

Countercyclical School Attainment and Intergenerational Mobility

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Introduction

- Schooling decisions are endogenous to contemporaneous economic conditions
 - Booms increase the opportunity costs of schooling, but also the ability to pay for it
 - Opportunity cost considerations tend to dominate – schooling mostly counter-cyclical (Charles et al. (2015), Aparicio (2016), Gaini et al. (2013a), Dellas and Sakellaris (2003), Atkin (2016))
- Two questions:
 - Question 1: Are the elasticities of schooling enrollment different for children from low or high parental background ?
 - Question 2: In case they are, do these differences have longer run consequences in terms of intergenerational mobility – as measured by IG occupational mobility?

This paper: literature and contributions

- At the crossroads of two literatures:
 1. Literature on “scarring effect” of recessions: typically looks at the impact of graduating in the midst of a recession, **holding educational choice constant**
 - Oreopoulos et al. (2012); Gaini et al. (2013a); Cockx and Ghirelli (2016)
 2. Literature on “enrollment” along the business cycle: investigates the impact of recession on enrollment, thus focusing on **short-run outcomes**
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- Here we consider economic conditions when individuals need to choose between dropping-out and following a post-compulsory curriculum. We therefore examine :
 1. how the business cycle affects **educational enrollment** and **attainment**
 2. how the business cycle and the resulting educational decision **translate into later life outcomes**
 3. how this effect varies **between high and low parental background students** and how in turn that **affects intergenerational mobility** – using a comparable measure of occupational outcomes across generations.

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 1. Using data on young adults (17 years old), study enrollment differences by parental background
 2. Using data on older adults (26-48 years old), study educational attainment and occupational outcome differences by parental background.
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Summary of findings

- Enrollment is counter-cyclical wrt local economic conditions
- Children of blue-collar workers are **more counter-cyclical** in terms of enrollment and attainment. Cohorts facing worse economic conditions at the end of compulsory education have a **lower parental background gap in enrollment and attainment**
 - +1pp in u. rate \Rightarrow reduction of the gap $\approx 6\%$ (enrollment) and $\approx 8\%$ (attainment) of the sample average.

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 - +1pp in u. rate \Rightarrow reduction of the gap \approx 6% (enrollment) and \approx 8% (attainment) of the sample average.
- Analogous pattern in the labor market: the parental background gap in the **probability of being in a white-collar occupation** is lower for those cohorts too (between 1% and 1.5% lower)
 - These differences appear largely explained by differences in educational attainment

Data

- French Labor Force Survey, 1982-2014
 - **Enrollment** regressions: Unit of observation - Individuals aged 17, with parental background information (occupation code)
 - Born between 1966 and 1996, aged 16 between 1982 and 2012 ($N \simeq 30000$)
 - **Attainment** regressions: Unit of observation - Individuals aged 26 or more (up to 48 years old), with parental background information using retrospective information on school attainment (degree) and occupation.
 - Born between 1966 and 1988, aged 16 between 1982 and 2004 ($N \simeq 190000$)
- Exploit heterogeneity in (96) département unemployment rates at the end of compulsory education
 - Administrative data on local unemployment since 1982
 - Unemployment rate based on département of birth

Descriptives - enrollment at age 17, by parental occupation

Table: Parental Occupation measure and covariates at age 17

	All	Blue Collar Father	White Collar Father
School Enrollment, age 17	0.825 (0.380)	0.766 (0.423)	0.912 (0.283)
School Enrollment, age 16	0.897 (0.304)	0.859 (0.348)	0.952 (0.213)
Year of birth	1979.6 (9.059)	1979.0 (8.892)	1980.6 (9.215)
Local Unemp. rate at age 16 (birth)	8.817 (2.155)	8.925 (2.188)	8.659 (2.096)
Local Unemp. rate at age 16 (residence)	8.783 (2.192)	8.909 (2.217)	8.599 (2.143)
Observations	27453	16290	11163

Standard deviation in parenthesis

Descriptives - by parental occupation

Table: Parental Occupation measure and covariates

	All	Blue Collar Father	White Collar Father
Post Compulsory Education	0.837 (0.370)	0.785 (0.411)	0.927 (0.260)
University Degree	0.400 (0.490)	0.267 (0.443)	0.634 (0.482)
White Collar	0.441 (0.497)	0.316 (0.465)	0.663 (0.473)
National Unemp. rate at age 16	8.809 (1.043)	8.780 (1.040)	8.862 (1.047)
Local Unemp. rate at age 16	8.517 (2.138)	8.553 (2.127)	8.453 (2.157)
Year of birth	1973.4 (5.636)	1973.1 (5.593)	1973.7 (5.691)
Observations	198063	126505	71558

Standard deviation in parenthesis

Baseline Specification

$$\text{Outcome}_i = \beta_0 + \beta_1 \text{High Parental Background}_i + \beta_2 U_{16,i}^{bplace} \\ + \beta_3 (U_{16,i}^{bplace} \times \text{High PB}_i) + \beta_4 X_i + \epsilon_i$$

- Outcomes:
 1. Educational Mobility: Enrollment (students, age 17), Post Compulsory and College Degree (individuals older than 26)
 2. Occupational Mobility: White Collar Occupation (individuals older than 26)
- Sources of variation:
 - Within département variation (using département of birth)
 - Most demanding specification: (Dépt × Parental Background) FE + (Dépt × Cohort) FE
 - s.e. clustered at the département level

School Enrollment

Table: Training and departmental unemployment rate, dépt of birth, at 16

	(1)	(2)	(3)	(4)
$U_{16,d}^{bpl}$	0.730*** (0.205)	1.159*** (0.280)	0.889** (0.351)	
$U_{16,d}^{bpl} \times \text{High PB}$		-1.107*** (0.336)	-1.104*** (0.326)	-0.945*** (0.253)
Dept \times PB FE	✓	✓	✓	✓
Cohort FE			✓	
Dept \times Cohort FE				✓
Observations	27453	27453	27453	27201

- Parental background gap is $\simeq 9\%$ lower for cohorts facing an unemployment rate 1pp higher (col 4)
- Low parental background are relatively most reactive around age 18. After, that the gap reverses and then vanishes around age 30 – [Graph](#)

Accounting for cross-département mobility [▶ Back](#)

- Results might reflect differential mobility between birth and age 16 by parental background. [▶ current residence versus place of birth unemp](#)
- Instrument unemployment at département of residence with unemployment at département of birth

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Table: Training and departmental unemployment rate, dépt of birth, at 16

	(1)	(2)	(3)	(4)
$U_{16,d}^{cur}$	0.794*** (0.223)	1.232*** (0.309)	1.007** (0.435)	
$U_{16,d}^{cur} \times \text{High PB}$		-1.158*** (0.370)	-1.162*** (0.354)	-1.024*** (0.279)
Dept \times PB FE	✓	✓	✓	✓
Cohort FE			✓	
Dept \times Cohort FE				✓
K-P stat	7261	1655	397	5521
Observations	27430	27430	27430	27181

School Attainment

Table: Post-compulsory schooling and departmental unemployment rate at 16

	(1)	(2)
	PostComp	PostComp
$U_{16,d}^{bpl}$	0.568*** (0.163)	
$U_{16,d}^{bpl} \times \text{High PB}$	-1.300*** (0.141)	-1.214*** (0.0962)
Adjusted R^2	0.054	0.054
Cohort FE	✓	
Dept \times PB FE	✓	✓
Dept \times Cohort FE		✓
Mean Gap in Outcome	14.2 pp	14.2 pp
$\hat{\beta} \times \frac{U_{\text{pctile}_{25}}^{75}}{\text{gap}}$	-25.6%	-23.9%
Observations	198063	198046

- Reduction in parental background gap of $\simeq 8.5\%$ for cohorts facing an unemployment rate 1pp higher (col 2).
- We find a similar pattern for college and UR at age 18 [▶ College and UR at age 18](#)

IGM - Occupation

- Educational mobility is higher for cohorts choosing post-compulsory education in bad economic conditions
- Does occupational mobility also increase - do these education differences pay off in the labor market?
 - More people getting educated in these cohorts might lower the returns to education, reinforcing the mobility component of recessions
 - *Compliers* might be students with below average returns
- We replicate the previous exercise, looking at children occupation as our outcome variable
 - With additional controls:
 - Age at survey \times parental occupation FE: accounts for the difference in life-cycle occupational profile by background (Lee and Solon, 2009)
 - Cohort \times year of survey FE : accounts for measurement error whereby educational or occupational status is increasingly overstated overtime.

Table: Occupational status and departmental unemployment rate at 16

	(1)	(2)	(3)
	White Collar	White Collar	White Collar
$U_{16,d}^{bpl}$	-0.0564 (0.220)	-0.00342 (0.214)	
$U_{16,d}^{bpl} \times \text{High PB}$	-0.480** (0.198)	-0.576*** (0.207)	-0.540*** (0.146)
Adjusted R^2	0.123	0.130	0.130
Dept \times PB FE	✓	✓	✓
Cohort FE	✓	✓	
Cohort \times Dept FE			✓
Age \times PB FE		✓	✓
Cohort \times Survey FE		✓	✓
Mean Gap in Outcome	34.7 pp	34.7 pp	34.7 pp
$\hat{\beta} \times \frac{U_{25}^{pctile75} - U_{25}^{pctile25}}{\text{gap}}$	-3.9%	-4.7%	-4.4%
Observations	198109	198109	198092

- Reduction in parental background gap of about $\simeq 1.5\%$ for cohorts facing an unemployment rate 1pp higher (mean gap in outcome 34.7 pp)

Education as a possible channel

Table: Occupational status and departmental unemployment rate at 16

	(1)	(2)	(3)
	PostComp	White Collar	White Collar
$U_{16,d}^{bpl} \times \text{High PB}$	-1.280*** (0.110)	-0.540*** (0.146)	-0.144 (0.150)
PostComp			31.05*** (0.666)
Adjusted R^2	0.055	0.130	0.180
Dept \times PB FE	✓	✓	✓
Cohort \times Dept FE	✓	✓	✓
Age \times PB FE	✓	✓	✓
Cohort \times Survey FE	✓	✓	✓
Mean Gap in Outcome	14.2 pp	34.7 pp	34.7 pp
$\hat{\beta} \times \frac{U_{\text{pctile}_{25}}^{75}}{\text{gap}}$	-25.2%	-4.4%	-1.2%
Observations	198046	198092	198046

- Controlling for educational attainment drives the interaction term to zero.
- Similar results when relating college education to unemployment at age 18.

Robustness check: accounting for mobility in regressions on long-run outcomes

- For the LR sample (adults age 26 to 48) we know place of birth but not place of residence at age 16.
- But we know both place of birth and residence for individuals age 16 of the same cohorts.
- We use Two Sample 2SLS estimator to retrieve the effect of unemployment at place of residence at age 16 on LR outcomes. [▶ Explanatory graph](#)
- Results very similar to “reduced form” results using birth place unemployment – consistent with enrollment results. [▶ TS2SLS table](#)

Conclusion

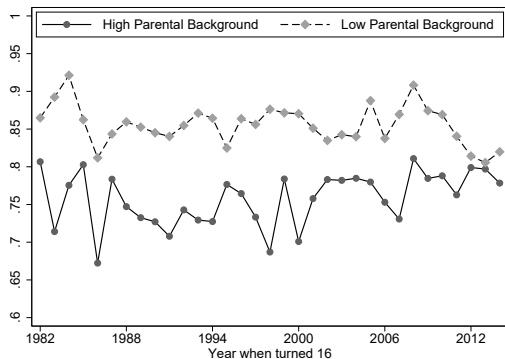
- Schooling is relatively more counter-cyclical for children of low-skill parents
 - Cohorts facing a higher unemployment rate at the end of compulsory school have a lower parental background gap in attainment (about 8.5% lower for 1pp more of unemployment)
- This persists in the labor market: the parental background gap in being employed in a white-collar job for those cohorts is lower as well (about 1% lower for 1pp more of unemployment at age 16)
 - This is largely explained by differences in educational attainment
 - This does not appear driven by differential spatial mobility between birth and age 16 by parental background
- Preliminary results and possible further steps:
 - Within parental occupation, we can distinguish **public versus private sector employees** – income of the former is less cyclical – isolating the cost of opp. channel: Children of public blue-collar workers appear relatively more counter-cyclical.
 - Constructs series for **skill-specific local labor demand**: job destruction by sector \times occupations
 - Distinguish between **temporary versus permanent shock** to unemployment.

Additional material

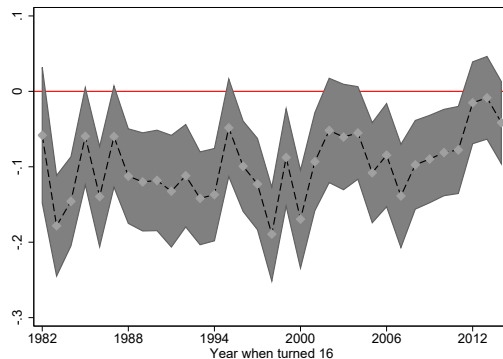
Cross-departement mobility between birth and age 16

▶ Back

Association between **birth place** and **place of residence** unemployment rate at 16 is stronger for low parental background – due to lower geographical mobility.



Regression of U_{16}^{cur} on U_{16}^{bpl}



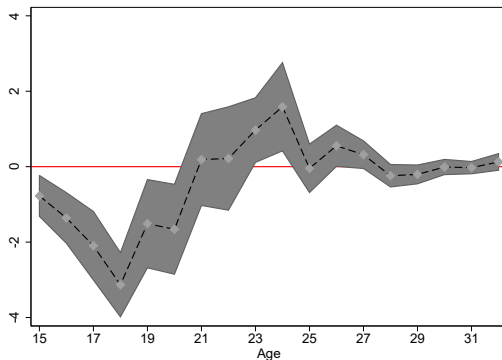
Difference in coefficients

Note: Left panel: Each dot corresponds to the coefficient of cohort-specific OLS regression of U_{16}^{cur} on U_{16}^{bpl} . Right panel: Each dot is the difference of high minus low parental background coefficients.

Diff. effect of local unemp. rate on enrollment for different ages ▶ Back

- 16 is a key age: end of compulsory schooling. But enrollment is likely to be affected by economic conditions later as well.

$$\text{Enrolled}_{\text{age}+1,i} = \beta_0 + \beta_1 \text{High PB}_i + \beta_2 U_{\text{age},i}^{\text{curr}} + \beta_3^{\text{age}} (U_{\text{age},i}^{\text{curr}} \times \text{High PB}_i) + \beta_4 X_i + \epsilon_i$$

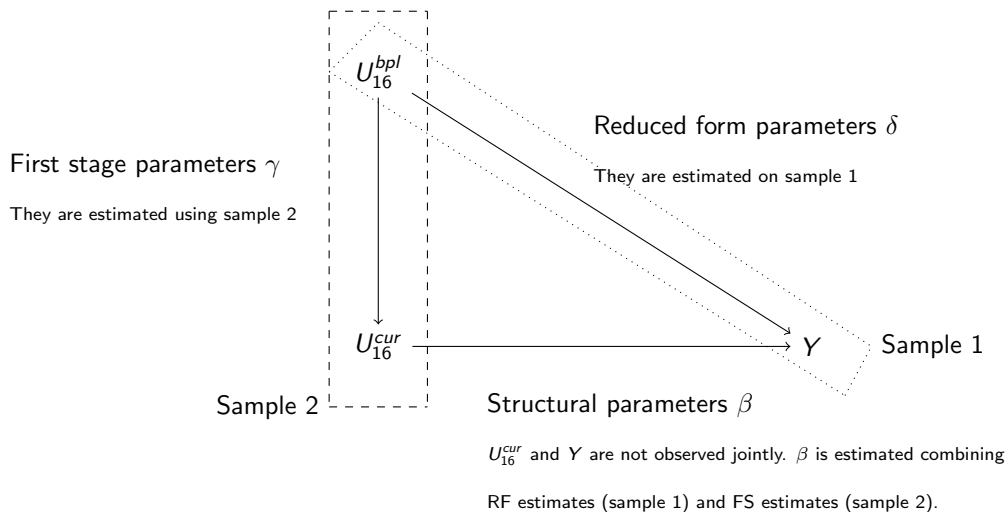


- We find that low PB students are more counter-cyclical than high PB until age 20 and more pro-cyclical at age 23 and 24. Differences vanish beyond.

Accounting for differential mobility in attainment equations: Two-Sample 2SLS

▶ Back

Figure: Illustration of the Two-Sample 2SLS estimation



Notes: Sample 1 includes individuals above 26 at the time of survey. Sample 2 includes individuals who are 16 at the time of survey belonging to the same cohorts as sample 1. We observe birth place for both samples – and therefore deduce unemployment at age 16 in birthplace. However, we observe long-term outcomes (highest degree, occupation) for sample 1 only and we observe current location at age 16 for sample 2 only.

Two-Sample 2SLS: results

▶ Back

Table: Two-Sample 2SLS estimates of the effect of departmental unemployment rate at 16 on post Compulsory and Occupational

	(1)	(2)	(3)
	PostComp	White Collar	White Collar
$U_{16,d}^{cur} \times \text{High PB}$	-1.479*** (0.132)	-0.624*** (0.178)	-0.166 (0.182)
Post Comp			31.02*** (0.643)
Dept \times PB FE	✓	✓	✓
Dept \times Cohort FE	✓	✓	✓
Age \times PB FE	✓	✓	✓
Cohort \times Survey	✓	✓	✓
Observations	198046	198092	198046

[1] Notes: Bootstrapped standard errors (500 replications) in parentheses – clustered at the département \times white collar father level. All regressions control for gender. Each replication of the bootstrap entails the estimation of both the first and second stages of the TS-2SLS procedure.

Table: College degree and departmental unemployment rate at 18

	(1)	(2)
	College	College
$U_{18,d}^{bpl}$	-0.376* (0.200)	
$U_{18,d}^{bpl} \times \text{High PB}$	-0.552** (0.219)	-0.513*** (0.150)
Adjusted R^2	0.159	0.159
Cohort FE	✓	
Dept \times PB FE	✓	✓
Dept \times Cohort FE		✓
Mean Gap in Outcome	36.7 pp	36.7 pp
$\hat{\beta} \times \frac{\Delta U_{25}^{25}}{\text{gap}}$	-4.5%	-4.2%
Observations	195204	195200

Table: Occupational status and departmental unemployment rate at 18

	(1)	(2)	(3)
	College	White Collar	White Collar
$U_{18,d}^{bpl} \times \text{High PB}$	-0.572*** (0.150)	-0.521*** (0.186)	-0.211 (0.168)
College			54.9*** (0.519)
Adjusted R^2	0.160	0.130	0.376
Dept \times PB FE	✓	✓	✓
Cohort \times Dept FE	✓	✓	✓
Age \times PB FE	✓	✓	✓
Cohort \times Survey FE	✓	✓	✓
Mean Gap in Outcome	36.7 pp	34.7 pp	34.7 pp
$\hat{\beta} \times \frac{U_{\text{pctile}_{25}}^{75}}{\text{gap}}$	-4.7%	-4.2%	-1.7%
Observations	195200	195238	195200

Descriptives - by adult children's occupation

Table: Occupation measure and covariates

	All	Blue Collar	White Collar
Post Compulsory Education	0.837 (0.370)	0.742 (0.438)	0.957 (0.204)
University Degree	0.400 (0.490)	0.145 (0.352)	0.723 (0.448)
White Collar Father	0.361 (0.480)	0.218 (0.413)	0.543 (0.498)
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Local Unemp. rate at age 16	8.517 (2.138)	8.561 (2.130)	8.461 (2.148)
Year of birth	1973.4 (5.636)	1973.1 (5.652)	1973.7 (5.601)
Observations	198063	110672	87391

Standard deviation in parenthesis

- *Blue collar*: ouvriers, employees; *White collar*: professions intermediaires and cadres