Adult participation in higher education and the 'knowledge economy': a cross-national analysis of patterns of delayed participation in HE across 15 European countries.

Accepted version [authors' version]

Forthcoming in *British Journal of Sociology of Education*
Accepted

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Abstract
'Delayed participation' in HE is an increasingly important feature of modern HE systems in many countries. Despite this, surprisingly little empirical research has been undertaken seeking to better understand levels of delayed adult participation in HE across Europe. The present paper responds to this gap by analysing country level data on delayed adult participation in HE across 15 European countries and by modelling associations between participation levels and a range of theoretically derived economic, social, demographic and systemic factors. The findings suggest that there is considerably more cross-national variation in levels of adult delayed participation and that prevalent typologies of HE, such as Trow's, fail to give recognition to the importance of delayed participation. The modelling work finds that social and demographic factors exhibit relatively strong associations with delayed participation in HE. This questions the pre-eminence of economic factors within much of the academic literature, policy discourse and policy activity.

Keywords: Widening participation in higher education, adult students, mature students, lifelong learning, mass higher education, educational decision-making.

1. Introduction

Increasing adult participation in higher education (HE) has become a universal objective across European nations. The shortening of the first cycle of HE in many countries as a result of the Bologna process, the inclusion of intermediate qualifications within the Qualifications Framework of the European Higher Education Area (EHEA), and an increasing emphasis on the recognition of prior learning in HE can all be understood as tools to widen access to HE. These tools are meant to be particularly relevant for 'non-traditional' groups (Cappellari and Lucifora 2009), including adult learners who may participate in HE as 'delayed entrants' -those individuals who enter –for the first time- after the traditional late teenage entry to a 'first cycle' HE qualification, such as an undergraduate degree. The emphasis on increasing adult participation in HE often derives from the view, subscribed to by the European Union (EU), of a dualised society comprising individuals who are seen either to be a 'low-skilled learner located in (or beyond) the knowledge society' or 'high knowledge-skilled learner (graduate/ postgraduate) for the knowledge economy' (Brine 2006:649). Against this backdrop, the European discourse on adult participation in HE has been linked primarily to HE's capacity to stimulate the development of a European knowledge economy and to boost labour force participation, individual's employment prospects and productivity, even if HE participation is also seen to have a, secondary, social dimension (European Commission 2011; Osborne 2003). This resonates with views put forward in a number of Member States (Sprogoe 2003).

While the "knowledge economy" is an elusive concept (Godin 2006) there is little doubt that HE is seen to be a central part of it. Powell and Snellman (2004:199) defined the knowledge economy as "production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence. The key component of a knowledge economy is a greater reliance on intellectual capabilities than on physical inputs or natural resources". Olsen and Peters (2005:331) characterize the knowledge economy with reference to five elements: the economics of abundance, the annihilation of distance, the de-territorialization of the state, and, investment in human capital. In the context of the knowledge economy, investment in higher education is presented as being of particular importance. As Olsen and Peters (2005:313) note higher education has "become the new star ship in the policy fleet for governments around the world. Universities are seen as a key driver in the knowledge economy" because, as Peters (2001:9) argued "while the evidence is far from conclusive at this stage, there is a consensus emerging in economic theory that education creates human capital, which directly affects knowledge accumulation and thus productivity growth". While the knowledge economy is related to the increasing cognitive demands of work, due to the difficulties to measure this, analyses have resorted to the use of educational qualifications of job-holders (Godin 2006), and "stocks of knowledge" such as national qualification levels as proxies. Burton-Jones (1999) notes that under what he calls the new economy of 'knowledge capitalism' economic demands require a move to continuous up-skilling and lifelong-learning. This would suggest the importance of participation in HE, including delayed participation for those individuals who did not participate in HE earlier on in life, for the narrative of the knowledge economy. In the knowledge economy narrative international comparisons and benchmarking are a central theme, as Obama put it: "because we know the countries that out-teach us today will out-compete us tomorrow" (Obama 2009).

Although the association between rising levels of access to HE, individual economic returns and higher economic growth is far from straightforward (Brown et al. 2011; Grubb and Lazerson 2004), delayed participation in HE has been found to yield economic benefits to individuals - even though these may be lower than the wage boost obtained by early HE participants (Elmand and O'Rand 2004). Hence, the timing of HE achievement, just like the level of that HE achievement, is important. Available evidence suggests that delayed participation in HE is a 'middle path' between entry to the labour market without HE credentials and entry immediately

after completion of secondary and (*immediately after this*) higher education, without a delay period between the two. This middle path is primarily taken on the one hand by relatively advantaged adults who do not hold HE credentials but who have high educational aspirations as well as, on the other hand, by more disadvantaged adults who moved directly from secondary education to the labour market (Elamnd and O'Rand 2004:144). Hence, debates around delayed participation in HE are also bound up with issues of social cohesion and social justice.

Despite the importance of adult participation in HE to European economic policy strategies, and despite the trends of what some have termed a silent 'enrolment explosion' of adult HE participation since the 1980s (OECD 1991), surprisingly little empirical research has been undertaken on the issue from a macro perspective. While a significant body of sociology of education literature has looked at delayed participation in HE, this has tended to offer micro-level analyses that 'study the adult HE student' and how his/her psychological and social circumstances and institutional strategies affect individual decision-making and attainment. Themes of identity (Busher et al. 2014; Howarda and Davies 2013; O'Donnell 2007) and gender, race and socio-economic inequalities (Reay 2002; Reay et al. 2002) have been explored in depth. There are also rich literatures on the individual level factors associated with delayed entry to HE (Gorard et al. 2006), on the differential returns that can be expected from participation in HE at different stages in the life-cycle (Elamnd and O'Rand 2004) and on organisational strategies to increase adult participation in HE (Osborne 2003). The majority of studies in this area tend to be qualitative in nature, and focuses on a single country. By contrast, the macro determinants of aggregate volumes of delayed participation in HE have received relatively little attention (Souto-Otero 2007). From a theoretical perspective, much of the literature that explores the link between social capital and education –a central aspect in this article- focuses on schools or immediate transitions from school to university (von Otter and Stenberg 2015). The present article complements and augments existing literature by adding a macro analytical perspective, by adopting a comparative approach that explores temporal and cross-national variations and by assessing a range of alternative theoretical hypotheses around the factors associated with levels of delayed entry at a national level. These are the main contributions that the present article offers.

It is often assumed within the lifelong learning literature that adult entry to HE has increased across the board, leading to a certain convergence across countries -what we call the 'convergence' hypothesis of adult entry into HE. This idea matches the calls for increased adult access to HE within national and European policy discourses as outlined above. However, there are crucial questions that the convergence hypothesis struggles to explain, most notably around cross-national variations in the levels and trends of different age groups participating in HE. In these respects the literature has not advanced substantially in the last twenty years. Alternative theoretical hypotheses around the relationships between macro-level factors and adult participation in HE abound but we remain at a point where the empirical evidence to illuminate those theoretical perspectives is scarce (Bengtsson and Wurzburg 1992; Tuijnman 1992). The article explores the following three questions:

- what is the share of new entrants to HE made up of 'delayed adult entrants' in European countries in the period 1998-2008, and how did it evolve in that period?
- have patterns of delayed adult participation converged or diverged in this period in those countries? and
- how are demographic, economic, social and systemic factors associated with national levels of delayed adult participation in HE in European countries, both in terms of entry and graduation?

In relation to the third question the article explores the association of those factors and national levels of delayed entry for two different age groups, which may be subject to different dynamics: those aged 24-34 and those aged 35 and over. The article explores these questions in a context of economic expansion in Europe (1998-2008), and stops at the beginning of the

financial crisis. The focus in this paper is on formal learning for adults, a crucial part of lifelong learning (Dave and Lengrand 1974). While the paper concentrates on adults entering HE for the first time, it nevertheless makes use in its literature review section of research on the drivers of adult participation in lifelong learning more generally. This is due to the fact that the extant literature on adult participation has tended to pay little attention to the nature of that participation – either as delayed or repeated – even though the two are very different. Theoretical accounts that emphasise the role of economic factors are based largely on human capital accounts in which adults are assumed to base decisions about delayed entry to HE on economically rational cost-benefit calculations of the relative gains (e.g. improved employment and income prospects) and costs (e.g. fees and income forsaken) of that education (Becker 1975). Loury (1981) noted that orthodox economic theories are too individualist, focusing on individual human capital and the establishment of the conditions for a level playing field to compete based on those skills. In contrast, social capital theory posits that social relations and trust are key factors (Coleman 1988). Increased social capital may lead to higher levels of delayed participation in HE given that increased trust in other people and institutions could be expected to boost individuals' willingness to take the risk of lost benefits (e.g forsaken income) and uncertain gains derived from delayed participation in HE. It can also provide additional information flows that reduce uncertainty. The analyses also account for a range of demographic and systemic variables posited in the literature to relate to delayed participation in HE.

The reminder of the article is structured as follows. Section two presents a review of the literature and highlights the main theoretical perspectives that seek to explain key factors that shape delayed participation in HE. Section three describes the details of the data and methodology and section four presents the main findings. Section five summarises the main results and discusses their implications.

2. Theorising delayed adult participation in HE: economic, social, demographic and systematic factors

While delayed adult participation is an under-researched policy area in terms of empirical analysis, theoretical attention on this issue is more common. Four broad sets of factors – economic, social capital, demographic, and systemic – have been theorised as being key in shaping delayed adult participation in HE. These are outlined below. The discussion serves to identify the key hypothesised relationships that the later empirical work incorporates.

Economic factors are the predominant explanation behind the growing importance of lifelong learning and HE more generally amongst policy-makers and play a central role within the academic literature in offering a range of explanations of delayed adults entry to HE (see Brown et al. 2011; Souto-Otero 2011 for reviews). One strand of economic theory focuses on the effects of technology on the labour market, in terms of the introduction of new skill requirements and its consequences for patterns of wage inequality (Card and DiNardo 2002). Supporters of the 'skills-biased technological change' thesis argue that the introduction of new technologies favours the wage and employment prospects of skilled workers whilst simultaneously damaging those of the less skilled (Autor et al. 2003). Tuijnman (1992:679) notes that the 'premise guiding the extension of adult provision in industrial societies is that as technology, production systems and organizational structures become more complicated there is a parallel increase in the need to augment experiences of education and work'. Hence, increased firm technological absorption is hypothesised to be related to increased demand for skilled labour. While there has been concern more recently that increases in demand cannot match current global trends in the supply of highly educated labour this may not immediately affect the level of demand for HE given the dynamics of positional competition (Brown 2000).

A second branch of economic literature focuses on the linkages between demand for HE and the relative labour market advantages that HE graduates can expect to enjoy as a result of their enhanced productivity (Becker 1975) or simply as a result of employer screening mechanisms (Arrow 1973). Although delayed entrants to HE have less time remaining in the labour market than early HE entrants, improved economic prospects in the form of greater employment chances and higher pay could still provide adults –in particular those who are less close to retirement- with economic incentives for delayed entry to HE. The larger these relative gains around job acquisition, job security and job remuneration are for HE graduates compared to non-HE graduates the higher the levels of delayed adult participation would be expected to be. Besides the employment premium itself, the broader economic cycle may also be important in shaping levels of adult participation in HE. In particular, high absolute levels of unemployment may deter adults from investing in HE, even when such investments could be expected to lead to somewhat improved employment prospects, due to increased uncertainty over the returns they might obtain. In this respect the effect of unemployment on delayed participation in HE would be different from the effect Raffe and Willms (1989) found on young people's decisions to stay on full-time education at school after the compulsory schooling age in Scotland. They concluded that the evidence for a 'discouraged workers' effect of unemployment on staying on at school ("whereby local unemployment discourages 16 year olds from leaving school" (Raffe and Willms 1989:559), was strong –although this was not the case for further education (FE), which they explain with reference to the highly occupationally specific character of FE in Scotland, that may restrict employment options in an uncertain labour market compared to broader-based school courses. Rather than "discouraged workers" we expect "discouraged students" due to the personal -and often financial- costs of HE for adults and uncertain benefits in contexts of high and unemployment. This is likely to be especially true if high levels of unemployment are persistent over time.

Whilst economic theories tend to focus on economic cost-benefit calculations around the perceived value of HE to adults, such cost-benefit calculations can be seen to sit within, and relate to, the severity of the underlying socio-economic inequalities within each country. Other things being equal, the relative risks around weaker education seem lower in countries where income distributions are more compressed (after taxes and transfers) compared with countries with wider income distributions in which relative weaknesses in terms of educational achievement are likely to be punished more heavily in the labour market. On this reading, inequality might be expected to increase demand for HE amongst adults. At the same time, however, potential delayed entrants to HE within more unequal societies could be hypothesised to be, on average, more disadvantaged –and less able to afford the costs of HE- than their counterparts in more equal societies. On this reading, greater levels of inequality would be expected to depress the ability of adults to participate in HE.

Finally, at a macroeconomic level, economists expect the globalisation of economic relationships and trade openness to be positively associated with greater demand for lifelong learning (Acemoglu 2003). According to this hypothesis, one of the main effects of globalisation relates to the need for national economic restructuring given intensified levels of international competition. The competitive advantage of advanced industrialised countries is seen to be located not in price but in the production of high value-added products which, it is argued, 'inevitably causes new demands for the higher order skills of professional and highly educated workers' (Green 2002:615). Economic globalisation is also associated with increased global labour market changes and flexibility and reduced job security, which enhance the need for the updating and upgrading of skills both as jobs evolve more rapidly and as individuals need to take-up new roles more frequently (Iversen and Wren 1998). However, the effects of economic globalisation on both job volatility and skills updating may not be as direct as has been suggested (e.g. Blossfeld et al. 2005; Garret 1998). Globalisation can also lead to greater specialisation to compete in international markets and to lower dependence on what for many European countries are relatively small home markets (Iversen 2001). As specialisation tends to

be related to reduced job and sectoral mobility (Hall and Soskice 2001), the effect of globalisation on adults' demand for HE could be ambivalent.

Social capital theory offers an alternative theoretical perspective to economic theories. At the societal level social capital can be associated to the degree of 'trust in society' and 'participation in organisations' (Putnam 2000). One of the central tenets of social capital theory is that it is conducive to the creation of human capital. Coleman (1988) refers to 'social capital within the family' (such as the time spent by parents in the education of the child) and 'social capital outside the family' (school and community networks for example) and outlines the ways in which these may influence individual educational attainment levels. Indeed, the effect of parental involvement in children's educational attainment is well known (Feinstein et al. 2004). While, naturally, the kind of social capital possessed will affect its usefulness to get ahead (Portes 1998) –for example strong ties may constrain the choices of mature students as documented by James (1995)-, increased social capital is hypothesised here to be associated with higher levels of delayed participation in HE given that increased trust in other people and institutions may be expected to boost individuals' willingness to take the risk of lost benefits (e.g. forsaken income) and uncertain gains derived from delayed participation in HE. Moreover, networks give access to information. Greater social capital can thus also provide new information about the benefits and costs of delayed participation or the selected of particular subjects (Busher et al. 2014). With increased information from trusted sources comes a perception of reduction in risk and uncertainty.

A third strand of theoretical attention focuses on demographic factors. Green (2002) notes the importance of demographic change for lifelong learning. Population ageing, and the resultant shifts to the profile of a country's population structure, are expected to gradually shift the demand for educational provision through the age groups towards older adults. As younger age cohorts shrink in relative terms the stock of fresh skills and knowledge acquired through the first cycle of formal HE decreases. Even though increases in the HE take-up rate amongst the younger age groups may cushion this effect, as the workforce ages 'there is a growing need for constant upgrading and updating of skills' (Green 2002:613) in order to increase their productivity levels so as to remain globally competitive and be able to sustain aggregate welfare levels and economic prosperity (Tuijnman 1992). This need may not be met, however, in the absence of incentives for older people to enter HE. Hence, whilst an older demographic structure tends to increase the demand for HE amongst adults, it is important to note that for adults closer to retirement there may not be considered sufficient time remaining in the labour market to incentivise their delayed entry to HE.

Finally, systemic factors are theorised to affect decision-making around delayed participation in HE in three ways. Firstly, the percentage of the population who have already gained tertiary level education (stock of tertiary graduates) affects the number of adults who can become 'new entrants' in HE. Hence, high levels of initial participation in HE might act to constrain future levels of delayed adult participation. Secondly, in order for adults to be able to enter HE there is a requirement in most European countries to hold upper secondary education qualifications. While this requirement in principle shapes the share of the adult population that is eligible to enter HE, many countries have established various systems to provide such adults with access to HE (Eurydice 2011). Thirdly, the type of secondary education taken counts. Students from vocationally oriented upper secondary programmes remain less likely to enrol in HE. Therefore, the national balance in upper secondary education between vocational and more general theoretical can be expected to be of importance for our analysis.

3. Data and Methods

As already advanced, this article analyses levels of delayed adult participants in HE programmes across 15 European countries. In terms of the outcome variables used, an analysis

of delayed participation could focus either on the percentage of all entrants to these HE courses who are delayed adult entrants or, alternatively, on the percentage of all graduates from these HE courses who are delayed adult graduates. Each may present differing dynamics and given that there is no a priori reason to focus on one or the other, and their substantive interest, we include separate outcome variables for entry and graduation in our modelling. In terms of both entry and graduation, the focus is on delayed adult participation in terms of its *relative share* of all new entrants to HE rather than in terms of its absolute size. HE is defined as ISCED level 5 theoretically (5A) or technically (5B) oriented courses[1] as identified within UNESCO's International Standard Classification of Education (ISCED 1997).

A final issue to contend with is the lack of an internationally agreed understanding of the term 'adult learner'. Time-use surveys report that there is a clear drop in time spent on studies after the early 20s in Europe (Eurostat 2004:41) and in most European countries those aged above 24 years would be considered adult learners. In order to detect potential variation in patterns of delayed participation in HE over the life-course our analyses define two groups of adult learners: those aged 24-34 and those aged 35 and over. Whilst it is recognised that the definition of the two age groupings for the entry and graduation outcome variables makes assumptions about the meaning of 'adult participation in HE' which may not be shared across nations (Powell et al. 2003) these two age groupings are nevertheless considered reasonable for the set of nations studied. To summarise, the modelling presented uses four outcome variables based on type of delayed participation (entry/ graduation) and age (25-34 and 35 or older). At each annual time point in each model the outcome variables relate to the percentage of all HE entrants/graduates (depending on the model in focus) who are in these age groups and who are participating in HE for the first time.

Following initial descriptive analyses, multivariate modelling explores associations between a range of key factors and delayed entry to, and graduation from, HE using annual data for 15 European countries over the period 1999 to 2008. The selection of explanatory factors incorporated into the models is guided by the literature review These are presented below along with a hypothesised direction of relationship expected between each explanatory variable and the outcome variables that also follows from the theoretical understanding presented in section 2.

In terms of the economic theories, six factors were identified in the literature review as relevant in shaping levels of delayed adult participation in HE: firm-level technological absorption; the HE employment premium; inequality; the economic cycle; trade openness; and job stability.

Firm-level technological absorption is measured by the percentage of all manufacturing that is classified as high skilled calculated using Eurostat's annual datasets on the production of manufactured goods (PRODCOM). It is hypothesised that this will be positively related to delayed participation in HE.

The employment premium of HE credentials is measured as the difference between the average annual unemployment rates of adults aged 25-64 years with upper secondary education and those with tertiary education. A positive value for this variable therefore reflects a country in which the unemployment rate is higher for those with upper secondary qualifications only compared to those with HE qualifications. This variable is expected to be positively associated with delayed participation in HE.

To account for the influence of the economic cycle, national unemployment rates are included in the entry models and a negative association is expected. For the graduation models national

[1] Disaggregated analyses between these two types of programmes are available from the authors upon request.

unemployment rates five years earlier are included on the basis that this would be approximately the time that the individual will have made decisions around entry.

Inequality is theorised as being of potential relevance to delayed participation in HE, although the direction of its influence is uncertain. Various inequality measures are available (de Maio 2007). The Gini coefficient, perhaps the most widely employed and understood of these measures, is used here. The Gini coefficient ranges here from 0-100 where 0 would reflect a nation with perfect equality of income (i.e. all individuals have identical incomes) and where 100 would reflect a situation of perfect inequality (i.e. one person has all the income). By way of context, the most recent income data shows Gini coefficients amongst the countries studied of between 25 (Denmark) and 34 (United Kingdom). As discussed above, increased inequality may encourage delayed participation in HE through increasing the relative labour market differential between skilled and less skilled workers. It may also potentially have the opposite effect, however, via the tendency for those potential delayed participants in HE to be more disadvantaged on average than in more equal societies and less able to bear the direct and opportunity cost of delayed HE. On balance, we expect a negative association between income inequality and delayed entry to HE, consistent with the negative associations between inequality and a range of other social outcomes found in the literature, including social mobility (Wilkinson and Pickett, 2009).

Trade openness may affect delayed participation in HE in advanced economies; open economies are expected to exhibit greater reliance on high-value-added skills-intensive products and employment. The modelling therefore incorporates a variable relating to trade openness in each country and this is operationalised as total exports and imports as a share of GDP each year. This is expected to be positively associated with delayed HE participation. Job stability is measured in our analyses as the average duration of job tenure in each year for adults aged 25-54 years. A negative association between job stability and delayed entry to HE is expected, particularly for individuals above 35 –as high level of general job mobility could be expected to stimulate up-skilling to obtain stability, and also the take-up of HE earlier on in life as an 'insurance' to shorten periods of unemployment (Hall and Soskice 2001). On the other hand, a positive association could be expected if there is high overall job stability but also a high level of dualisation of the labour market that combines a very protected part of the workforce with a sizable unprotected segment of the workforce (Rueda 2005), which would have incentives to upskill to lower their job insecurity.

Based on social capital theory we hypothesise a positive relationship between levels of social capital and levels of delayed participation in HE, other things equal. The social capital variable used here is a conceptually broad multi-dimensional social capital index constructed for each nation at four annual time points from four waves of the European Social Survey (2002, 2004, 2006 and 2008). At each time point a national social capital index score is calculated as the composite of four separate domains of social capital with each domain containing multiple separate indicators. Each indicator is expressed on a continuous scale from zero (weakest social capital) to ten (strongest social capital) reflecting, depending on the variable, either the average nation score or the proportion of respondents agreeing. The domains (and indicators) which were able to be identically constructed at the four time points are: trust in people (degree of trust in other people, people are generally fair, most of the time people are helpful); trust in formal institutions (degree of trust in parliament, the legal system, police and politicians); participation in organisations and voluntary groups (whether in the past year the individual has contacted a politician or government official, worked in a political party or other organisation, worn a campaign badge/sticker, or taken part in a protest or demonstration); and social relations (how frequently the person meets socially with other and whether they have anybody to discuss personal matters with). In the absence of evidence to the contrary all four domains are weighted equally, as are all indicators within each domain. The survey weights provided in the survey

were used throughout the construction of the index and values for non-surveyed years are calculated as averages of the neighbouring periods to complete the time-series.

The demographic structure of a nation is clearly of relevance in terms of the size of the population able in principle to become delayed participants in HE. This is measured as the percentage of the population aged 35-49 years and this is expected to be positively related to levels of delayed participation in HE.

In terms of systemic factors, the existing stock of adults with HE credentials naturally acts to reduce the potential volume of delayed participants to HE. To account for this, the annual percentage of the population aged 25 and above and with tertiary education is incorporated into the analysis. This is expected to be negatively associated with delayed participation in HE. Secondly, a negative association between the percentage of the working age population in the later stages of their working life and the level of delayed participation in HE is expected given that the economic benefits that could be accrued from such participation decrease with age. This variable is measured as the percentage of the total population aged fifty or older in each year. The nature of prior attainment is also of systemic relevance given that those with theoretically oriented upper secondary education tend to be more likely than those with vocationally oriented upper secondary courses to enter HE. To take this into account the models include a variable on the structure of upper secondary education take-up in each country. This is captured by the share of ISCED level 3 students following programmes defined as ISCED3A (i.e. general, theoretical upper secondary education programmes). This percentage is expected to be positively associated with delayed participation in HE. Finally, dummy variables identifying counties are incorporated to seek to account for any remaining country specific variation that is not otherwise captured within the modelling.

Table 1 below summarises the explanatory factors used in the regression modelling as well as the direction of the relationship between each factor and HE outcome variables around delayed HE entry and delayed HE graduation. The outcome variables and majority of the explanatory factors are sourced from the Eurostat database with specific additional explanatory factors sourced from the World Bank (trade openness), OECD (job stability) and European Social Survey (social capital). Further details on the indicators and data sources are provided in Appendix A.

Table 1: Explanatory variables and hypothesised relationships with outcome variables

Explanatory variables (calculated annually 1999-2008)	Operationalisation	Hypothesised relationship with outcome variables
Demographic		
Population ageing	% of population aged 50 or over	Negative
Economic		
Firm technological absorption	% of the value of total manufacturing output coming from high-skill manufacturing	Positive
Employment premium	% point difference in unemployment rates between upper secondary and tertiary educated adults aged 25-64 yrs	Positive
Economic cycle	Unemployment rate 15-64 yrs	Negative
Trade openness	Exports and imports as a share of GDP	Positive
Job Stability	Average duration of job tenure for adults aged 25-54 yrs	Positive
Income inequality	Gini coefficient	Negative
Social		
Social capital	Composite social capital index score (0-10 scale)	Positive
System		
Stock tertiary graduates	% of adults aged 25 plus educated to tertiary level	Negative
Upper secondary vocational specificity	% of students in ISCED programmes enrolled in ISCED 3a	Positive

Data limitations in the area of adult education are an inevitable, yet often significant, challenge for cross-national research and this is particularly true when that research incorporates a temporal dimension (Donaldson and Townsend 2007). Although the present dataset has taken considerable effort to assemble and has been built according to a set of factors previously identified as relevant in the existing literature it is acknowledged that it remains limited, as most such datasets are, in terms of sample size, variables and the countries which offer data across all variables and years. The analyses incorporate a substantial number of explanatory factors, which makes relatively large demands of the assembled data. This may have implications for detecting the statistical significance of weaker effects; yet given that these are non-random data it is in any event not appropriate to conduct standard statistical significant testing. Consequently, significance tests are not reported and our analytical approach instead emphasises the exploration of the substantive associations at play (Ziliak and McCloskey 2008).

In terms of the analysis, and as already advanced, the descriptive statistics presented set out the changing context of levels of delayed entry to HE across the countries studied; this is combined with the use of pooled cross-sectional linear regression models, exploiting ten years of annual data, to explore relationships between delayed adult participation in HE and the factors outlined above in this section. As with all analysis of this sort we are mindful that the models cannot speak to causal relationships but rather, as is our aim, to patterns and associations between variables after having controlled for other factors. Given that the data are hierarchical in nature – ten annual time points nested within each of the fifteen countries analysed –there is likely to be temporal autocorrelation in the data which has implications both in terms of variables and model specification. In terms of variables, the models include an additional explanatory variable relating to the previous year's outcome variable (i.e. a lagged dependent variable). In terms of model specification, multilevel regression models could be used for these purposes and are

familiar within the educational research literature (Goldstein 2010; O'Connell and McCoach 2008). However, such models are not possible to employ here due to the relatively small number of country (i.e. level two) units analysed. Instead, pooled linear regression models with panel-corrected standard errors are used to take account of the temporal autocorrelation in the data, as recommended by Beck and Katz (1995) and widely followed within the recent comparative political economy (Rueda 2005) and education literatures (Busemeyer 2007). The models implemented here specify that errors are heteroskedastic (i.e. each panel has its own variance) and uncorrelated within panels. The regression models are carried out separately for the two types of delayed participation (entry and graduation) and for the two adult age groups of interest (25-34 and 35+) identified above in this paper with the full range of explanatory variables outlined above.

4. Findings

Table 2 offers an initial overview of the comparative picture by setting out how the share of new entrants to HE that is made up of delayed adult entrants has changed in each country between 1998 and 2008. As context, column two shows the total number of new entrants to HE in order to highlight whether there has been an overall expansion or contraction of the HE system as a whole in that country over this period: a value greater than 100 denotes expansion and below 100 denotes contraction. For each of the two adult age groups in focus, Table 2 first shows the percentage of all new entrants who are from this age group and the second column shows the percentage point change in this figure between 1998 and 2008. A positive value in this second column on the percentage point change variable therefore indicates an increase in the share of total entrants from this age group over the time period. For example, 20% of Germany's new entrants in 2008 were aged 25-34 years compared to 28% in 1998 (i.e. 8 percentage points lower).

Table 2: Delayed entrants into ISCED 5 programmes in selected European countries

	Total new entrants 2008/ 1998	Aged 25-34		Aged 35 plus	
		% New entrants 2008*	% Point change 1998-2008**	% New entrants 2008*	% Point change 1998-2008**
Austria	163	17	-1	10	0
Belgium	101	2	-3	1	-2
Czech Republic	178	12	6	7	7
Denmark	130	9	-1	2	0
Germany	109	20	-8	11	0
Spain	94	12	2	4	1
Finland	118	15	0	9	2
Hungary	98	13	-12	5	2
Ireland	118	7	2	4	1
Iceland	181	25	6	18	5
Netherlands	118	7	-3	5	0
Norway	118	13	-3	14	3
Sweden	124	20	-3	14	3
Slovakia	153	17	12	9	-3
UK	123	16	-3	21	4

Note:. Authors' own calculations.
* Refers to new entrants in the age group as a proportion of total new entrants.
** Refers to the percentage point change between 1998 and 2008 in all new entrants to HE coming from this age group.

The table shows that the total number of new entrants (column two) has increased in all but two countries over this period, although the extent of the expansion across countries is quite varied. This is the only clear trend, however, as the patterns for the two age groups are highly divergent between nations. Beyond the specific national stories we would underline two main messages.

Firstly, the percentage of adults over 25 entering HE is small in some countries but is substantial in others: around a fifth or more of new entrants to ISCED 5 HE programmes were aged 25 or above in 10 of the 15 countries in 2008. This questions the appropriateness of widely employed ideal types, such as Trow's (1973:4), that distinguish between levels of growth in HE systems based on 'age grade' figures and take into account only those individuals who enrol into HE directly after finishing secondary school. Given the substantial levels of delayed participation in many countries outside of the 15-19 year age group, as well as the level of cross-national variation in this respect, our findings suggest that levels of HE growth need to be measured by looking both at recent secondary education leavers *and* adult participants. It is this overall participation level that can be expected to affect the aspects in which Trow was interested – HE financing, curriculum, administrative pressures– when building his typology of HE systems. This is particularly so given that Trow (1973) himself, and others later (Anisef et al. 1985; Kirby 2009), have suggested that the diversity of the student population, and not only its size, can strain national HE systems. Table 2 also shows that levels of delayed participation in HE programmes decreases markedly after age 35 in most (although not all) countries: thus, 'lifelong learning' falls significantly short of being truly lifelong virtually everywhere in our sample.

The second message is that patterns of delayed adult participation have been markedly divergent over the period covered, both in terms of trends and absolute levels. This is in spite of general usage and acceptance of the 'convergence hypothesis' within the literature. Indeed, Table 2 highlights many different dynamics. Several countries have seen expansion in both the total number of entrants and the share of those entrants who are over 25 (e.g. Czech Republic, Iceland) whilst others have seen an expansion in new entrants but not in the share made up by delayed entrants (e.g. Belgium, Germany, Netherlands). In contrast, Hungary has experienced a contraction in total entrants as well as a reduced share for delayed entrants whilst Spain has witnessed a contraction in total entrants but an increase in the share of delayed entrants.

Having described the changing context of delayed participation in HE systems across Europe, we move to the multivariate analysis of the association of key factors with delayed participation in HE – both in terms of entry and graduation – for the two adult age groups of interest. Results are presented in Table 3. For the continuous variables, unstandardised coefficients are shown on top and standardised coefficients are shown below and in brackets in order to gain some sense of the relative effect sizes of these factors. All of the models are powerful, although these unusually high R-square values can in part be explained by the nested nature of the data (i.e. multiple time points nested within nations rather than being purely independent cases) as well as by the inclusion of the country dummy variables (which account for around one third of these R-square values).

Table 3: Regression results: factors associated with delayed participation in HE

	Entry models		Graduation models	
	Adults 25-34	**Adults 35 plus**	**Adults 25-34**	**Adults 35 plus**
Demographic				
Population ageing	0.19 (0.10)	0.32 (0.19)	1.18 (0.24)	0.52 (0.27)
Economic				
Firm technology absorption	-0.06 (-0.09)	0.00 (-0.01)	-0.09 (-0.05)	-0.01 (-0.02)
Employment premium	0.07 (0.03)	0.35 (0.13)	0.15 (0.02)	-0.25 (-0.09)
Economic cycle	-0.30 (-0.18)	-0.27 (-0.17)	0.08 (0.02)	0.08 (0.04)
Trade openness	-0.07 (-0.40)	-0.05 (-0.31)	-0.16 (-0.35)	-0.04 (-0.24)
Job stability	0.61 (0.11)	-0.10 (-0.02)	0.12 (0.01)	0.14 (0.02)
Income inequality	0.00 (0.02)	0.00 (0.00)	0.00 (-0.01)	0.00 (0.01)
Social				
Social capital	1.99 (0.21)	1.34 (0.16)	-4.45 (-0.18)	-0.46 (-0.05)
Systemic				
Stock tertiary graduates	0.08 (0.09)	0.04 (0.05)	-0.17 (-0.07)	0.12 (0.12)
Upper secondary vocational specificity	-0.01 (-0.03)	0.02 (0.05)	0.01 (0.02)	-0.02 (-0.06)
Lagged outcome variable	0.50 (0.51)	0.46 (0.46)	0.14 (0.14)	0.51 (0.51)
Country effects (Ref=Austria)				
Belgium	-1.92	-1.25	-25.91	-4.56
Czech Republic	3.82	0.65	-19.25	-1.48
Germany	-3.80	-5.98	-10.07	-7.55
Denmark	2.25	-0.90	6.52	-1.32
Spain	-2.43	-3.88	-24.18	-6.43
Finland	-2.71	-3.34	2.74	0.34
Great Britain	-1.89	3.59	-36.06	-0.65
Hungary	8.14	0.70	-6.98	1.66
Ireland	3.05	0.82	-19.48	1.26
Iceland	2.74	2.67	9.28	7.61
Netherlands	-2.79	0.04	-13.62	-1.27
Norway	-4.14	0.86	-5.48	-0.70
Sweden	0.93	0.58	-0.72	1.26
Slovakia	10.10	5.14	-12.06	5.18
Constant	-7.24	-6.32	42.57	-7.13
R^2	0.93	0.94	0.95	0.97

Note: N=135, groups=15. Standardised coefficients for non-dummy variables shown in brackets.

In terms of main messages, demographic and social capital factors tend to have noticeable larger associations than economic factors, except for trade openness and economic cycle (for entry) but these exhibit negative coefficients –an issue discussed further below- and against the dominant perspective within policy and economic discourses. The social capital factor in particular has large positive associations in both entry models. The results show, thus, that entry and graduation are two different phenomena and should not be subsumed into a single analysis.

Several factors, in particular economic cycle (for entry) and social capital, show associations of a different sign with entry and graduation, which deserves further research of the mechanisms that lay behind these different associations. The coefficients on the share of the population aged 50 or above are also relatively large, particularly for the models relating to adults aged 35 and above, and for graduation. It may be that the presence of older relatives provides adults with additional family resources and/or support networks (e.g. around childcare provision for example) that facilitates their delayed participation in HE. Alternatively, population ageing may increase the need for individuals to up-skill as they progress through their employment histories and may also encourage individuals to take a longer-term view of their careers given that life expectancy, and likely also the retirement age, could be expected to be higher in ageing countries.

Economic factors perform relatively poorly in terms of their modelled associations despite both policy and academic literatures tending to emphasise their importance. The coefficients across these six explanatory factors are generally small in size (indeed, practically zero for firm technological absorption and inequality), except for economic cycle (entry) and trade openness, where they are large and negative. The size of the employment premium is, as expected, generally positively related to both forms of delayed participation although its effects are slightly larger at the point of entry, when decisions around participation are being taken. Of all of the economic variables trade openness is the most consistent in terms of its direction and shows large effect sizes. The unexpected negative coefficients on firm technological absorption and trade openness may, as 'age stereotype models' of hiring decisions suggest (Gong et al. 2010), reflect the interest of innovative firms in younger educated recruits, which would tend to diminish rather than to increase incentives to greater levels of schooling later on in life. The positive correlation between economic cycle (level of unemployment) and graduation deserves further exploration. Those individuals who were committed to enter HE for the first time as mature students in an unfavourable economic context may be particularly motivated to graduate.

The results for job stability generally show a positive association with delayed HE participation for younger adults, except for older adults in terms of entry into HE. This could lend some support to the literature on labour market dualisation between insiders and outsiders whereby a core set of workers enjoy job security, many of whom will have received early HE, while others do not (Rueda 2005) and would seek upskilling in their quest for greater stability. These findings also underline the importance of life-cycle differences as they suggest that the insecurity associated with 'outsider' status in the labour market can act as a stimulus for greater delayed participation in HE amongst younger adults but as an impediment to such participation in HE for older adults.

System level factors do not present clear associations. The existing stock of graduates in the population was expected to be negatively associated with delayed HE participation but this is not in general the case, although effect sizes are small. The degree of upper secondary vocational specificity has mixed associations but these are, also, small in size.

The lagged variable coefficients are understandably large. Inevitably, many country specific factors and system differences are not captured in the modelling. The importance of the country dummy variables identifying each nation – both in terms of their substantial contribution to the overall model power and in terms of the size of many of their coefficients – suggests that such country specific factors play an important role in shaping levels of delayed participation in HE. It is the task of further research to further illuminate the nationally specific factors which make up this portion of the variance currently captured by these dummy terms. For instance, country dummies show markedly larger negative effect sizes in the graduation models than in the entry models, particularly for adults aged 25 to 34, and this suggests that most countries are markedly less successful than Austria (the reference nation) in supporting delayed entrants through their courses to successful graduations, an aspect which would warrant further research.

5. Conclusions

Although delayed participation in HE has acquired an increasingly high profile within both the education literature and policy strategies its macro-level determinants have been a neglected research area. This paper has sought to respond to this gap. The analyses offer three main conclusions as well as a clear need for further research on the role of nationally specific factors not able to be captured here.

Firstly, at the descriptive level the findings underline the importance of delayed participation in HE and, given the large proportion of adult new entrants in HE in some systems, question the appropriateness of the widely employed typology by Trow (1973) that distinguishes levels of growth of HE systems only by looking at the 'age grade'. Our findings suggest instead that levels of growth in HE systems need to be measured by looking both at the 'age grade' *and* at adult entrants to HE. It is this overall participation level – as well as the extra demands created through the additional diversity that delayed entrants bring to HE systems– that affect the aspects of HE in which Trow (1973) was interested.

Secondly, the analyses do not lend empirical support to the widely claimed trends of convergence in absolute levels of delayed participation in HE across European countries. Our findings show that although expansion in absolute terms is the norm across the countries analysed, there is almost complete diversity in national experiences and growth patterns when looking across both absolute levels and changing shares of delayed entrants to HE. The results also suggest important cleavages related to the life course. Delayed participation in HE decreases markedly after age 35 in virtually all countries, though there are exceptions, such as the UK and Iceland.

Thirdly, the results of the modelling question the importance of economic factors in relation to delayed adult participation in HE despite these factors being emphasised both in the economics of education literature and in policy discourses. In contrast, associations on these factors are generally weak and/ or are, contrary to expectations, negative. Whilst recognising that these results cannot imply causality, these associations suggest that economic factors have not been important drivers of delayed HE participation over the decade analysed. This questions the use of econometric human capital thinking that underpins much of the current political discourse in this area and suggests that if policy makers wish to increase the volume of new adult entrants to HE they should be advised to move away from foregrounding economic arguments and to consider a wider range of influential factors in their policies. While participation in HE may be key to the narrative of the 'knowledge economy' delayed entry does not simply depend on economic factors. At best economic arguments may be used to underline the importance of delayed adult participation in HE. The results suggest, on the other hand, important roles for demographic and social capital factors (in the case of entry), both of which have relatively large positive effects. These factors thus deserve greater attention within the academic literature and policy debates.

Finally, the size of the country dummy terms shows both that national systems matter and that there are country-specific factors of relevance to delayed participation in HE that are not able to be accounted for explicitly within these models. These effects are relatively large and underline a clear need for further research to seek to identify and model these nationally specific factors currently captured within the country dummy terms, particularly in terms of the apparent variation between countries in drop-off between entry and graduation that these models imply. This may include an analysis of relevant government policies and financial arrangements for delayed participation in HE across countries and their effects, an aspect that was not included in this article. Such further research could also explore the clustering of countries based on features that might contribute to the reported national differences. For instance, and although

the patterns are complex, Anglo-Saxon, Nordic and Eastern European countries tend to be comparatively more open in relation to delayed participation –especially with regards to entry- than continental European countries. The country dummies for Anglo-Saxon countries, however, also show that these countries face comparatively much more pronounced challenges in supporting delayed entrants aged 25-34 through to successful graduations than Austria, the reference country. Future analyses could also explore the robustness of the findings in times of economic contraction.

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Appendix A: Data sources

Variable	Indicator	Source
Outcome variables		
Delayed participation in HE	New adult entrants to, and graduations from, ISCED level 5 courses (i.e. 5A and 5B combined), as a share of all new entrants	Eurostat database Population and social conditions >Education and training>Education: Entrants: educ_entr2tl Graduates: educ_grad4
Explanatory factors		
Demographic		
Population ageing	Percentage of total population aged 35-49 years	Eurostat database Population and social conditions >Population>Demography (demo_pjangroup)
Economic		
Firm-level technological absorption	Percentage of the value of manufacturing output that comes from high-skilled manufacturing	Eurostat's annual PRODCOM datasets and two digit level NACE Rev. 2 codes Eurostat statistics tab>Manufactured goods (PRODCOM)
HE employment premium	Percentage point difference in the unemployment rates of tertiary educated and upper secondary educated adults aged 25-64 years	Eurostat population and social conditions database>Labour Market>LFS>(lfsa_urgaed)
Economic cycle	Unemployment rate	Eurostat population and social conditions database>Labour Market>LFS>(lfsa_urgaed)
Trade openness	Total exports and imports as a share of GDP	World Bank National Accounts data >Economic Policy and External Debt
Job stability	Average duration of job tenure for adults aged 25-54 years	OECD StatsExtracts>Labour>Labour force statistics>Job tenure
Income inequality	Gini coefficient	Eurostat population and social conditions database>Living conditions and welfare>Income and living conditions>Income distribution and monetary poverty>Distribution of income>(tessi190)
Social		
Social capital	Social capital index	European Social Survey Waves 1-4
Systemic		
Stock tertiary graduates	Percentage of the population aged 25 plus with tertiary education	Eurostat database Population and social conditions >Education and Training>Educational attainment, outcomes and returns of education (edat_lfse_06 and edat_lfse_07)
Upper secondary general/theoretical cohort	Percentage of the upper secondary education cohort engaged in general/theoretical programmes	Eurostat population and social conditions database>Education and training>Education>Enrollments>(educ_enrl1tl)