School Dropout in Europe: Trends and Drivers

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Abstract

- This paper analyses the trends and factors underlying school dropout in Europe. Dropout rates are defined as the percentage of the population aged 18-24 with at most lower secondary degree and not in further education or training.
- Concerns about school dropout are based on potential adverse consequences with respect to perspectives on the labour market and participation in society.
- Current dropout rates are dramatically high in Spain, 31.9%, and Portugal, 35.4%, well above the EU27 average of 14.9%. Most countries reduced their dropout rates over the period 1997-2007, except for Spain.
- We use the variation in cross-country/over time characteristics to explain the different evolution of dropout rates.
- We find that the structure of upper secondary education matters for dropout since regions with a higher proportion of vocational studies experience a lower incidence of early school-leavers.
- We also observe more dropout in regions with a relatively high-share of employment in non-technical services or in construction, which suggests that the industrial composition of the economy is an important factor.

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Maria Gutiérrez-Domènech ("la Caixa") *

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This paper analyses the trends and factors underlying school dropout in Europe. Dropout rates are defined as the % of the population aged 18–24 with at most lower secondary degree and not in further education or training. We find that the structure of upper secondary education matters for dropout since regions with a higher proportion of vocational studies experience a lower incidence of early school-leavers. We also observe more dropout in regions with a relatively high share of employment in non-technical services or in construction, which suggests that the productive model is an important factor.

JEL Classification: I20, J24
Keywords: school dropout, vocational studies, productive model, flexitime

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1 Introduction

School dropout (or early school–leavers) refers to those pupils aged below certain age that leave school before reaching the minimum level of education needed for well-functioning in the labour market. Following the statistical criteria of Eurostat and OECD, the dropout rate is commonly measured as the percentage of the population aged 18–24 with at most lower secondary degree and not in further education or training. In this paper, we analyse the variation of early school–leavers across regions and time in Europe. This will help identifying some of the main determinants of school dropout and provide useful guidelines for reducing it.

School dropout is considered one of the major problems of education systems and is currently high on the policy agenda in most OECD countries. This indicator is a barometer of the health of a society and the skill level of its future workforce (Heckman and LaFontaine (2007)). Concerns about school dropout are based on potential adverse consequences with respect to perspectives on the labour market and participation in society (unemployment, social exclusion or participation in criminal activity).[1] Therefore, apart from private costs in terms of lower expected income, social costs associated with school dropout can be large. Moreover, since it is almost universally accepted that a country's economic performance depends strongly on the stock of skills and qualifications possessed by its workforce, it is important to understand the factors underlying dropouts.

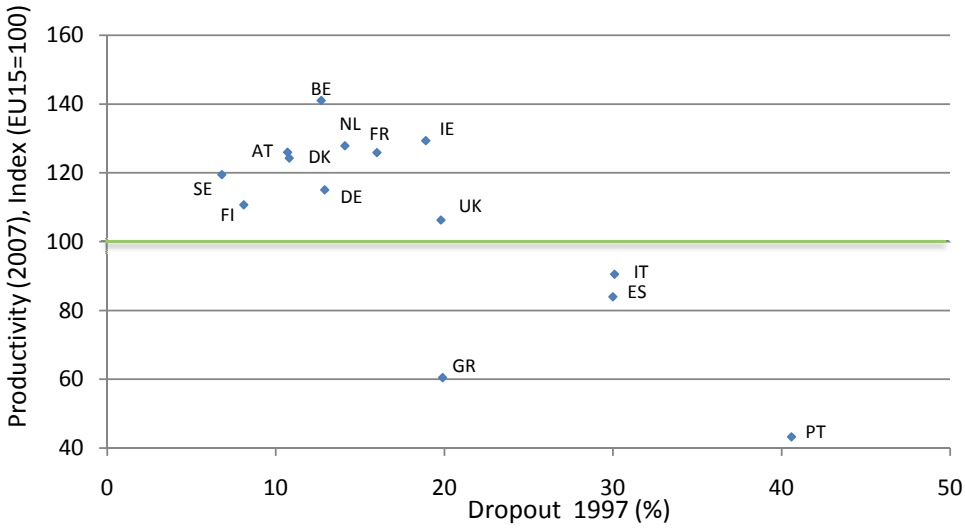
On these grounds, Figure 1 shows the correlation between dropout rates and productivity per hour across several countries in Europe (EU15). We lag dropout rates ten years since the incidence of school abandonment will affect productivity after some time once these individuals are completely within the working age band.[2] We observe that Spain and Portugal are the countries with the lowest productivity, well below average, and with the highest incidence of early school–leavers, more than 30%.

The Spanish case is remarkable. Although part of its poor performance in labour productivity is explained by its growth model specialised in low productivity industries (e.g. construction and tourism), empirical evidence shows that since the mid–2000s, 2/3 of the difference in labour productivity between Spain and the EU15 is accounted for by within industry differences (Mas et al. (2008)). The delay in the

[1] For example, Sum et al. (2009) find higher rates of joblessness and jailing for High School dropouts in the US.

[2] Contemporaneous dropout and productivity rates show a similar correlation.

Figure 1: Productivity and Early School–Leavers by Country



Note: Dropout: % of the population aged 18–24 with at most lower secondary education and not in education. Productivity: gross value added/hours (engaged) worked, EU15=100; Portugal (2006).
Source: European Labour Force Survey (Eurostat) and EU KLEMS database.

use of new technologies (Information Communication Technology or ICT) in Spain has clearly contributed to the differences across countries in productivity within the same industries. One of the reasons why the adoption of ICT in Spain is low is its high volume of school dropout (for other aspects see Felgueroso and Jiménez-Martín (2009)). This suggests that a reduction of the incidence of early school-leavers would raise the use of ICT, which in turn would increase productivity in Spain (and similarly, in Portugal).

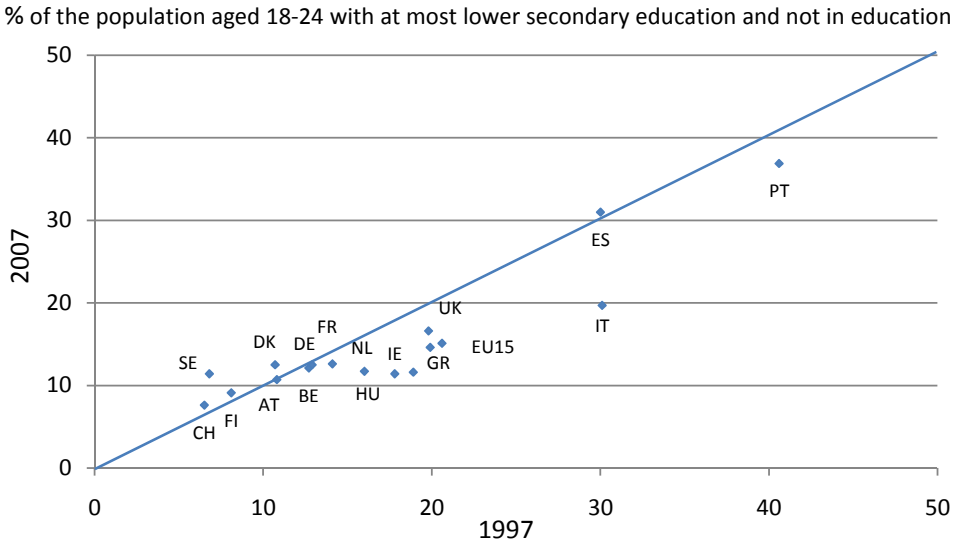
The rest of the paper is as follows. Section 2 describes the trends of dropout in Europe. Section 3 explains the drivers of early school abandonment. In Section 4, we analyse the factors behind the differences in dropout rates across Europe. Finally, Section 5 summarises the key results.

2 Trends of school dropout in Europe

This section describes the evolution of dropout in various countries using the European Labour Force Survey (ELFS) for the period 1997–2009.[3] Current dropout rates are dramatically high in Spain, 31.9%, and Portugal, 35.4%, well above the EU27 average of 14.9% (2008). More importantly, Figure 2 shows that most countries

[3]More information about the data can be read in Appendix A.

Figure 2: Evolution of Early School–Leavers by Country (1997, 2007)



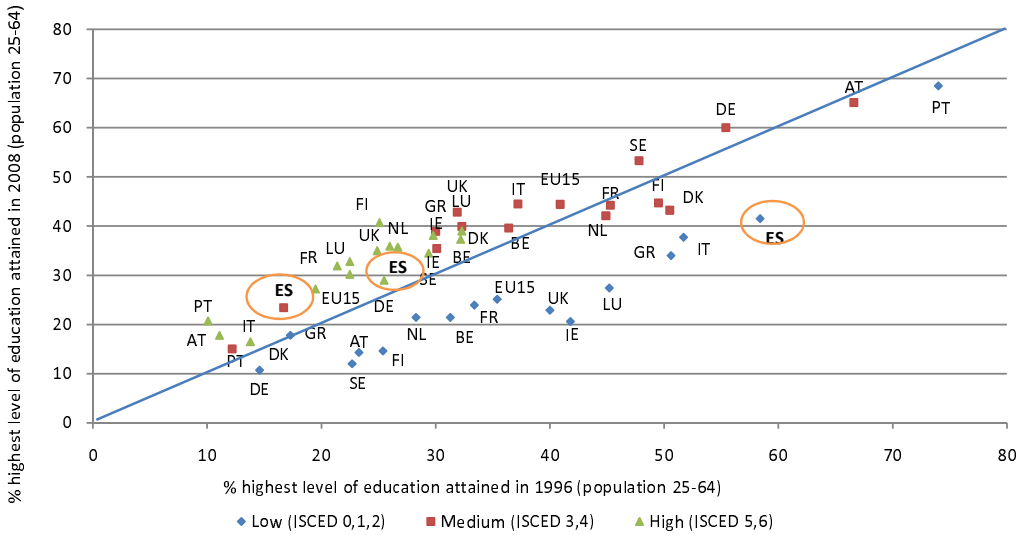
Source: European Labour Force Survey (Eurostat).

reduced their dropout rates over the period 1997–2007, except for Spain and the Scandinavian countries. In fact, Spanish dropout rates decreased from 70% in 1977 to 30% at the end of the 1990s, but remained at roughly 30% ever since. By contrast, Italy and Portugal, the two other EU15 countries with very high incidence of school abandonment, improved their rates over the last ten years. This is especially the case for Italy, whose dropout rate declined ten points. Ireland also experienced a substantial decline in school abandonment over this period, around 7 points, and the rates in UK, Greece and the Netherlands progressed as well around five points. Despite having experienced a slight increase in the prevalence of dropout, the Scandinavian countries continue to hold the lowest dropout rates in Europe.

One of the results of a large number of early school leavers in a region can be the generation of a dual composition of the population by educational levels, which consists of a high share of individuals with high and low educational attainment and by a low share of medium attainment. As shown in Figure 3, Spain is clearly characterised by this dual composition. Although the fraction of low educated people decreased between 1996 and 2008 (about 17 percentage points), Spain remained well behind other countries (Portugal, Italy and Greece).

Moreover, Figure 3 shows that the proportion of population in Spain with medium degree continues to be amongst the lowest in Europe, despite having increased around 7 percentage points over this period. By contrast, the share of highly educated individuals evolved very favourably (around 10 percentage points) and it is

Figure 3: Composition of the Population by Educational Levels in EU 15 (population aged 25–64, 1996–2008)



Notes: Lower level corresponds to the % of population with at most lower secondary education; higher level means the % of population with tertiary education (first or second stage).
Source: European Labour Force Survey (Eurostat).

currently among the highest, certainly above the EU 15 average. Hence, this data reveals that Spain was quite successful in achieving a large share of population with tertiary qualifications, but did not manage to shift the fraction from low to medium (Felgueroso and Jiménez-Martín (2009)). Other northern European countries are better located in this respect. For example, while the Netherlands's share of highly educated population is not far from the Spanish one, its proportion of low educated is much lower.

The composition of the population by educational levels plays an important role in determining a country productivity and livings standards. In fact, studies point out that it is more efficient to devote resources to reach a very large proportion of individuals with secondary education rather than the aforementioned dual composition with a very large number of dropouts and relatively high tertiary rates (World Bank (2005)). Clearly, one way to achieve this would be through the reduction of the incidence of school dropout.

On these grounds it is very useful to identify some of the main determinants of dropout (Section 3). The nature of the education and training system as well as the productive model will influence the level of early school–leavers. Other factors also matter such as the role of the parental involvement and family background. For example, Blondal and Adalbjarnardottir (2009) shows that the quality of the

relationship between parents and their children (authoritative, indulgent, authoritarian or neglectful) seems to better predict the likelihood of the child's staying in school than do specific parental actions that are aimed directly at the child's education such as the adolescents' perception of parents' assistance with homework. Similarly, results in Pereita and Pastor (2000) suggest that family socio-economic status variables as well as the youth labour market conditions are significant factors in determining the probability of dropping out in Spain.[4]

3 Determinants of school dropout

This section describes cross–country/over time factors that may have an impact on the evolution of dropout rates: the role of the educational system, the productive structure, demographic characteristics, flexitime at work and economic cycle conditions.

Learning model

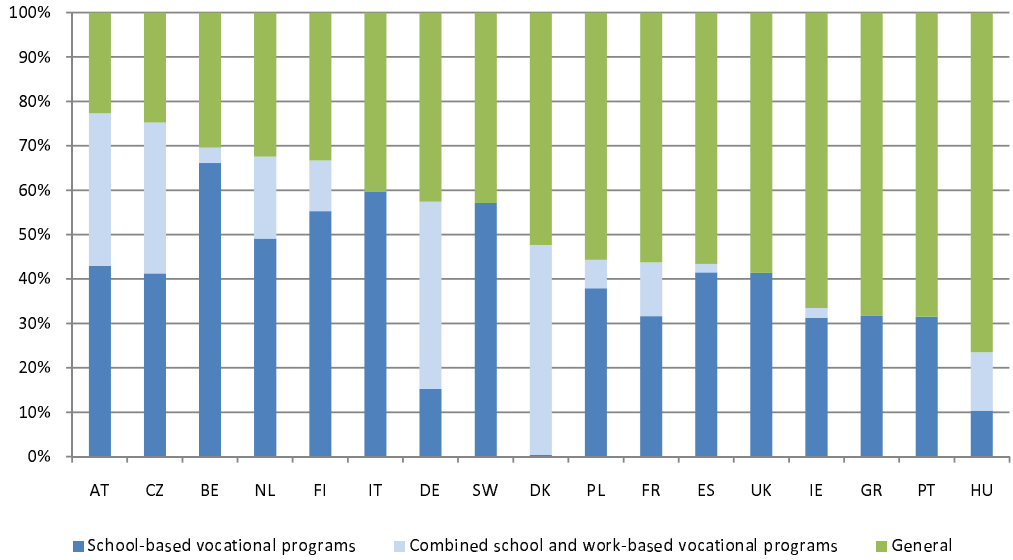
It is difficult to develop a criterion that summarises all the factors that characterise the educational pathways. One possibility is to classify countries regarding the share of upper education that is vocational (and not general), and according to the prevalence of combined work and academic within upper vocational studies.

One of the key aspects in order to boost medium educational levels is a well-functioning vocational training system (Gangl (2003)). Within this framework, the report by Field et al. (2007) emphasises the importance of having a high fraction of upper secondary education in vocational studies rather than in general courses. It is also positive regarding the use of more work-based vocational programs.

Overall, these recommendations are directed to countries whose vocational system is relatively poor. For example, a survey on educational patterns for Spain explicitly mentions that the attractiveness of vocational studies in this country could be raised (OECD (2008)). The report suggests that vocational teaching should be evaluated with respect to their success in the transition of graduates to qualified jobs and that this information should be made available. It also advises to improve general skills within the vocational pathways such as written expression and foreign languages since employers generally complain of graduates' weakness in these competencies. This analysis recommends enhancing the possibility to transfer from upper voca-

[4]Studies also find an association between early school abandonment and drug use (Bray et al. (2000)).

Figure 4: Distribution of Upper Secondary Education (2007)



Notes: Lower level corresponds to the % of population with at most lower secondary education; higher level means the % of population with tertiary education (first or second stage).
Source: OECD (2009) and own calculations.

tional studies to tertiary education since this would make these programs more appealing to students, but without detriment of the university quality standards.

Most studies point out that vocational programs may have the added benefit of dropout prevention. For example, Meer (2007) argues that students with practical abilities are better off with a vocational degree than academically oriented individuals and vice versa. Other authors also find that a well-functioning vocational system is helpful to prevent early school abandonment (Haywood and Tallmadge (1995), Digest (1987), Plank et al. (2005)). Furthermore, there is evidence that countries with an extensive vocational training system will have more positive volatility in the labour market (transitions between education, employment and apprenticeship) than countries without these systems (Brzinsky-Fay (2007)). Although other aspects of the learning model and career paths are very important, the structure of upper education is a key factor.

Within the learning model, another important aspect is the wage returns to vocational education, which may put off students in pursuing their studies if pay is relatively low, especially amongst those with low ability.[5] Countries vary in the wage returns to vocational degrees and this will generate differences in the incentives to

[5]In many countries students enrolling in vocational training tend to be the lowest attainers at the end of compulsory education. For this reason, an evaluation of the returns to vocational education must take into account certain ability bias and the process of self-selection, and it is important to find the right counterfactual in comparing labour market outcomes.

Table 1: The Role of the Educational System (2007)

Distribution of Vocational Programs (Weight of Work-based)	Distribution of Upper Secondary Education Weight of Vocational Studies		
	High	*Medium*	*Low*
High	Austria Czech Republic	Germany, Denmark France	
Medium	Belgium, Netherlands Finland	Poland Spain	Ireland Hungary
Low	Italy	Sweden	United Kingdom Greece, Portugal

Source: Field et al. (2007) and own calculations.

study further. That is, it is possible that regions where there is no income premium of undertaking vocational studies compared to discontinuing studying, more at-risk students will dropout. Data sources are often incomplete and do not allow for precise country comparison with respect to vocational returns but case studies can help to observe those differences. Studies typically show that individuals with vocational qualifications receive higher wages than those without post-school qualifications, especially early school leavers though there are some exceptions showing little labour market value of certain vocational qualifications (Hoeckel (2008)). For example, in the UK, McIntosh and Garrett (2009) find that on average individuals with intermediate vocational qualifications earn less than individuals without, although they emphasise that such comparisons are affected by the unobserved characteristics of the individuals in the two groups, as well as by the nature of the jobs that they do.

Figure 4 shows that there are large differences across countries in the distribution of enrolment by program orientation in the upper secondary education. It distinguishes between general education, combined school and work-based vocational/technical programmes and only school-based vocational/technical programs. This data allows to classify countries in terms of their enrolment patterns in upper education in 2007 (Table 1). On one hand, we distinguish three groups regarding the weight of vocational studies on the upper secondary level: high if the share of vocational education is above the third higher percentile; medium if the rate is in the middle third percentile and low if it is below that.

On the other hand, we also differentiate three groups in terms of the share of combined school and work-based in the overall enrolment of students in vocational programs (the alternative being school-based only): high if the share is located in the last third percentile; medium if the share is in the middle third percentile and low

(or nil) if it is below. Following both dimensions of classification, Austria and Czech Republic are characterised by a high proportion of vocational studies in upper education and they also have a high rate of vocational programs that combine school and work. Other countries with a relatively high prevalence of vocational studies are Belgium, the Netherlands and Finland. On the lower spectrum are located Greece, United Kingdom and Portugal.

Over the period 1997–2008 most countries show a relatively stable pattern in the distribution upper education, although data is rather volatile. However, it is noticeable the fact that the share of vocational studies in upper education displays an upward trend in Portugal, Ireland and Spain. The increase of the share is more than ten percentage points in the last two countries. This upward trend might have contributed to the decrease in dropout in Portugal and Ireland. For the Spanish case, it is likely that other factors working in the opposite direction may have canceled out the positive effect of increasing the relative weight of vocational training. In Italy, data do not reflect large changes in this variable, although recently there have been efforts to raise the possibility for students to choose vocational courses organized by corporations or company boards instead of following the traditional school courses (Roberti (2009)). The latter may have helped towards the progress of school dropout in this country.

In order to observe the association between the distribution of upper secondary education and the incidence of dropout we use as covariate the enrolling rates in upper education over time and across country provided in the OECD: *Vocational Studies over Upper Education (%)* and *Combined School and Work-based Vocational Programs (%)*.

In determining the final allocation of upper secondary education, the supply of the different courses also matters. In this sense, government intervention may be necessary to correct for failure in training markets deterring potential firms to participate in *Combined School and Work-based Vocational Programs*. For example, Hasluck (2004) argues that in the UK costs are not the main barriers for employers engagement in apprenticeship training. Instead, the lack of awareness of the programme, concerns about relevance of specific qualification frameworks, lack of interest in work-related training among young people and the quality of applicants for apprenticeship training are more important.

Our attempt for classifying the educational system is in line with the model described in Hannan et al. (1996). This paper organises the system on the basis of two

dimensions: the degree of differentiation between academic and vocational tracks and the standardisation of their curriculum design and content. Standarisation refers to the uniformity of standards, for example with respect to curricula and school-leaving qualifications, across an education system. Transitions out of school tend to be smoother in standardised systems because employers can rely on the information in (standardised) certificates (Raffe (2008)). Another element is the differentiation of educational pathways, especially at the upper-secondary level according to: the scale of participation in vocational compared with general education; nature of vocational pathway (school-based or work-based or apprenticeship); occupational specificity; and the level of transferability between general and vocational pathways.

Table 2: A typology of Education/Training Systems

		Degree of Differentiation		
		High	*Medium*	*Low*
Degree of Standarisation	*High*	Germany, Netherlands	England, France, Italy	Japan, Ireland, Scotland
	Medium		Spain	
	Low			US, Canada

Source: Hannan et al. (1996).

Productive model

The composition of employment by sectors according to their technology content will affect the incidence of school dropout. We expect that areas with a higher share of employment in relatively low skilled workforce will have a higher level of school abandonment. Similarly, the type of jobs available in the labour market may also have an impact: *Share of Employment in Public Administration (%)*, the proportion of skilled jobs or *Share of Employment in High-tech manuf./services (%)*, the weight of the touristic business or *Share of Employment in Retail services (%)* and the weight of the construction sector or *Share of Employment in Construction (%)*.

The level of job turnover (*Share of Employment in Fix-term Contracts*) could have an effect on school dropout, although the sign could go in both directions. On the one hand, a high fraction of temporary employment, more prevalent within less educated youngsters, may raise the perception of easy access to jobs and hence reduce the willingness to study further. But, on the other hand, it may also strengthen the view that only the very qualified people are able to get a permanent job and therefore increase incentives to continue schooling.

Demographic factors and economic cycle conditions

Demographic characteristics may influence the incidence of early school abandonment since they affect employment competition within various gender/age group. That is, the more qualified are the competitors of youngsters, the more incentives they have to study further. One way to measure this idea would be the ratio between individuals aged within the defined dropout age (18 to 24) and the low-educated population aged 16 to 64 years old (the population holding the education level that they would have if they decided to leave school early).

Another demographic variable that may play a role is the fraction of older workers aged between 50 and 64 in total employment. The idea is that the older the stock of the employment force the more old technologies are likely to prevail, which in turn may reduce incentives for youngsters to study further. Related to this, it also matters the gender educational path dependence stock of low-educated people in the labour market, that is, the proportion of low-educated population of older population aged between 26 and 64 on the total population. Because of data limitations, we summarise the previous ideas with the ratio of young population 15–24 over working age population 15–64 (*Population Share (15–24)/(15–64)*).[6]

Another factor that may determine the willingness to study further could be the current needs in the population for low qualified jobs within the household production. The latter would increase if, for example, more women are at work since this increases the demand for outsourcing housework. One way to measure this could be the *Female Employment Rate (16–64)*. An alternative interpretation of the impact of female employment on dropout would also be possible if there is a relationship between mothers at work and the likelihood of abandoning school (although the sign would be a priori ambiguous).

Studies generally find that dropout is more prevalent in males. Therefore, in order to account for the possibility that dropout in certain regions may be larger because they have a higher proportion of men, we use the share of youngsters that are men (*Male Share (15–24)*).

The state of the general economy may also play a role in the incidence of school dropout and for this reason we include regional *Unemployment rates (%)* and regional *Growth rates (%)* in the analysis. We expect that when unemployment is large, youngsters perceive that there are less job opportunities in the labour market,

[6]We have contemplated other demographic variables such as, for example, the fraction of immigrants over the total number of students. However, data available on the rate of immigrant students over the whole period was rather poor and despite finding the expected negative sign, a relatively large number of observations were lost once added in the analysis.

which increases their willingness to study further (and reduce dropout). Similarly, when unemployment is low, the pool of jobs available is large, and youngsters have poor incentives to study further since they perceive that they can easily find a relatively good job even if they are low educated.

Working time arrangements

From another perspective, working time arrangements is likely to play a role in the incidence of dropout. That is, for example, the possibility for working flexitime is likely to facilitate parents being more involved in the education of their children, which in turn will have an effect on school abandonment. It is also possible that more flexitime facilitates the implementation in the educational system of the *Combined School and Work-based Vocational Programs*. One way to measure this is to look at the *Share of Flexitime at Work* and compare this with the incidence of dropout, once other factors are controlled for.

This exercise is undertaken separately from the rest of the analysis since data on working time arrangements is restricted to the 2004 ad-hoc ELFS. More precisely, we create a variable that tells us the proportion of workers in a region that work under a flexitime system, explore the NUTS regional variation in Europe in year 2004 and analyse the association between working time arrangements and the rate of school leavers (see Appendix A for further details).

Other factors

We add time and country dummies to take into account other characteristics that also matter for the incidence of dropout but they are not included in the regression because the information is not available over the whole period and countries. This will help reducing the potential bias that the exclusion of some regressors may generate on the estimates of the included ones. The fact that the number of observations is relatively small also restricts the amount of regressors that can reasonably be included in the analysis.

Amongst others, one key aspect behind the decision to dropout are the earnings or job perspectives offered by vocational training, which differs across countries. Although we control for the upper secondary school model, we do not have data on the wage premium of vocational studies. Similarly, the wage of dropout, that is, the wage differential between primary and secondary education, is likely to have an effect on the willingness to study further since students calibrate the potential gains of continuing at school.

Another factor that could play a role in the prevalence of dropout is the cost of the course in the sense that higher tuition fees may put off studying further for certain groups of population. On another spectrum, existence of minimum wages may also be relevant since it has been shown in the literature that there is a positive association between minimum wages and high school dropout rates (Crofton et al. (2009)). Countries are also different in the monetary incentives to hire young people and in the degree of school accountability or supervision of the quality of their teaching.

4 Results

This section analyses the variation of dropout rates across Europe using information that differs across country and across time (C*T) as well as across country and across region within the country (C*R).[7] We undertake an OLS regression of the regional dropout rate on the explanatory variables described in the previous section. Results are shown in Table 3 and 4, respectively.

Learning model

With regard to the learning model, we observe in both analysis C*T and C*R that there is a negative association between the share of upper secondary education in vocational training and dropout. That is, regions with a higher percentage of enrolment in vocational studies tend to be relatively more successful in preventing early school abandonment. We also find that there are some gains in using vocational programs that combine school and work training. These results are robust and prevail after the inclusion of other factors and country dummies, and therefore indicate that one way to reduce dropout would be the implementation of a highly qualified vocational system with more work training. As an illustration, it is interesting to compare, for example, the dropout rate that the model estimates for Spain in 2007 (30,6%) with that if Spain had the learning model as Austria (24,6%).[8] In other words, other things being equal, dropout rate in 2007 in Spain would have been six percentage points smaller had this country had a similar learning model as Austria.

[7] The C*T analysis includes 16 countries and 10 years from 1998 to 2007. The regional exercise uses information on 22 countries and 96 regions (some countries, mainly small ones, have data on one region only).

[8] Austria is the country with the largest share of vocational studies in upper education (77,3% in 2007) and one of the countries with relatively more vocational programs that combine school and work (48,7%). The respective numbers for Spain are 43,4% and 44%.

Table 3: Estimation of School Dropout across Time in Europe, Population aged 18-24, 1998–2007

	Coefficient	Std. err.
Learning Model		
Vocational Studies over Upper Education (%)	-0.080**	(0.030)
Combined School and Work-based Vocational Programs (%)	-0.075*	(0.045)
Productive Model		
Share of Employment in Construction (%)	0.577*	(0.346)
Share of Employment in Fix-term Contracts (%)	-0.382**	(0.152)
Demographic Factors		
Female Employment Rate (16–64) (%)	0.564***	(0.147)
Population Share (15–24)/(15–64) (%)	0.894***	(0.204)
Male Share (15–24) (%)	0.237	(0.293)
Cycle Conditions		
Unemployment rate (%)	0.307	(0.198)
Regional Growth rate (%)	0.085	(0.167)
Observations	148	
R-squared	0.98	

*** p<0.01, ** p<0.05, * p<0.1.
Country and Year Dummies.

Productive model

Results also suggest that the productive model matters for the prospects of education since dropout is higher in regions with more employment in relatively less skilled jobs. On these grounds, Table 3 shows that countries with a higher share of labour in construction tend to have a higher rate of dropout. Similarly, we observe in Table 4 that regions with more employment in retail services also have higher prevalence of dropout.[9] By contrast, those with more employment in high technological manufacturing and services tend to have lower dropout rates. The relationship between the incidence of school abandonment and public employment is not significant. In general, these results suggest that a higher specialisation in high technology production system would probably help decreasing school dropout.[10]

The proportion of fixed-term contracts is positive correlated with dropout but once country dummies are included in the regression the sign changes from positive to negative, which suggests that countries with more temporary work are generally those with higher rates of dropout. One hypothesis supporting the negative coeffi-

[9]The classification of employment varies in the two analysis C*T and C*R because of differences in the data available.

[10]Another proxy for the degree of technological development in a region could be the ratio of patents in ICT. But estimates were not significant and this variable was not reported in a relatively large number of regions.

Table 4: Estimation of School Dropout across Regions in Europe, Population aged 18–24, 2004

	(1)		(2)	
Learning Model				
Vocational Upper Education (%)	-0.220**	(0.053)	-0.088	(0.120)
Productive Model				
Share of Employment in Public Administration (%)	-0.298	(0.265)	-0.189	(0.281)
Share of Employment in High-tech manuf./services (%)	-0.937**	(0.446)	-1.028**	(0.408)
Share of Employment in Retail services (%)	0.826**	(0.255)	0.483***	(0.165)
Cycle Conditions				
Unemployment rate (2003) (%)	0.378*	(0.202)	0.320**	(0.129)
Regional Growth rate (2003) (%)	-1.113**	(0.307)	0.152	(0.309)
Working Time Arrangements				
Share of Flexitime at Work	-0.116**	(0.036)	0.254*	(0.133)
Observations	147			
R-squared	0.61		0.75	

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets.
(1) Standard errors clustered by country. (2) Country dummies.

cient would be that, within a country, in years with more uncertainty in the labour market only the very qualified get a job, and this creates incentives to study further.

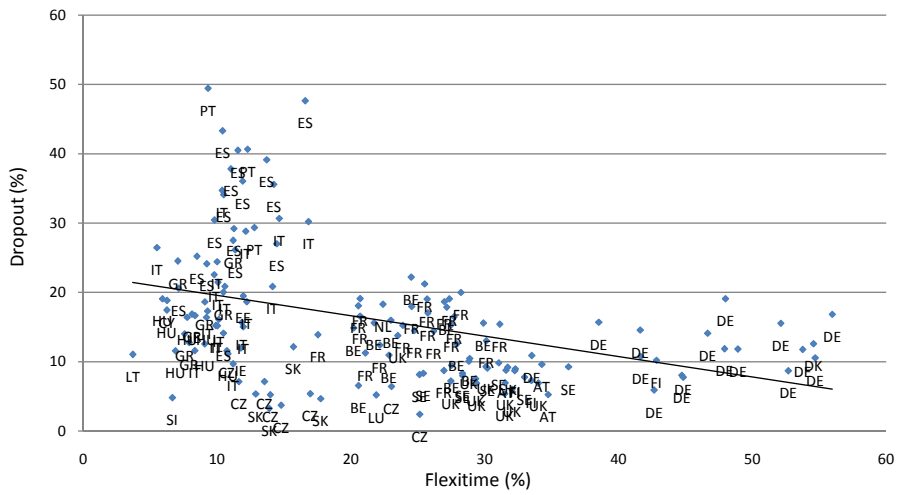
Demographic factors and cycle conditions

Results for the demographic and macroeconomic factors are not clear-cut. We observe higher dropout rates in regions with higher female employment rates. One possibility would be that more women at work generate the need for domestic work, which increases the demand for low skilled jobs (or dropouts). Regarding the age composition of the population, countries with relatively younger population experience higher incidence of dropout, but we do not have a clear explanation for this. The fact that dropout is higher when there are more men than women of young age is in line with the stylised fact that dropout is higher for men than for women.

Working time arrangements

The C*R analysis in Table 4 shows that there is a strong negative association between working flexitime and dropout, but the sign reverses after the inclusion of country dummies in the model. We observe in Figure 5 that working time arrangements seem to be highly country specific with relative small regional variation since countries form clusters. For example, while all regions in Germany are located on the right hand side, where the use of flexitime is larger, the Spanish regions are on the other side.

Figure 5: Flexitime and Dropout across European regions (2004)



Note: Dropout: % of the population aged 18–24 with at most lower secondary education and not in education.
Source: European Labour Force Survey (Eurostat).

Hence, results do not support the hypothesis that the use of flexitime at this aggregate level may help decreasing the incidence of dropout, as we stated in Section 3. One of the drivers behind this idea was that more flexitime may facilitate parents involvement in their children education and hence reduce the incidence of dropout. However, in order to investigate accurately the relationship between flexitime and dropout in this sense we should explore youngsters and parents' individual data.

5 Conclusions

This paper analyses the factors underlying school dropout in Europe. Dropout rates are defined as the % of the population aged 18–24 with at most secondary degree and not in further education or training. It is widely accepted that human capital, particularly attained through education, is crucial for economic progress. Hence, understanding some of the main determinants of dropout will provide useful guidelines for reducing it.

The main finding of the paper is that the structure of upper secondary education is an important factor for the prevalence of school dropout. Estimates are quite robust in pointing out that once country and time variation is controlled for as well as other cycle and demographic factors, regions with a higher proportion of vocational studies experience a lower incidence of early school-leavers. We also observe gains in terms of

lower dropout rates of implementing vocational systems with a higher combination of school and work. As an illustration, the model estimates that dropout rate in Spain in 2007 would have been 6 percentage points lower had this country had the learning model as Austria, which has the highest share of vocational studies in upper education in our sample.

Results also show that the productive model matters for dropout since regions with a relatively high share of employment in non-technical services or in construction have a higher prevalence of school abandonment. Even though our results cannot be interpreted in a causal manner, they indicate that the learning model and the productive model deserve a close look.

A Data and Variables

Most information for the cross-country across-time (C*T) analysis for the period 1997–2008 has been retrieved from Eurostat. Age population data comes from the International Data Base U. S. Census Bureau. Data for the classification of upper secondary education was extracted from the OECD.

The cross-country across-region (C*R) regression is based on the European Labour Force Survey (ELFS) ad-hoc module "Work organisation and working time arrangement" collected in 2004, and Eurostat. We use the NUTS classification for European regions.

Some countries have missing values or inconsistencies in the variables collected over time. For example, Norway experienced significant jumps in dropout rates due to very low sample sizes and had to be eliminated from the C*T final analysis. In Ireland, few missing observations were filled in using interpolation in C*T and dropout data for C*R is from 2005. With respect to the explanatory factors, the Netherlands had, for instance, an unrealistic jump in the proportion of foreign-born students and when this variable was included in the regression, the Netherlands case was omitted. Hence, in order to avoid the elimination of countries when adding more variables, whenever was possible missing observations were filled in using interpolation.

Construction of Variables

Share of Flexitime at Work: the proportion of individuals in a certain region/country with flexitime at work. An employed person is considered to be working under a fixed working schedule if he/she has a fixed start and end of a working day or has staggered working hours with banded start/end (categories 1 and 2 of the variable varwkhrs in the 2004 ad-hoc ELFS module); otherwise he/she is considered to have a flexitime working time schedule.

Employment share in different sectors:

In the C*T analysis we use the share of employment in construction. Hence, the estimate for this variable will reflect the association between the weight of construction in total employment and the incidence of dropout.

In the C*R analysis we use a different classification since the Eurostat provides other groupings in regional data: *Retail services* (wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods; hotels and restaurants; transport, storage and communication; *Public services* (Public administration

and defence, compulsory social security; education; health and social work; other community, social and personal service activities; private households with employed persons; extra-territorial organizations and bodies) and *High-techological manufacturing and services*. The estimates for these variables need to be compared with the omitted category, which is the share of employment in the rest of sectors.

Regional unemployment rates:

The information in C*R is missing for one of the subregions in Finland (FI20) and we proxy it with the regional unemployment rate of the whole country.

Regional GDP growth rates:

For Austrian, UK and Denmark, regional information on unemployment was at a more detailed level than for the rest of the variables. To convert the regional data to three regions we calculated the average of the sub-regions. There are no GDP growth rates at regional level for Norway.

Upper secondary education composition: share of enrolment in vocational studies in upper secondary education (the other being general upper secondary education) and the share of programs that are a combination of school and work-based. The second variable is only available in the C*T analysis.

In the C*T analysis, few observations were missing in the middle of the time span and hence interpolation was used to fill in the gap. Source: OECD.

In the C*R analysis we use data corresponding to 2004. In Norway, regional information was missing for 2004 and we take data from 2006. We prefer assuming that the pattern of enrolment is likely to be similar in both years than omitting all Norwegian regions. Source: Eurostat.

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