the participation in this sector has been steady across generations.[11]

[11] Actually for women the participation in this sector grew for the cohorts born between 1940 and 1960, to decrease to its original levels afterwards (see figure A.17 in the appendix).

3.1.1 Age-Cohort Interactions

The previously discussed decompositions assumed implicitly that there were no interactions between age and cohort effects. The implication of this is that any differences in age profiles between cohorts would be limited to parallel shifts, and so would be any differences in cohort profiles across ages. This assumption can be sometimes false, and model (2) was estimated to correct for this potential drawback.

Rather than reiterating the main findings from the previous sections, here we limit ourselves to discuss the patterns when there are important differences in the profiles due to these interactions. Our discussion will be based on the analysis of the predicted age and cohort profiles presented in figures 7, 8, and A.18-A.21 in the Appendix. The regression estimates of model (2) are presented in tables 1-4.[12]

In what concerns labor force participation the age-cohort interactions indicate that the life-cycle participation patterns for women have changed markedly across generations. In particular, the rising female participation at high ages is a phenomenon mostly attributed to younger cohorts (see figure A.19). Also, the cohort analysis indicates that women belonging to younger generations tend to stay working for more years.

For males there are few substantial life-cycle differences between cohorts, but younger generations seem to be retiring earlier (see figure A.20).

The analysis for informal salaried workers indicates that younger generations have life-cycle profiles in which the participation in this sector begins to rise again after ages as early as 30. This is a cause for concern because it means that in the future we will see larger populations of elder workers employed at low quality jobs.

Another interesting finding is that the monotonically increasing life-cycle pattern observed for self-employment no longer occurs once we allow for age-cohort interactions. In particular, figure 7 shows that

[12]The cohort variable in the regression tables is defined to be the year at which individuals turned 15 years of age, where years are coded 87-108. However the graphical results are plotted against the cohort year of birth, to facilitate the reading.

for younger generations the participation patterns tend to stabilize and even decrease as workers age.

Finally, regarding participation in the formal (salaried) sector we can emphasize that for younger generations of women the participation rates are decreasing sharply after age 30. This means that in the years to come we should expect a larger participation of women in the informal sector, especially among the elder.

3.2 Cyclical Components

To finish the presentation of results we briefly discuss the cyclical fluctuations in the sector relative sizes. In each of the cyclical graphs, a plot of the unemployment rate is included to capture the business cycle fluctuations.

A look at the cyclical plots in figures 2-6, 9, and A.22-A.23 shows that the female labor force participation is countercyclical, while its male counterpart seems to be procyclical or acyclical at times. This would provide support to the idea that in Mexico there is an "Added Worker" effect, whereby women increase their participation rates in bad times of the business cycle.

The participation in the informal salaried sector seems somewhat countercyclical, especially in the model allowing for age-cohort interactions. On the other hand, a clearer countercyclical participation occurs for the informal self-employed, while the formal sector has strong countercyclical participation rates. Table 5 summarizes the previous findings for all the estimated models.

These findings provide support to the idea that the informal sector serves as a second-best option for workers when the economy slows down or enters a recession. Whether these cyclical patterns are due to the formal sector expelling workers, or due to unemployed workers not finding jobs in the formal sector during recessions (as Bosch and Maloney, 2007, would argue) cannot be disentangled with the analysis of cohort data, because it doesn't tell us about individual transitions between sectors. However, it indicates that some workers participating in these sectors do so involuntarily, especially in periods of low growth or recession.

4 Final Remarks

In this paper we analyzed the participation rates in the overall labor force, as well as in the formal, informal salaried, and informal self-employed sectors for urban Mexico between 1987 and 2008. A cohort analysis was conducted, and each participation rate was decomposed in age, cohort, and time (or cyclical) effects.

In general, the results indicate that there are quite distinct patterns of participation across sectors and between men and women.

In terms of the life-cycle patterns, we find that labor force participation and participation in the formal sector follow a standard inverted U-shape profile. For the formal sector, the employment rates peak rapidly at age 30 and then start decreasing. For the labor force participation rates, the life-cycle profile is relatively flat at the top for men with ages between 25 and 50 years; while for women this participation keeps increasing until age 50, when it starts decreasing.

Regarding the age profiles in the informal sector employment rate we found that younger workers are much more likely to participate in the informal salaried sector, while participation in informal self-employment monotonically increases with age. However, for younger cohorts this pattern is changing and the participation in self-employment over the life-cycle is leveling off, while that of the informal salaried is rising mainly among older workers and women.

Some authors have interpreted the previous patterns as a sign that there is a "staging" process whereby young workers enter the informal salaried sector voluntarily in search of job market experience, to then move to the formal sector, where they will accumulate capital and further experience, and finally become informal self-employed at the end of their life.

Our finding that this pattern is changing for the newer generations raises important questions about the transformations occurring in the labor markets, and it also raises concerns that older workers and women

will end up employed in a sector with low pay, low productivity and virtually non-existing fringe benefits.

The cohort analysis confirms that younger generations of women are participating at higher rates in the labor force, and their life-cycle profiles are also rapidly evolving across generations. In other words, the insertion of women in the labor market is far from over in Mexico, and we will witness important transformation of this workforce in the years to come. On the other hand, the labor force participation rates for men seem quite stable across generations.

Our analysis indicates that there is a higher participation in the informal salaried sector among younger generations, and a decreasing participation in informal self-employment. Participation in the formal sector seems relatively stable over time. Should these trends continue in the future, we will see a rising employment share in the sector with the worst employment conditions and lowest productivity, namely the informal salaried.

Regarding the cyclical component of the rates, our results show that the female labor force participation is countercyclical, while its male counterpart seems to be procyclical or acyclical at times. This provides some support to the hypothesis that there is an "Added Worker" effect taking place during economic downturns.

The participation in self-employment is countercyclical, and so is the one at the informal salaried sector, although to a lesser extent. These findings suggest that the informal sector serves as a second-best option for some workers when the economy slows down, as some dualist models have posited.

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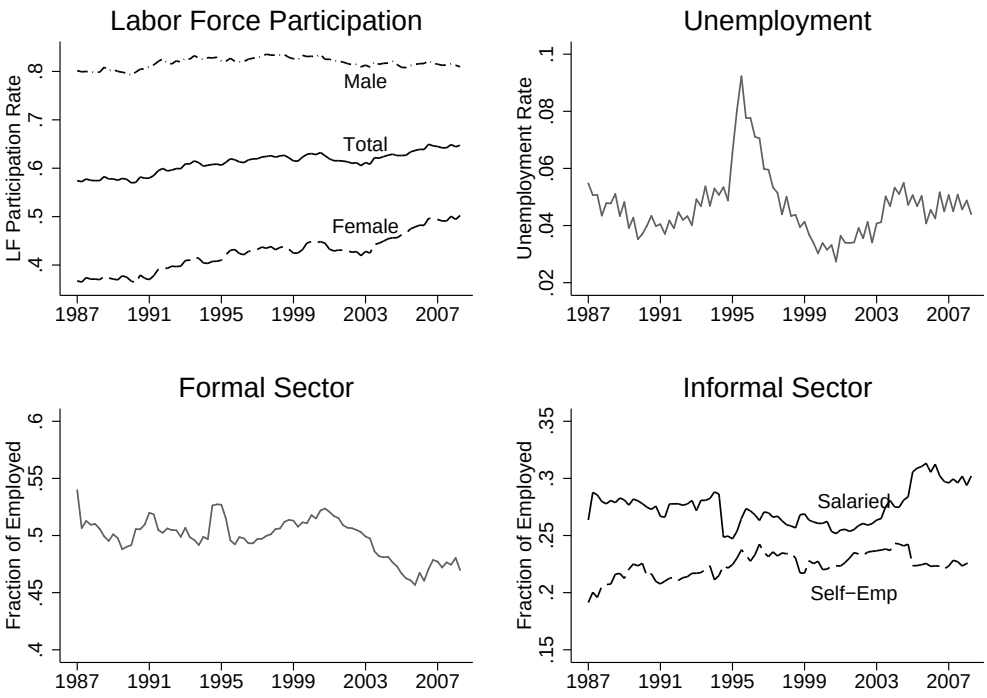

Figure 1: Participation Rates

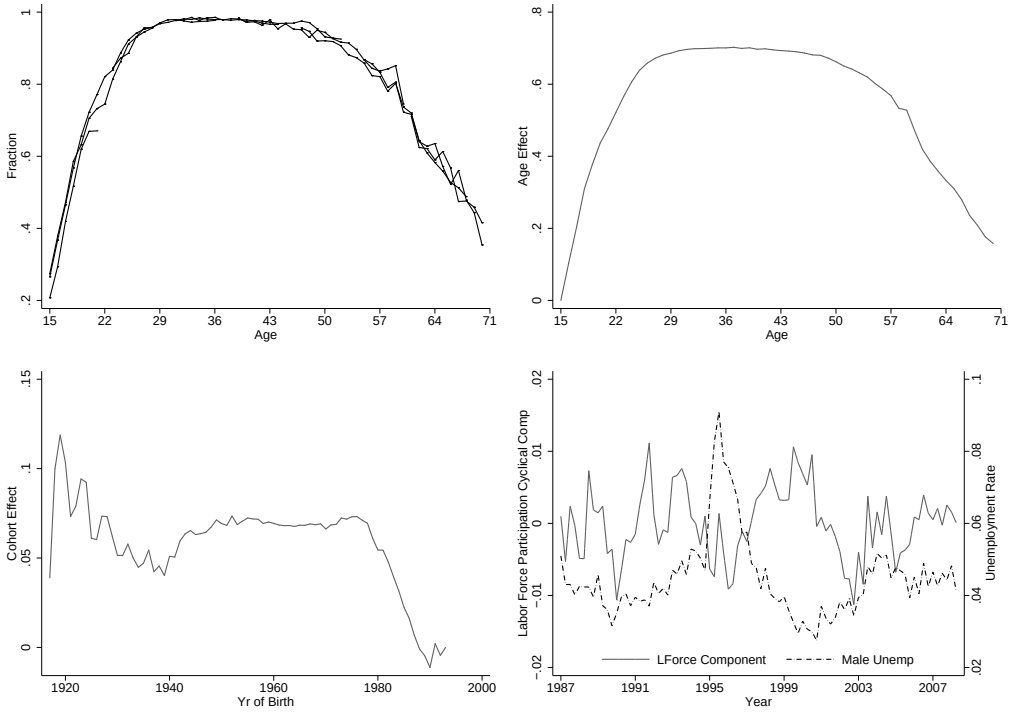

Figure 2: Male Labor Force Participation-Decomposition I

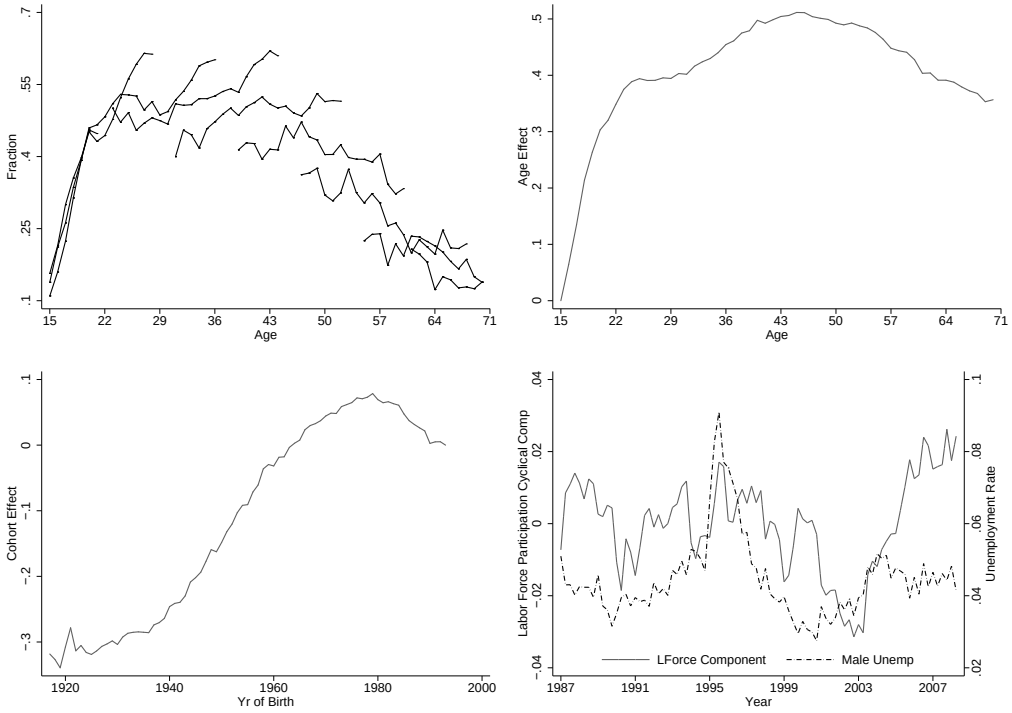

Figure 3: Female Labor Force Participation-Decomposition I

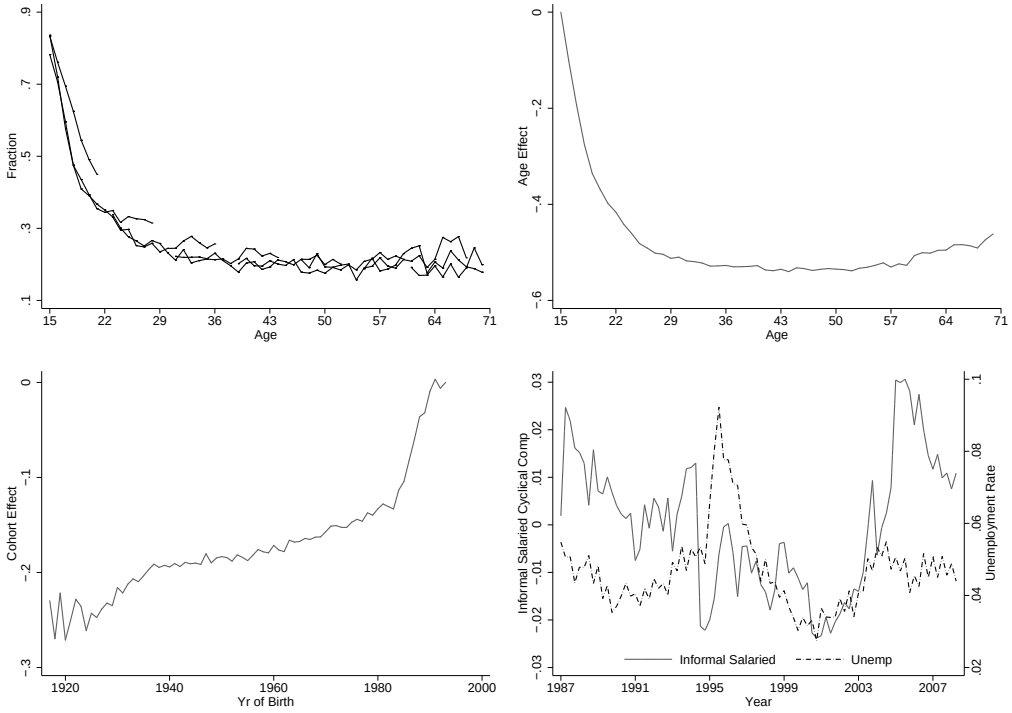

Figure 4: Informal Salaried-Decomposition I

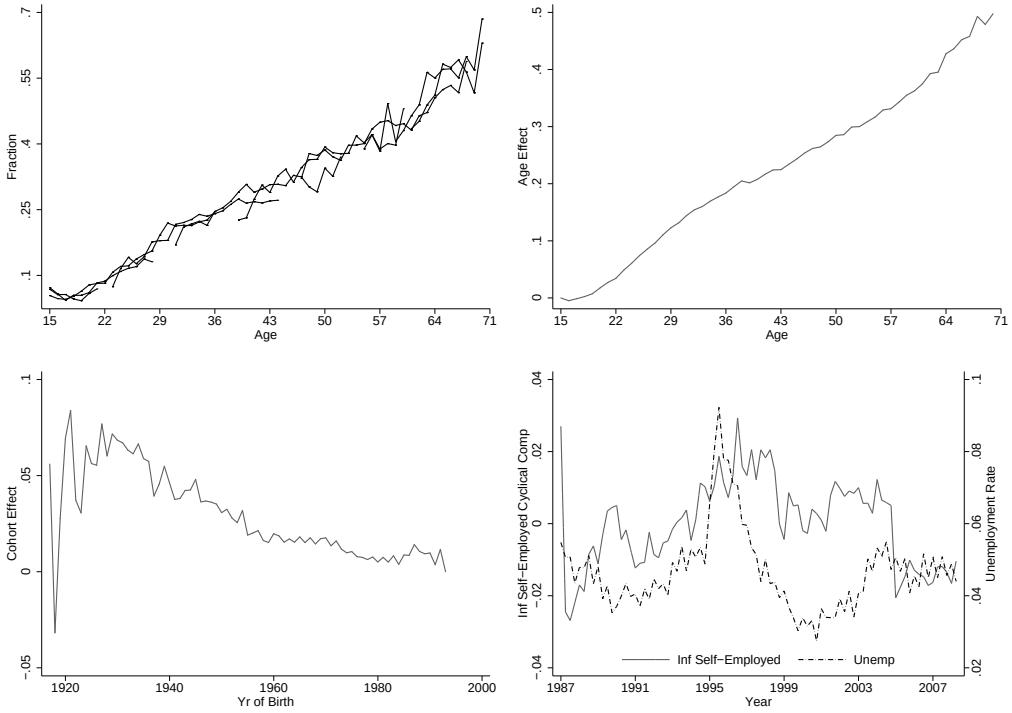

Figure 5: Informal Self-Employed-Decomposition II

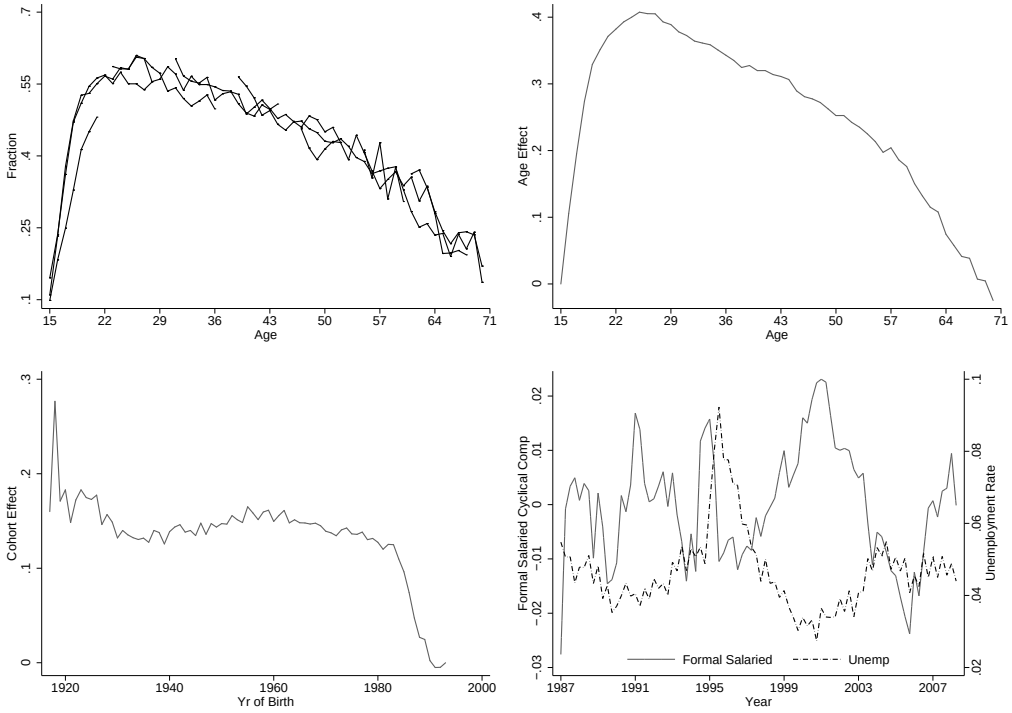

Figure 6: Formal Salaried-Decomposition I

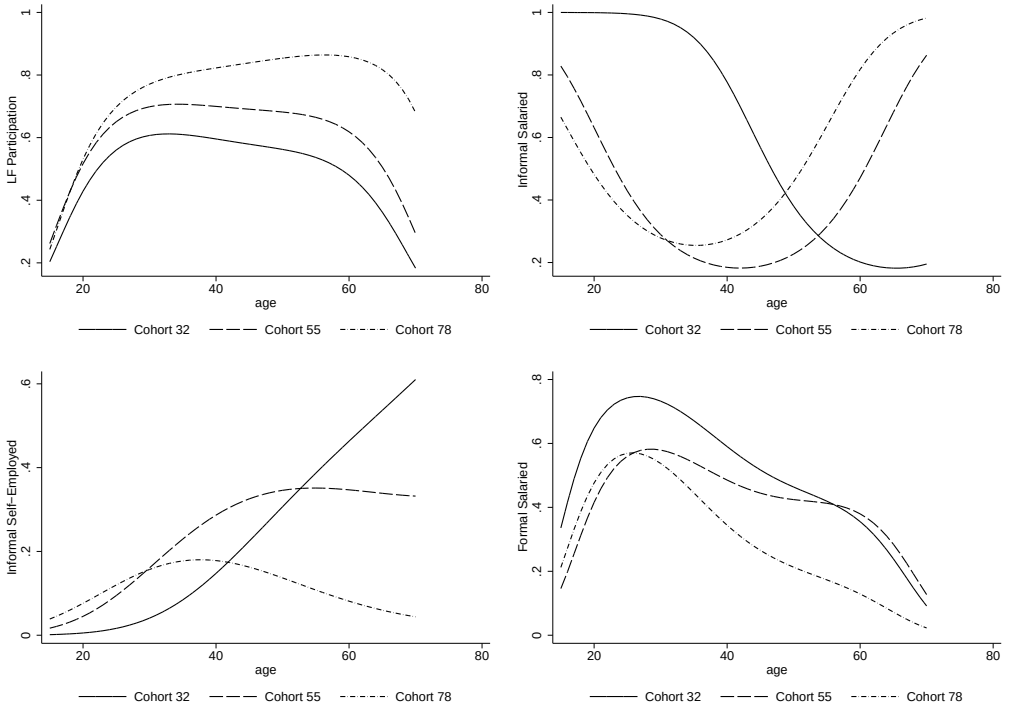

Figure 7: Age Profiles-Decomposition II

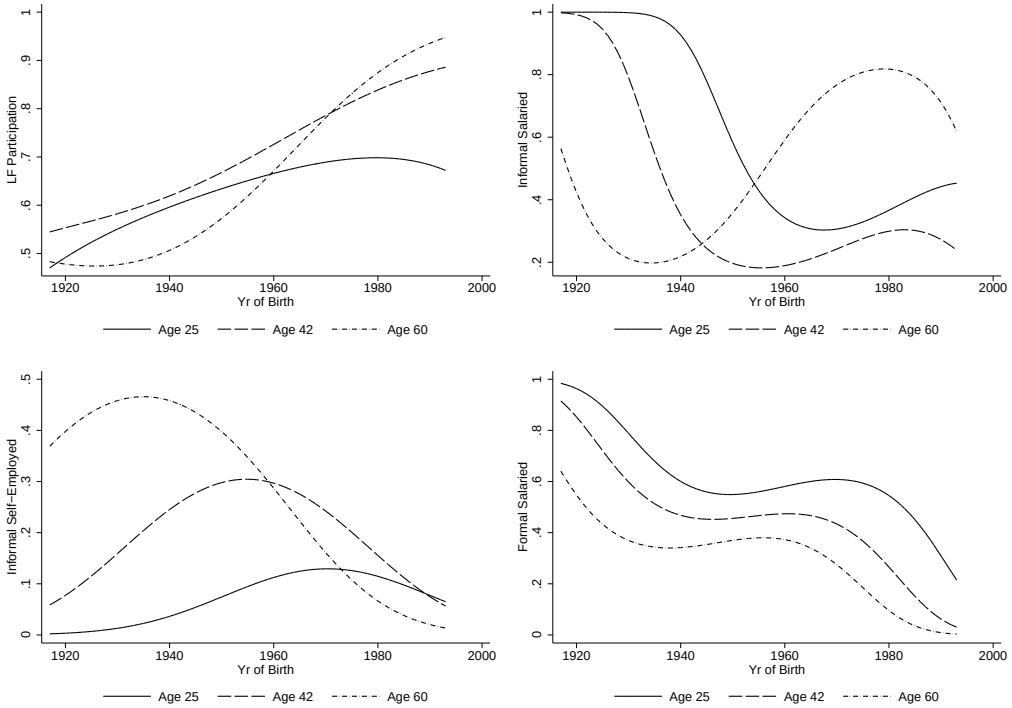

Figure 8: Cohort Profiles-Decomposition II

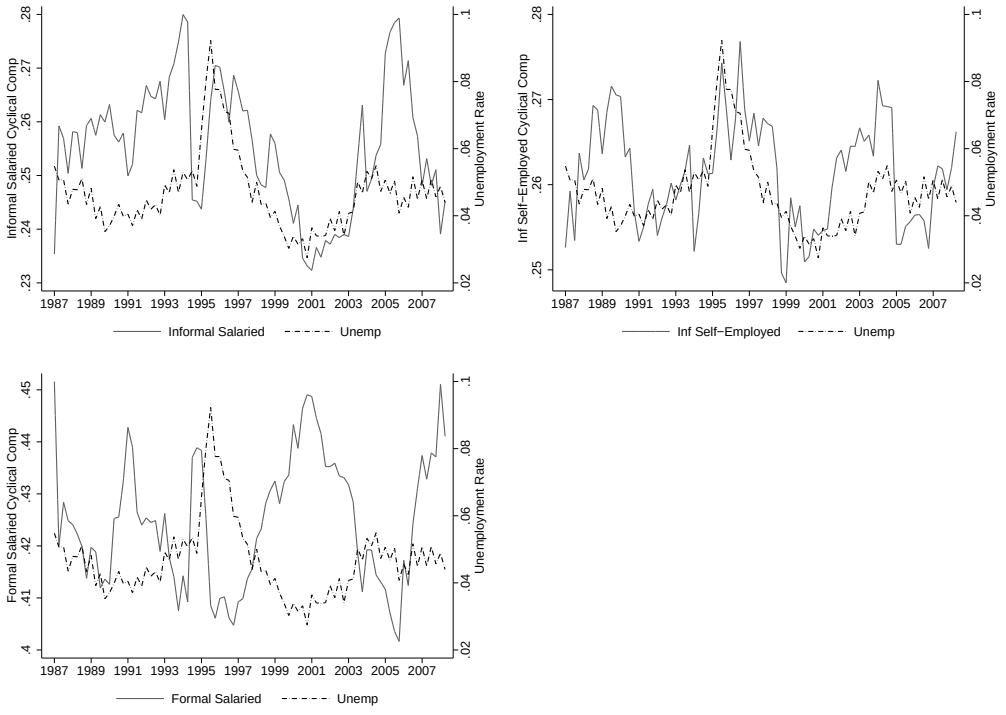

Figure 9: Cyclical Components-Decomposition II

Table 1: Labor Force Participation

	Total	Male	Female
Age/10	11.335***	5.8341***	8.7764***
	(.2876)	(.4213)	(.3224)
$(Age/10)^2$	-3.726***	-.47042***	-3.0854***
	(.0777)	(.0848)	(.0905)
$(Age/10)^3$	.57105***	-.1898***	.50024***
	(.012)	(.0136)	(.0145)
$(Age/10)^4$	-.03267***	.01961***	-.02944***
	(6.9e-04)	(8.0e-04)	(8.5e-04)
Cohort/10	1.6906*	-7.0456***	1.0893***
	(1.005)	(1.101)	(.2233)
$(Cohort/10)^2$	-.24995*	.96312***	-.09518***
	(.1417)	(.1173)	(.0108)
$(Cohort/10)^3$	.01894*	-.03964***	
	(.0097)	(.0041)	
$(Cohort/10)^4$	-.00075**		
	(2.9e-04)		
Age*Cohort/100	-.26724***	.60043***	-.32601***
	(.0809)	(.1007)	(.027)
Age*$Cohort^2$/1000	.02482***	-.05256***	.0351***
	(.0056)	(.0064)	(.0015)
Unemployment rate	1.2496***	-.61588*	2.0955***
	(.1869)	(.3258)	(.268)
Constant	-14.761***	4.4546	-11.194***
	(2.539)	(3.4)	(1.23)
R^2	0.960	0.976	0.901
Observations	4816	4816	4816

Standard errors in parentheses. Dependent variable expressed in log-odds

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Informal Self-Employed

	Total	Male	Female
Age/10	6.1638***	6.0732***	9.2696***
	(.2177)	(.2379)	(.4732)
$(Age/10)^2$	-.62646***	-.51389***	-.80322***
	(.0239)	(.0252)	(.0787)
$(Age/10)^3$	.03283***	.02484***	.04031***
	(.0018)	(.002)	(.006)
Cohort/10	3.4654***	4.3415***	9.2463***
	(.2493)	(.2841)	(2.109)
$(Cohort/10)^2$	-.16635***	-.22071***	-.85652***
	(.0127)	(.0145)	(.2424)
$(Cohort/10)^3$			.02738***
			(.0088)
Age*Cohort/100	-.37158***	-.47789***	-.89277***
	(.032)	(.0366)	(.1928)
Age*$Cohort^2$/1000	.00712***	.01359***	.04083***
	(.0016)	(.0018)	(.0137)
Unemployment rate	1.432***	1.287***	1.7329***
	(.2775)	(.3135)	(.4454)
Constant	-24.808***	-27.41***	-43.102***
	(1.256)	(1.413)	(5.582)
R^2	0.968	0.955	0.934
Observations	4816	4816	4816

Standard errors in parentheses. Dependent variable expressed in log-odds

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Informal Salaried

	Total	Male	Female
Age/10	-14.118***	-12.846***	-20.321***
	(.4189)	(.4388)	(.4537)
$(Age/10)^2$	.4242***	4.5078***	4.4804***
	(.0161)	(.1064)	(.1195)
$(Age/10)^3$		-.66421***	-.62924***
		(.017)	(.0204)
$(Age/10)^4$		.03635***	.03474***
		(.001)	(.0013)
Cohort/10	-23.844***	5.4246***	-8.7919***
	(.9398)	(1.418)	(.3417)
$(Cohort/10)^2$	2.218***	-.78618***	.43352***
	(.1083)	(.1608)	(.0175)
$(Cohort/10)^3$	-.06514***	.03437***	
	(.0042)	(.0058)	
Age*Cohort/100	2.4621***	-.31687**	1.0169***
	(.0749)	(.1263)	(.0457)
Age*$Cohort^2$/1000	-.1362***	.03107***	-.02614***
	(.0049)	(.0086)	(.0025)
Unemployment rate	10.838***	7.6111***	13.747***
	(1.959)	(1.603)	(2.051)
Unemp rate squared	-79.981***	-52.219***	-112.27***
	(16.71)	(14.11)	(18.41)
Constant	86.182***	2.3892	56.28***
	(2.982)	(3.945)	(1.803)
R^2	0.892	0.943	0.861
Observations	4816	4816	4816

Standard errors in parentheses. Dependent variable expressed in log-odds

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Formal Salaried

	Total	Male	Female
Age/10	13.374***	13.573***	14.439***
	(.4736)	(.5565)	(.6218)
$(Age/10)^2$	-5.9462***	-6.1949***	-5.8082***
	(.1308)	(.146)	(.1488)
$(Age/10)^3$	.91892***	.97153***	.87869***
	(.0208)	(.0234)	(.0241)
$(Age/10)^4$	-.05167***	-.05495***	-.04926***
	(.0012)	(.0014)	(.0014)
Cohort/10	-11.875***	-11.067***	-10.431***
	(1.597)	(1.791)	(1.948)
$(Cohort/10)^2$	1.4871***	1.2982***	1.4969***
	(.1848)	(.207)	(.218)
$(Cohort/10)^3$	-.05926***	-.04991***	-.06393***
	(.0068)	(.0076)	(.0078)
Age*Cohort/100	.86707***	.79562***	.81718***
	(.1419)	(.1588)	(.1755)
Age*$Cohort^2$/1000	-.06434***	-.05156***	-.07556***
	(.01)	(.0112)	(.0118)
Unemployment rate	-10.17***	-7.1035***	-15.82***
	(1.655)	(1.977)	(2.065)
Unemp rate squared	70.255***	39.16**	121.87***
	(14.29)	(17.55)	(18.22)
Constant	15.257***	15.683***	5.5975
	(4.273)	(4.828)	(5.516)
R^2	0.865	0.842	0.832
Observations	4816	4816	4810

Standard errors in parentheses. Dependent variable expressed in log-odds

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Cyclical Component	**Decomposition I**			**Decomposition II**		
	Total	Male	Female	Total	Male	Female
Labor Force Participation	0.27	-0.23	0.35	0.38	0.01	0.43
Informal Salaried	0.10	0.23	0.00	0.38	0.50	0.19
Informal Self Employed	0.25	0.21	0.29	0.42	0.33	0.45
Formal Salaried	-0.39	-0.40	-0.22	-0.46	-0.52	-0.33

Table 5: Cyclical Correlation with Aggregate Unemployment

A Appendix

Figure A.10: Male Employment Rates

Figure A.11: Female Employment Rates

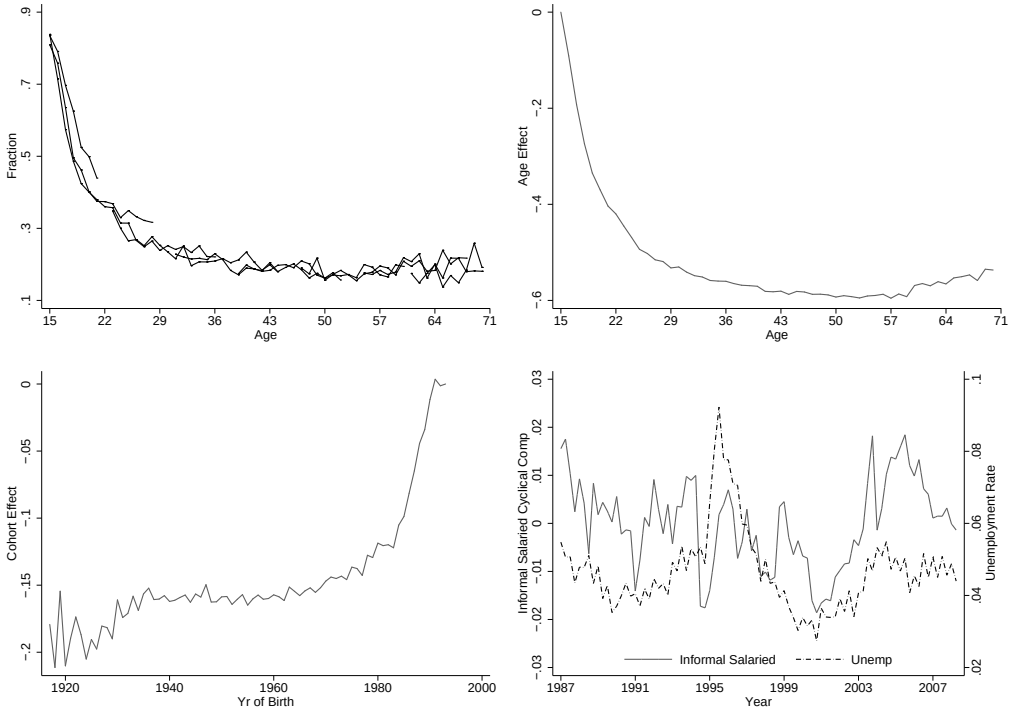

Figure A.12: Male Informal Salaried-Decomposition I

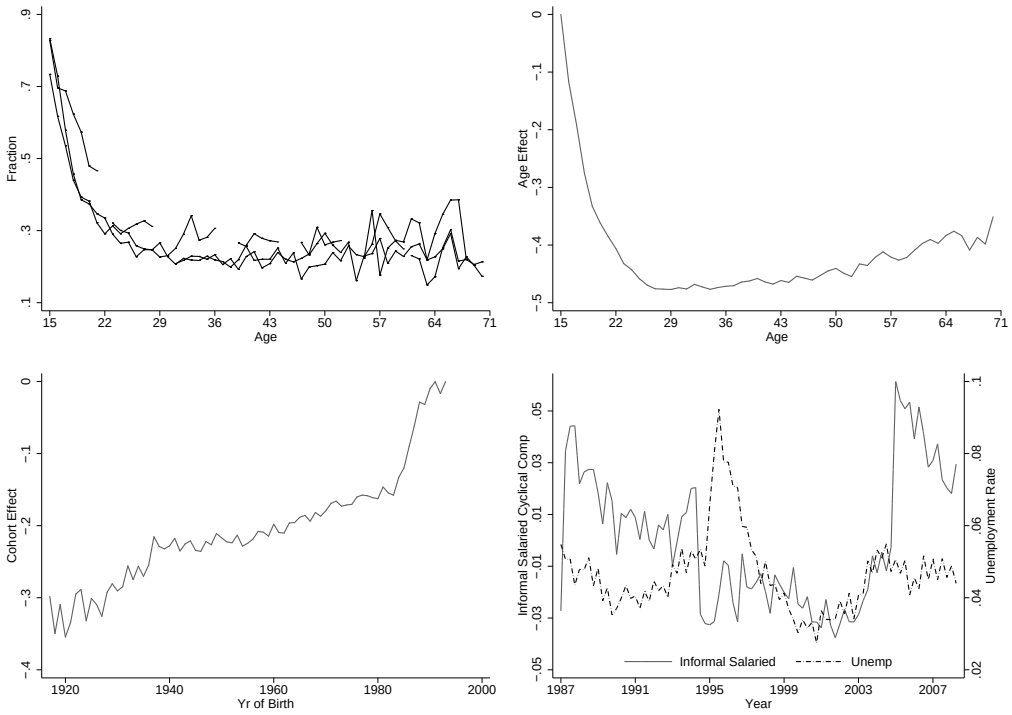

Figure A.13: Female Informal Salaried-Decomposition I

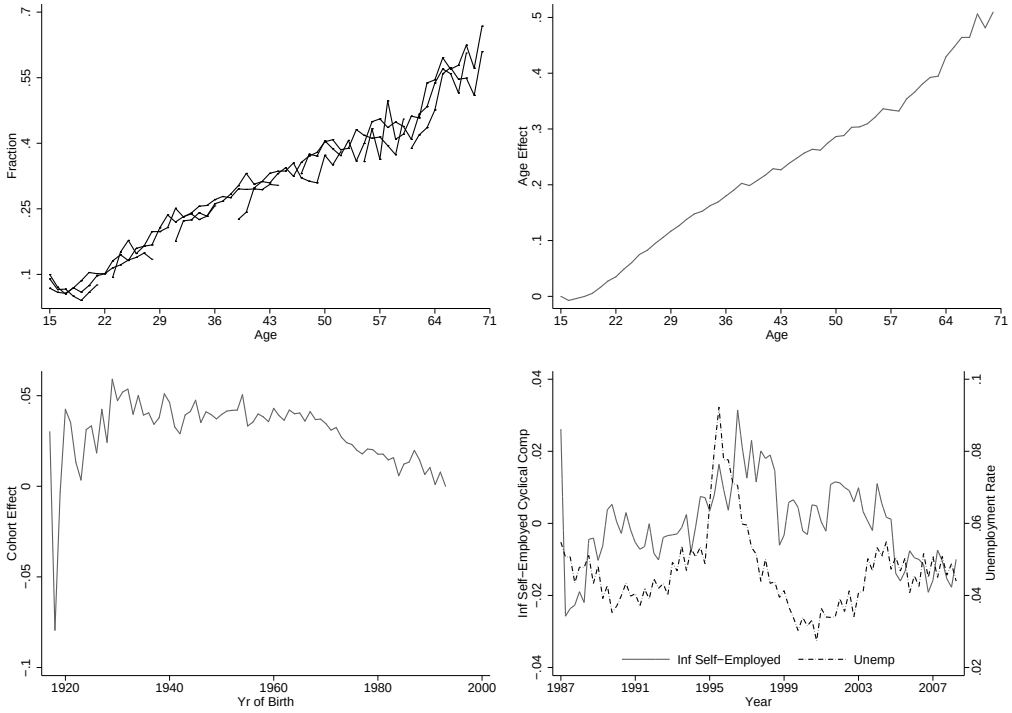

Figure A.14: Male Informal Self-Employed Decomposition I

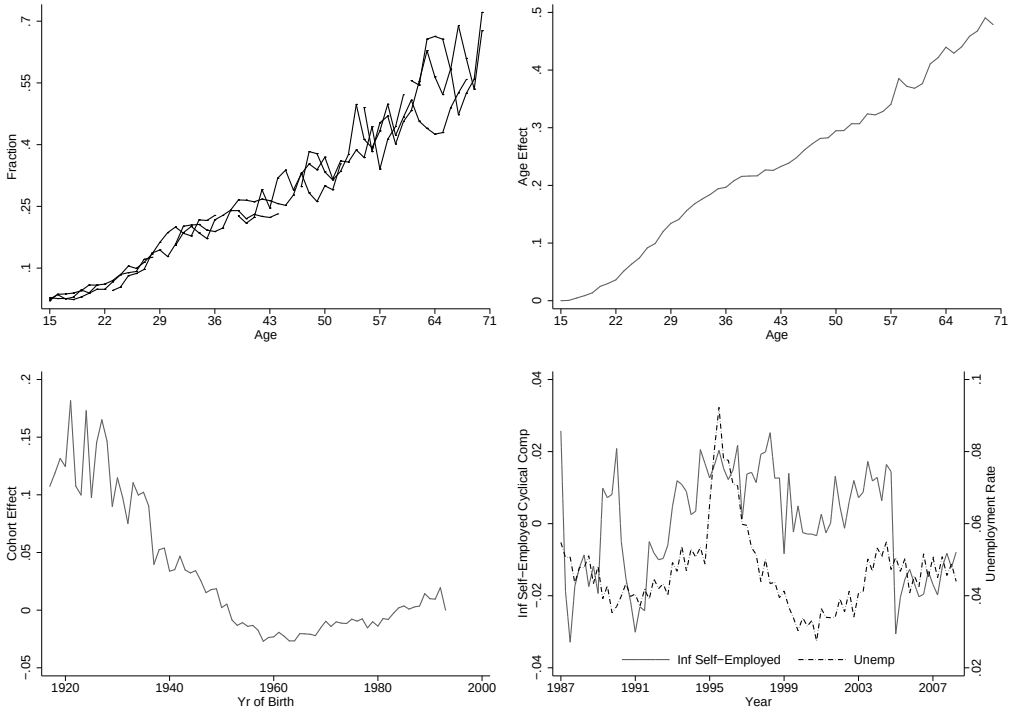

Figure A.15: Female Informal Self-Employed Decomposition I

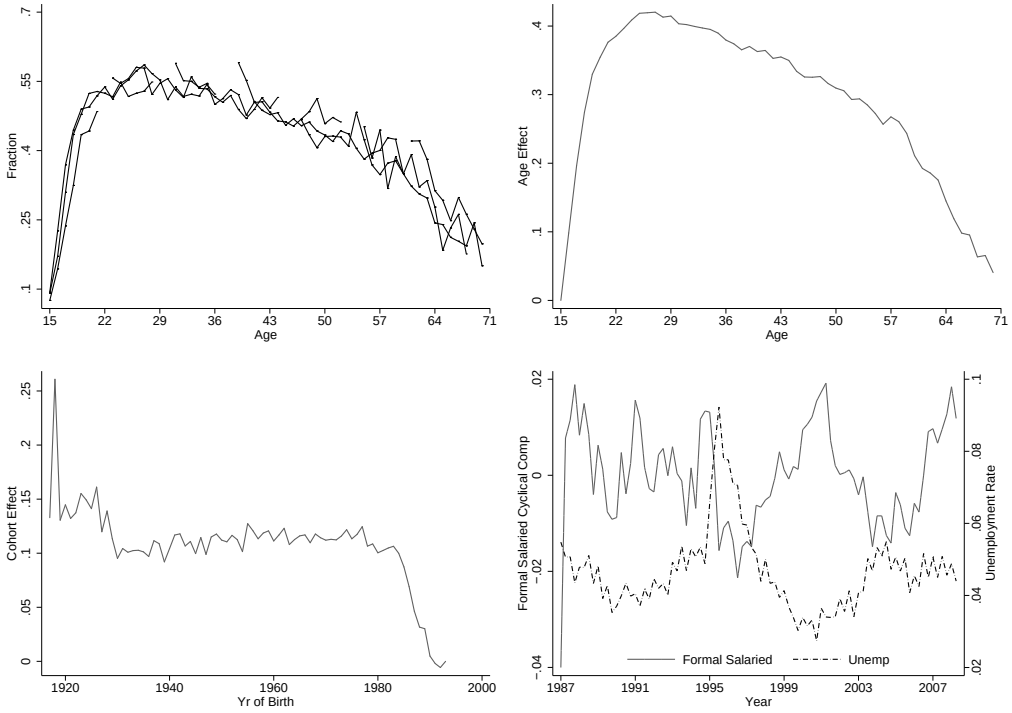

Figure A.16: Male Formal Salaried-Decomposition I

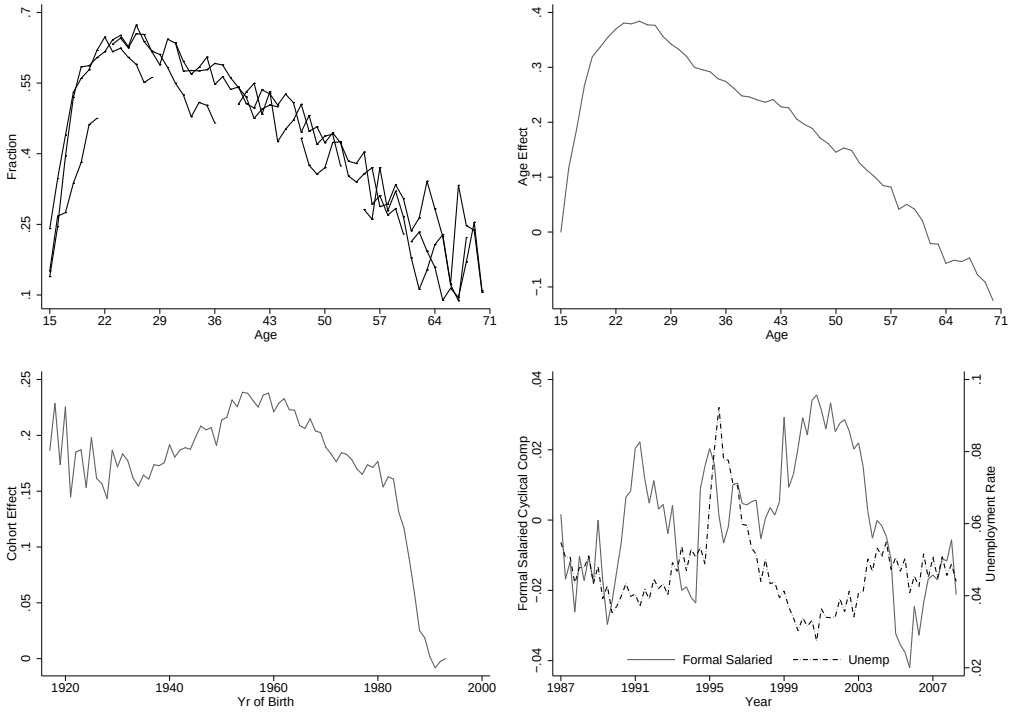

Figure A.17: Female Formal Salaried-Decomposition I

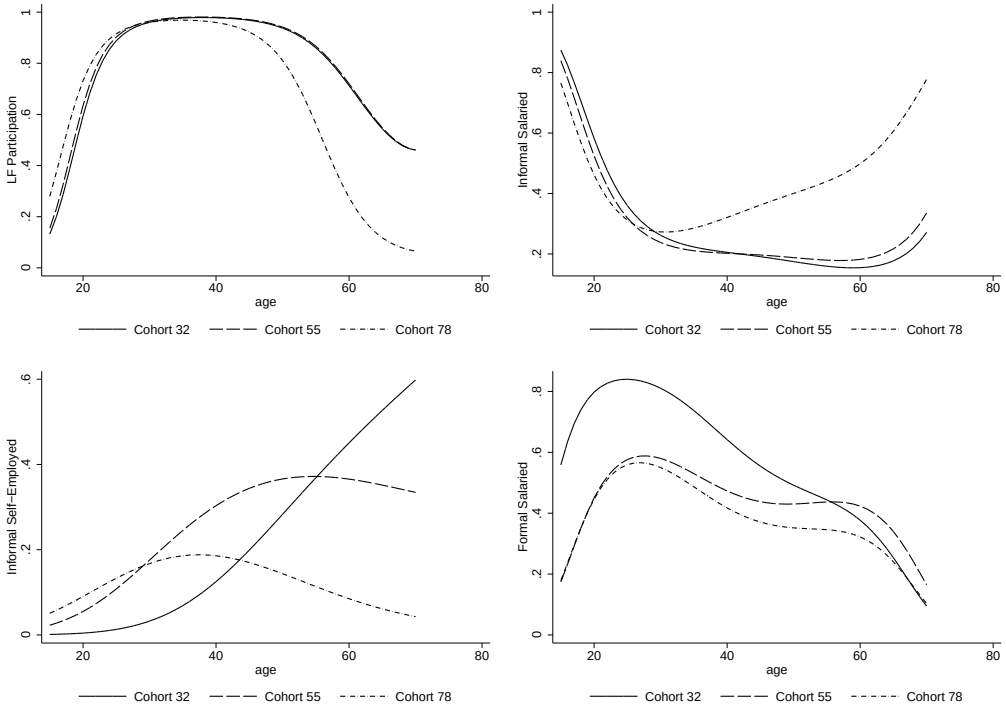

Figure A.18: Age Decomposition II-Male

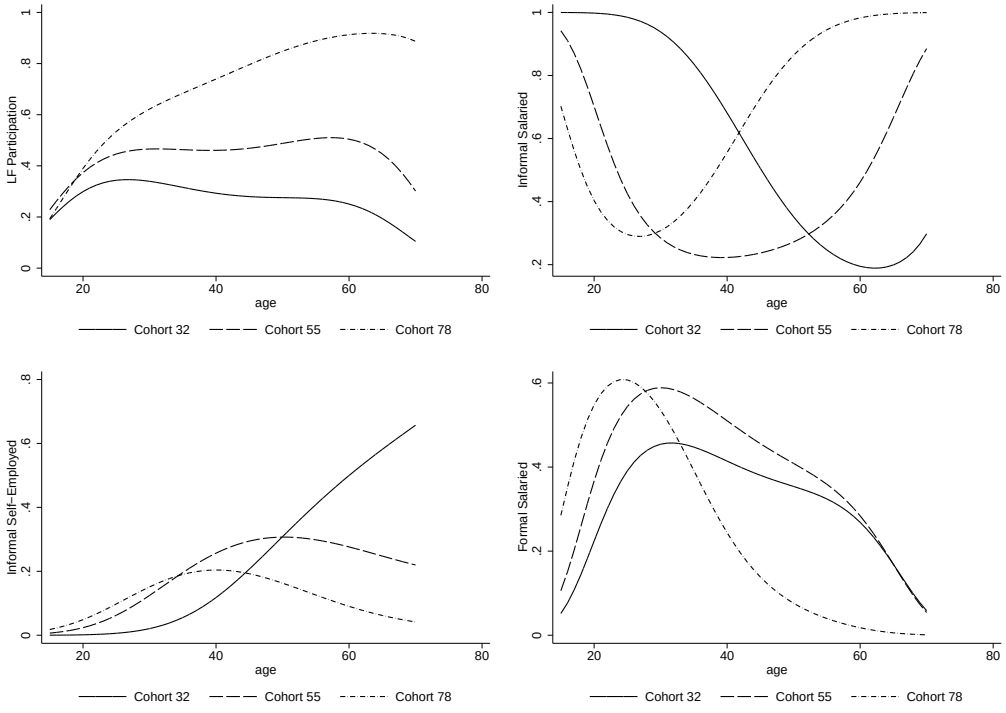

Figure A.19: Age Decomposition II-Female

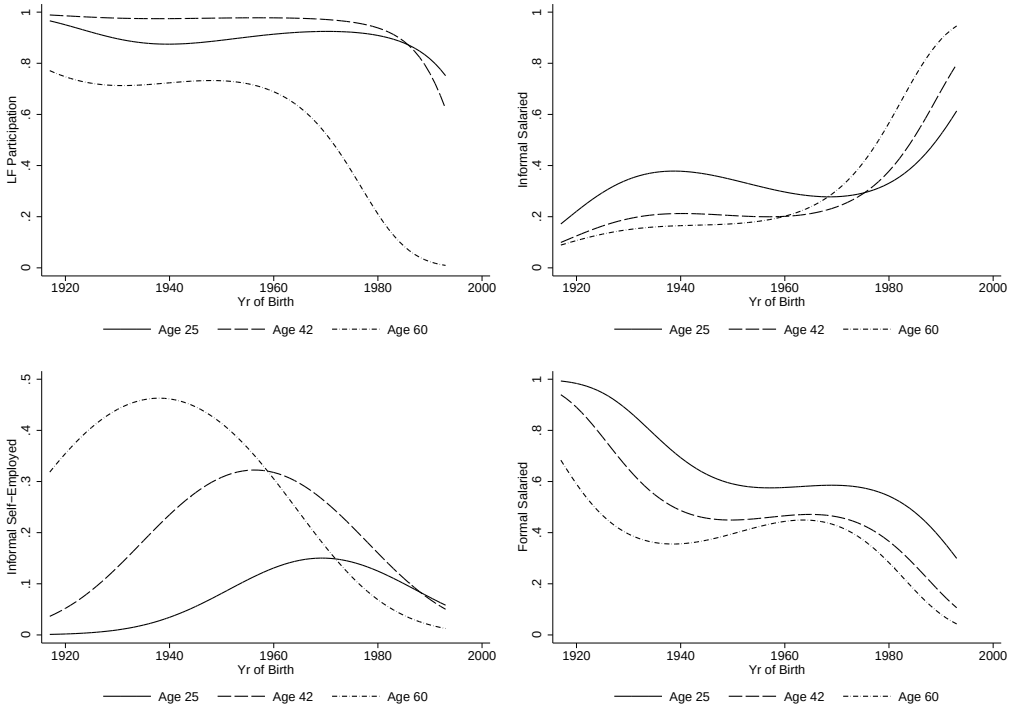

Figure A.20: Cohort Decomposition II-Male

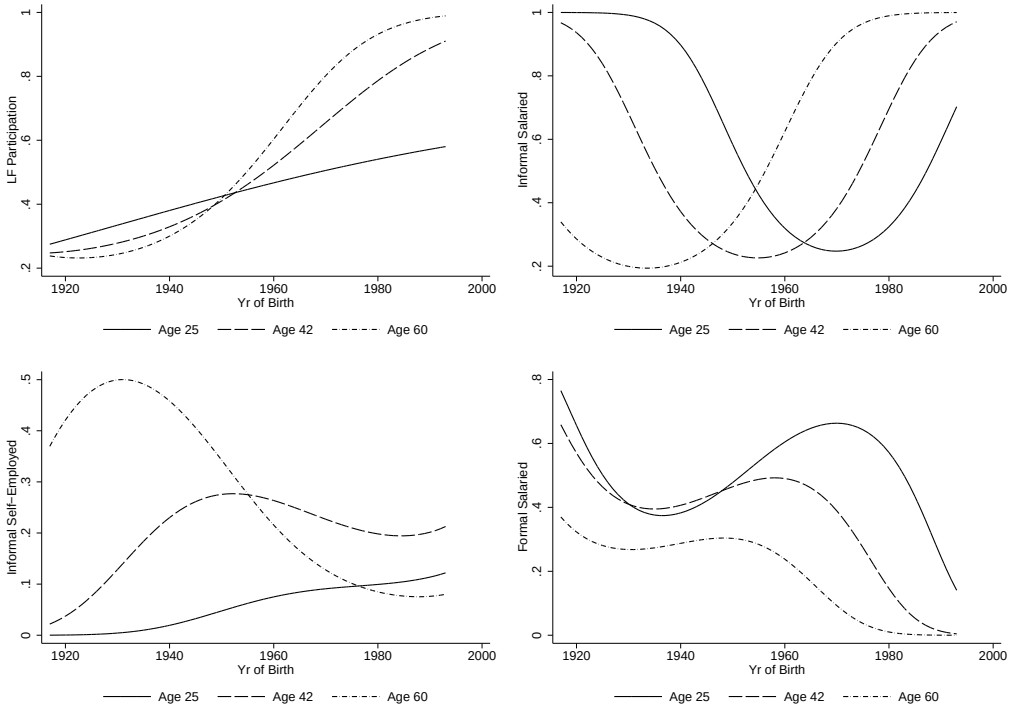

Figure A.21: Cohort Decomposition II-Female

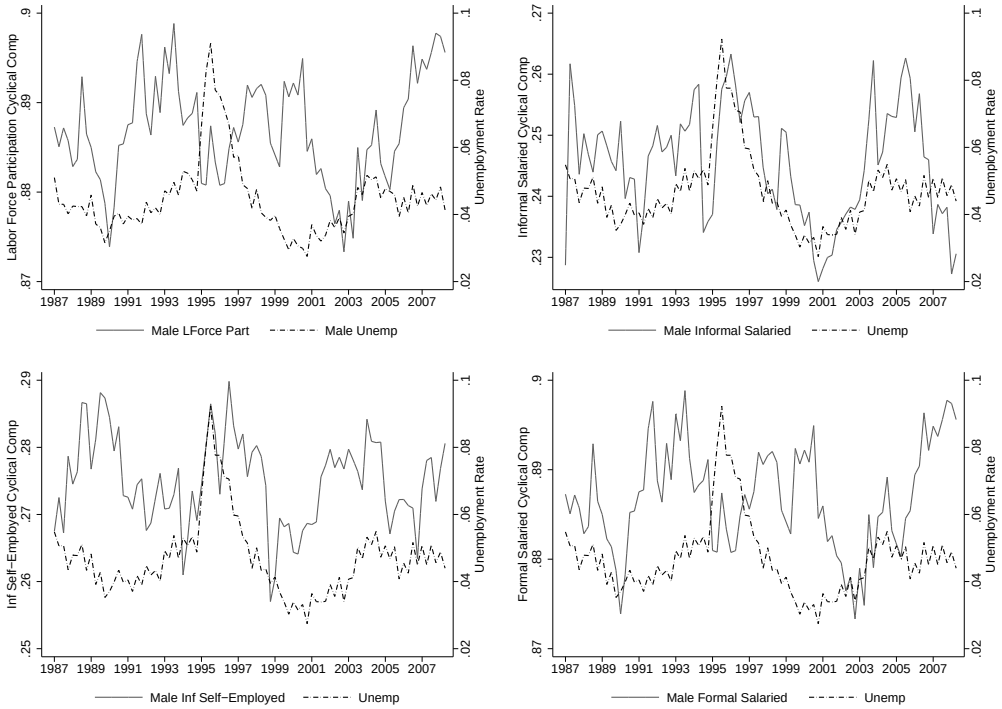

Figure A.22: Cyclical Decomposition II-Male

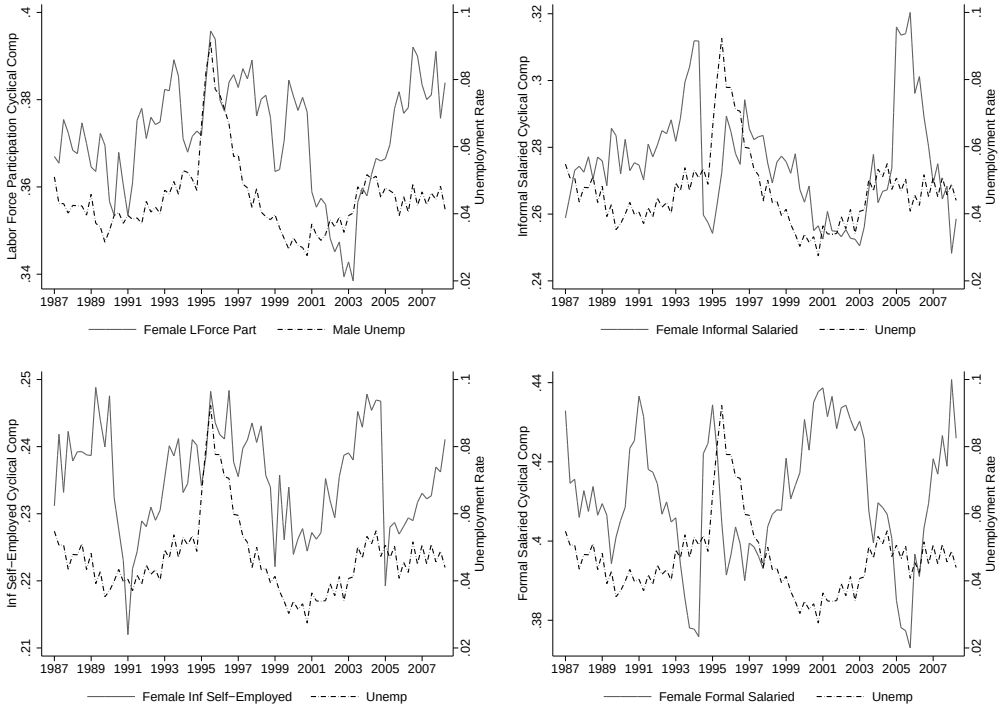

Figure A.23: Cyclical Decomposition II-Female

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