Fixing Europe's youth unemployment and skills mismatch, can public financial support to SMEs be effective? The case of the European Commission and European Investment Bank joint initiatives.

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Contents

1. Introduction and executive summary

Youth unemployment is a striking issue in the world and particularly in the European Union. It undermines the perspectives of new generations and threatens social cohesion. Youth unemployment is a self-sustained phenomenon arising from young people's lack of skills as well as depressed economic conditions. Tackling youth unemployment in the European Union requires to mobilize new policy instruments that would effectively support and sustain youth employment perspectives.

Yet, the objective is to directly support employers to improve their ability to hire and train young people. This thesis assesses the relevance, effectiveness and scope for success of such-demand driven policy and operational approaches. In particular, Small and Medium Enterprises (SMEs), the main employers of young people, suffer from a lack of skills and a constrained access to finance. Hiring and training young people appears challenging for them. This reinforces their own skills issues and sustaining high unemployment rates.

A comprehensive initiative for youth employment channeled through SMEs would be effective if such support is, for all the stakeholders involved, required and profitable. In depth, the SMEs point of view is particularly important as their responsiveness to such program will determine its success. Building on this assessment, this thesis proposes a set of comprehensive recommendations to better calibrate these initiatives and foster the enabling environment. In this field, the European Union institutions, and in particular, the European Commission (EC), and the European Investment Bank (EIB), which channel important resources towards development programs could play a sharp and bold role. Public financial support to SMEs to bolster youth employment constitutes the primary focus of this thesis. It also includes a comprehensive and related investigation into the European youth unemployment and initial vocational training policy contexts.

Youth unemployment arises from a self-sustained loop between youth lack of skills and firms' lack of finance, reinforced by the economic depression.

Roughly 6 million young people between 18 and 24 years old are unemployed in the EU, resulting in an overall 23.3% unemployment rate. The EU member States are affected differently. Although it arises from structural patterns, youth unemployment has overreacted to the current economic turmoil. This involves high political

and economic costs for the European societies as a whole generation is threatened. It undermines the EU productive potential and overall political project.

Firstly, youth unemployment lies in the significant mismatch existing between youth qualifications and the actual skills required by firms within the economy. This skills mismatch takes the form of over and under education, admitting the lack of relevance of education curricula for the labor markets needs. It has to be addressed through a better responsiveness of training systems, emphasizing on work place learning. Secondly, SMEs being the first employers of young people in Europe, their small financial and logistical capabilities constrain their ability to properly invest in training. This has been reinforced by the economic crisis which has worsened their financial position and increased credit market fragmentation across the European Union. Therefore, to be efficient, an initiative tackling youth unemployment in the EU shall address SMEs' specific financing needs through tailor-made products.

Dual initial vocational education has proven to be efficient in reducing the skills mismatch and promoting youth employment.

Dual education associates school and work based vocational training. Various theoretical and empirical evidence have shown that this type of training eases the youth skills mismatch as it combines the delivery of practical and relevant skills with a broader and transferable knowledge. Quality on-the-job training placements and consistent learning framework are key determinants for successful outcomes. Workplace vocational education is considered as a decisive policy to tackle Europe's youth unemployment challenges.

Scholars have demonstrated the significant benefits of on-the-job training for young people, employers and local governments. However, dual vocational education and especially its work based component are insufficiently developed within SMEs, especially because of market failures, capabilities issues and a lack of incentives. Therefore, the public sector shall step up to make a difference. In order to be effective, such interventions ought to understand various stakeholders' needs, shape incentives accordingly, design the relevant flexible frameworks and target properly youth and SMEs.

The European Commission and the European Investment Bank are stepping up to take a decisive stance in the fight against youth unemployment.

Before the recent spur of the European youth unemployment crisis, the EC had a priority in youths' training and the EIB in SMEs' access to finance. Nevertheless, those policy actions did not have youth employment as a specific goal.

Through program interventions and financial products mobilization, the EC and EIB can be determining catalysts to reduce youth unemployment in the European

Union. As a result, the two institutions have developed some tailor-made innovative intervention types to specifically address such challenges. The EC has launched in early 2014 its *Youth Employment Initiative*; in August 2013, the European Investment Bank has implemented its *Skills and Jobs - Investing in Youth* program. In depth, these initiatives support SMEs' funding to hire and train youth, develop on-the-job training opportunities for youth and aim to modernize vocational education systems across Europe. Both institutions can benefit from common synergies.

The outcomes of such policy options depend on the various stakeholders' responsiveness. Therefore, a careful investigation of their needs and behavior would help understanding how to better calibrate these interventions.

Several comprehensive micro data analyses of various stakeholders' needs and behavior reveal the relevance and scope for success of such options.

A first analysis based on the European Commission, European Central Bank survey on the access of firms to finance (SAFE) demonstrates the magnitude of firms' lack of skills and lack of finance as well as the connection between both constraints. It also shows a positive effect of public funds on employment generation.

The second analysis attempts to capture the behavior of firms providing training. From the Bruegel-Unicredit European firms in a global economy (EFIGE) dataset, it is proved that firms lacking finance tend to provide less training. Besides, firm-level training provision has concrete positive effects on productivity and employment creation. Public funds could stimulate firms' training investments.

In order to be relevant, the EC/EIB interventions ought to adequately target SMEs already providing training or lacking skills. Thus, the two previous analyses reveal that such firms are less likely to request bank financing but more are more likely to seek for equity, mezzanine or securitization financing.

These two first assessment do not capture specific dynamics for the youth as such data are not provided. However, such general trends could appear even more relevant for the youth and constitute a sound basis to develop comprehensive policy answers to youth unemployment challenges.

The last micro econometrics analysis is based on Eurostat regional data. It outlines the positive effects of vocational education in terms of development and youth employment convergence. If vocational education development reduces youth unemployment, its effects on job matching and youth inactivity could be greater, implying that the current vocational education schemes ought to be fostered.

Some management recommendations to maximize the impact of such initiatives on youth and SMEs.

From a policy standpoint, the EC and EIB shall set up the adequate frameworks to enhance training quality and increase investment in work base learning. It is therefore important to build and sustain the relevant partnerships between all the stakeholders; their active involvement shall be ensured. Outreaching youth is determining, it could be achieved if young people's integration into the labor market is ambitiously supported. Advertising on the interests of vocational education and work place training for youth would attract more of them.

Program interventions shall attempt to ease SMEs' logistic and financial constraints to provide training. Training firms should therefore collaborate on a sectorial or regional basis to develop work place training opportunities and mutualize their training programs. Newly developed innovative training technologies could reduce SMEs' training costs and target better their specific needs. Youth entrepreneurship and self-employment support could fulfill similar objectives. Eventually, promoting work base training for youth supposes concentrating on the skills required today and in the future.

Mobilizing the adequate financial products will determine a significant part of these initiatives' outcomes. Indeed, the type of financing used directly determines firms' participation and reaction function. To this extent, the EC and EIB ought to set the stage for systematic cost sharing mechanisms among all the stakeholders involved. As the bank financing channel is weakened in Europe and firms do not seem to be keen on requesting such financing provision, the EC and EIB should develop alternative/non bank intermediated financial products. To leverage more resources into youth training, the EC/EIB could support the development of a broader market for private investors. Stimulating young people's own ownership of their employment and training opportunities may be a relevant and solution to explore.

2. EU youth unemployment: skills mismatch and SMEs access to finance

2.1. EU youth unemployment: An Overview

2.1.1. Youth unemployment trends in the EU

In its report on *Youth Unemployment Trends*, the International Labor Organization characterized the perspectives for the youth as *"gloomy"* (ILO 2013 b). This statement reflects particularly the magnitude of the challenges the EU is facing.

Using Eurostat definition (Eurostat 2013, p101), the youth unemployed are the persons aged between 15 and 24 *"who were without work during the reference week, or were currently available for work and were either actively seeking work in the past 4 weeks or had already found a job to start within the next 3 months"*. The youth unemployment rate represents the ratio of unemployed youth over the economically active 15-24 years old population.

Eurostat data reveal that nearly 6 million youth are unemployed (5.5 million as of December 2013). This accounted in December 2013 for a 23.3% unemployment rate in this age category for the EU 28. This is to compare with an overall 11% unemployment rate. OECD figures show that youth unemployment rates in the EU reached a maximum level in 25 years; in some countries it is even an absolute maximum (OECD 2013 d).

Youth unemployment rates are significant and affect European countries disproportionally. The so called "southern" and "periphery" countries of the EU are characterized by rates of youth unemployment dramatically higher than their "core" and "northern" counterparts. In some countries as Croatia, Greece, Italy, Portugal or Spain, these rates are actually tremendous.

Table 2.1.: Youth Unemployment rates as of December 2013

EU 28	22.9	Finland	16.6	Malta	13.8
Euro area	23.3	France	26.2	Netherlands	10.5
Austria	10.1	Germany	6.8	Poland	27.7
Belgium	22.5	Greece	57.4*	Portugal	36.4
Bulgaria	30.5	Hungary	24.1*	Romania	23.2***
Croatia	50.8	Ireland	23	Slovakia	32.7
Cyprus	38.7	Italy	42.1	Slovenia	24.4
Czech Republic	18.6	Latvia	27.6**	Spain	53.4
Denmark	12.8	Lithuania	22.9	Sweden	20.2
Estonia	21.4*	Luxembourg	21.0	United Kingdom	20.8**

* November data.
** October data.
*** September data.
Data: Eurostat

Figure 2.1.: Youth Unemployment - Regional Breakdown 2011

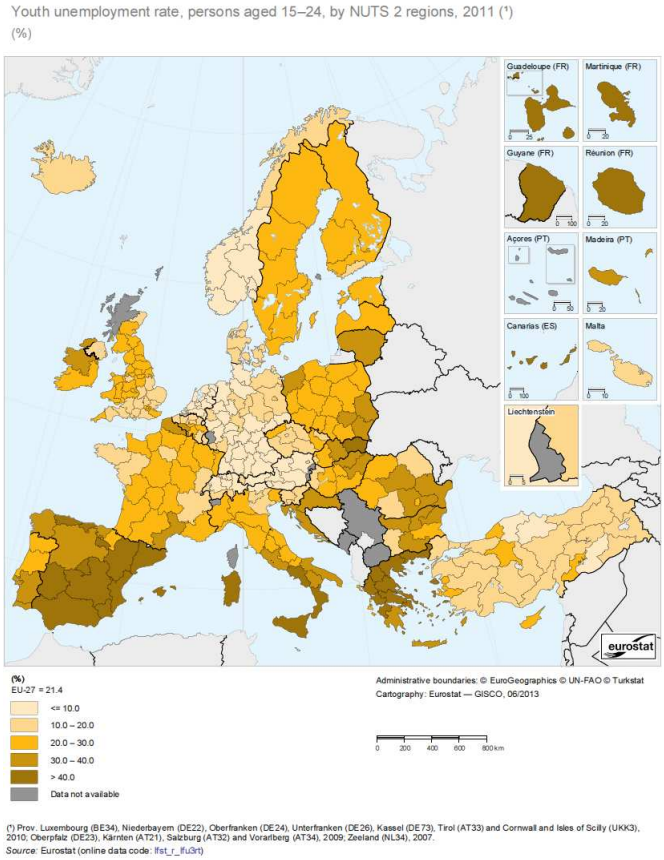
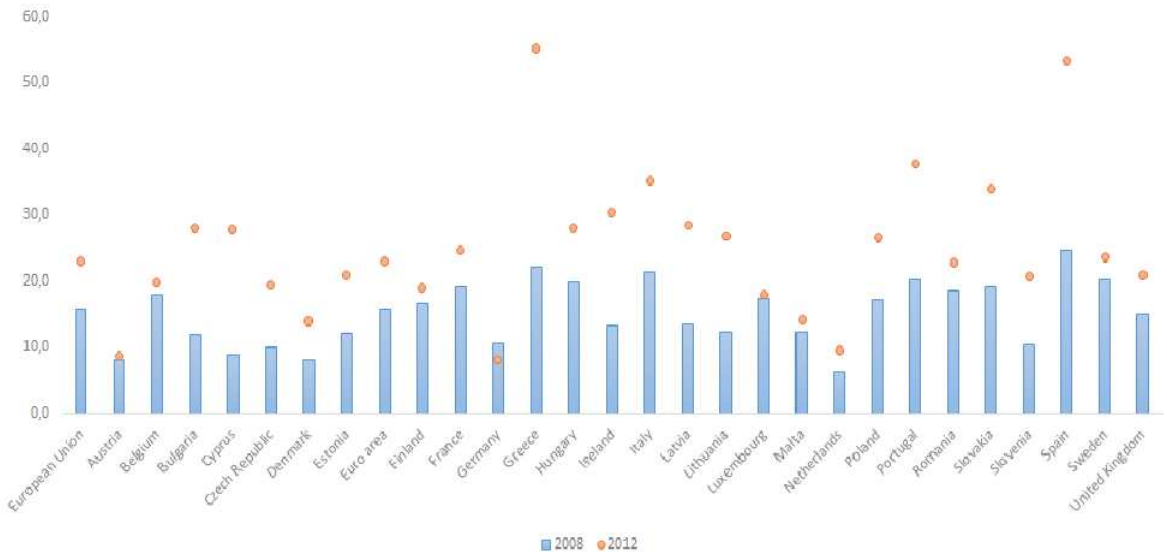
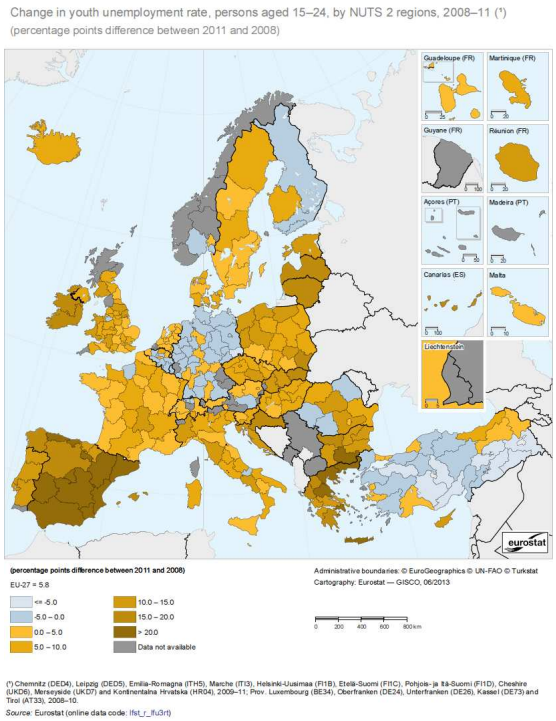


Figure 2.2.: Change in Youth Unemployment 2008-2012



Data: Eurostat.

Figure 2.3.: Change in Youth Unemployment 2008-2011



The OECD expects little changes in this trend for next couple of years (OECD 2013 a).

A more qualitative analysis of youth unemployment in the EU should recall three important facts. First, youth unemployment rates do not take into account the whole picture. The young population not in employment, education or training, the NEETs represents the challenges the EU is facing in a better way. There are 7.5 million of them within the EU (Eurostat). Second, youth unemployment tends to combine itself with long term unemployment. An increasing share of youth unemployed are unemployed for more than six months (ILO 2013 b). Youth unemployment affects with more severity the disadvantaged (OECD 2013 d). Third, the work quality for the youth has decreased with the proliferation of non-standard contracts: temporary or part time work mostly. In France, Germany, Poland, Portugal, Sweden and Spain, at least half of the youth employed are hired on a temporary basis (Higgins 2012).

Unlike overall unemployment rates, youth unemployment rates do not only evolve as a reaction to the business cycle. The great recession and the fiscal contraction are not the only causes for dramatic youth unemployment levels. The difference between youth and adult unemployment rates outlines, for each country, the magnitude of the youth employment challenges. The gap has been widening since September 2013, admitting that the observable job recovery does not concern the youth yet.

Table 2.2.: Difference youth unemployment rate and adult unemployment rate as of December 2013

EU 28	13.8	Finland	12.6	Malta	9.7
Euro area	13.0	France	16.3	Netherlands	5.1
Austria	4.7	Germany	2.6	Poland	18.9
Belgium	16.1	Greece	30.7*	Portugal	22.9
Bulgaria	17.5	Hungary	16.8*	Romania	16.8
Croatia	33.7	Ireland	13.9	Slovakia	20.4
Cyprus	25.7	Italy	27.9*	Slovenia	14.4
Czech Republic	12.9	Latvia	8.8*	Spain	30.8
Denmark	7.1	Lithuania	11.4	Sweden	14.6*
Estonia	6.6*	Luxembourg	15.1	United Kingdom	13.3*

* September data.
Data: Eurostat

Although youth unemployment rates are always higher than overall unemployment rates (OECD 2010 d), the magnitude this difference, for most of the EU countries, implies some particular structural patterns. This difference is 7.9% in the US and 3.3% in Japan (Eurostat), suggesting that youth unemployment may be a EU specific challenge.

2.1.2. Youth unemployment patterns in the EU

Youth unemployment which is structurally at a high level in the EU, tends to over-react to the business cycle.

Table 2.3.: Difference between youth unemployment rate and 25-74 years unemployment rate: 2008 vs 2012

	2008	2012		2008	2012		2008	2012
EU 28	9.8	13.9	France	12.8	16.0	Netherlands	3.9	5.0
Euro area	9.3	13.0	Germany	3.5	2.9	Poland	11.4	18.0
Austria	4.9	5.1	Greece	15.5	33.1	Portugal	13.0	23.7
Belgium	12.1	13.4	Hungary	13.0	18.5	Romania	14.2	17.1
Bulgaria	6.9	17.1	Ireland	8.1	17.5	Slovakia	10.8	21.8
Cyprus	5.9	17.6	Italy	15.7	26.4	Slovenia	6.7	12.7
Czech Republic	6.0	13.5	Latvia	6.7	14.9	Spain	14.8	30.5
Denmark	5.5	7.7	Lithuania	7.7	14.5	Sweden	16.1	18.0
Estonia	7.5	12.0	Luxembourg	13.4	13.8	United Kingdom	11.1	15.3
Finland	11.6	12.9	Malta	7.5	9.2			

Data: Eurostat.

This table highlights two patterns in youth unemployment. First, compared to adult unemployment, youth unemployment tends to be structurally higher. Even in 2008, at a time considered as an historical low for youth unemployment rates (Gomez-Salvador & Leiner-Killinger 2008), such rates displayed a strong difference with respect to adult unemployment rates. Even in some countries considered as economically virtuous, such differences were important: Finland, Luxembourg or Sweden. Second, youth unemployment rates have reacted more than the adult rates to the economic depression which started in 2008. Indeed, in every country except Germany this difference has increased from 2008 to 2012. However, except for the countries which have faced a dramatic economic turmoil, the change between 2008 and 2012 is not wide.

As recalled by Daniel Gros (2013), a comprehensive understanding of youth unemployment supposes to analyze this dynamic beyond youth unemployment rates. Indeed, youth unemployment rates cannot fully be compared to adult unemployment rates. A significant part of the 15-24 years old is indeed not part of the active population yet; as most of those youth are currently enrolled in education or training. In addition, the situation is deeply different between the 15-18 and the 19-24 years old segments as most of the 15-18 may not be seeking for immediate employment.

Thus it is insightful to take a look into the youth unemployment ratio (unemployed population/total population) and the percentage of youth not in education employment or training (NEETs).

Table 2.4.: Youth unemployment ratio 2012

EU 28	9.7	France	9.0	Netherlands	6.6
Euro area	9.6	Germany	4.1	Poland	8.9
Austria	5.2	Greece	16.1	Portugal	14.3
Belgium	6.2	Hungary	7.3	Romania	7.0
Bulgaria	8.5	Ireland	12.3	Slovakia	10.4
Cyprus	10.8	Italy	10.1	Slovenia	7.1
Czech Republic	6.1	Latvia	11.5	Spain	20.6
Denmark	9.1	Lithuania	7.8	Sweden	12.4
Estonia	8.7	Luxembourg	5.0	United Kingdom	12.4
Finland	9.8	Malta	7.2		

Data: Eurostat.

Table 2.5.: NEETS ratio 2012

EU 28	13.1	France	12.2	Netherlands	4.3*
Euro area	13.0	Germany	7.1	Poland	11.8
Austria	6.5	Greece	20.3	Portugal	14.1*
Belgium	12.3	Hungary	14.7	Romania	16.8
Bulgaria	21.5	Ireland	18.7	Slovakia	13.8
Cyprus	16.0	Italy	21.1	Slovenia	9.3
Czech Republic	8.9	Latvia	14.9	Spain	18.8*
Denmark	6.6*	Lithuania	11.2	Sweden	7.8*
Estonia	12.5	Luxembourg	5.9	United Kingdom	14.0
Finland	8.6*	Malta	11.1		

* NEETs measurement issues.
Data: Eurostat.

It nuances the dramatic dynamics captured by youth unemployment rates solely. For instance, the 56.5% Spanish youth unemployment rate corresponds to 943,000 young people seeking for immediate employment (Eurostat - 2013 third quarter).

However, these important differences between youth unemployment rates and youth unemployment ratios could also be the result of an exit from the active population or a prolonged period of education to avoid unemployment (OECD 2010 d). Analyzing youth unemployment in the EU requires to assess youth access to employment and its relation with several key factors as the business cycle or demographics.

Inspired from Nial O' Higgins (2012), the following set of regressions provides, for each country, an assessment of the youth employment patterns.

Assuming that business cycle affects employment with a lag effect of two quarters, the following set of regressions is used to perform an OLS panel analysis.

$$Ln(ER^{y}_{it}) = \alpha_i + \beta_i Ln(GDP_{i,t-2}) + \varepsilon_{it} \qquad \textbf{(1.1)}$$

$$Ln(ER^{a}_{it}) = \alpha_i + \beta_i Ln(GDP_{i,t-2}) + \varepsilon_{it} \qquad \textbf{(1.2)}$$

$$Ln(ER^{y}_{it}) = \alpha_i + \beta_i Ln(ER^{a}_{it}) + \varepsilon_{it} \qquad \textbf{(1.3)}$$

Where ER^{y}_{it} is the youth population employed for country i at time t.

ER^{a}_{it} is the employed population over 25 years old for country i at time t.

$GDP_{i,t-2}$ is an index for real GDP, with a lag effect of two semesters compared to the employment rate.

Data run from Q1 2008 until Q3 2013.

Table 2.6.: Youth employment patterns 1/3

	(1) Ln youth employed	(2) Ln employed 25 and over	(3) Ln youth employed
Ln GDP lag	0.0757	0.120***	
	(0.98)	(6.67)	
Ln employed 25 and over			2.811***
			(22.30)
Constant	4.902***	6.797***	-16.98***
	(6.01)	(35.61)	(-16.69)
Observations	600	600	600

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Data: Eurostat.

Youth employment tends to be less responsive to the business cycle than employment for the population over 25 years old. The weakness of this positive relation implies that growth is not a sufficient condition to boost youth employment. It suggests structural issues for youth employment.

With some controls for the overall employment dynamics and the demographic changes, the structural patterns of youth employment appear more clearly.

$$Ln(ER^{y}_{it}) = \alpha_i + \beta_i Ln(GDP_{i,t-2}) + \beta_i Ln(ER^{t}_{it}) + \varepsilon_{it} \qquad \textbf{(1.4)}$$

$$Ln(ER^{y}_{it}) = \alpha_i + \beta_i Ln(GDP_{i,t-2}) + \beta_i Ln(TP^{y}_{it}) + \varepsilon_{it} \qquad \textbf{(1.5)}$$

$$Ln(ER^{y}_{it}) = \alpha_i + \beta_i Ln(GDP_{i,t-2}) + \beta_i Ln(ER^{t}_{it}) + \beta_i Ln(TP^{y}_{it}) + \varepsilon_{it} \qquad \textbf{(1.6)}$$

Where$ER^{t}_{it}$is the overall employed population for country i at time t and;

$TP^{y}_{it}$is the total population between 15 and 24 years old for a country i at time t.

Table 2.7.: Youth employment patterns 2/3

	(4) Ln youth employed	(5) Ln youth employed	(6) Ln youth employed
Ln GDP lag	-0.278***	0.193**	-0.210***
	(-6.30)	(3.14)	(-4.64)
Ln total employed	3.037***		2.695***
	(35.68)		(25.06)
Ln youth population		1.710***	0.412***
		(18.58)	(5.03)
Constant	-16.15***	-8.109***	-16.92***
	(-21.68)	(-8.52)	(-22.70)
Observations	600	600	600

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Data: Eurostat.

The overall employment and demographic dynamics seem to have more powerful effects on youth employment than the business cycle.

Although it is mostly not statistically significant, the following table provides the coefficients to the following regression for each country.

$$Ln(ER^{y}_{t}) = \alpha + \beta Ln(GDP_{i,t-2}) + \varepsilon_{t} \qquad \textbf{(1.7)}$$

Table 2.8.: Youth employment patterns 3/3

Country	β	Country	β	Country	β
Austria	-0.324*	Germany	-0.1255	Netherlands	0.105
Belgium	-0.164	Greece	2.413***	Poland	-0.547*
Bulgaria	-0.903***	Hungary	-0.0388	Portugal	1.229
Cyprus	-1.240**	Ireland	2.903***	Romania	-0.12
Czech Republic	-0.679*	Italy	-2.39	Slovakia	-1.46
Denmark	-0.253	Latvia	0.511	Slovenia	-0.802
Estonia	0.614	Lithuania	0.584	Spain	3.084
Finland	0.496	Luxembourg	-3.743	Sweden	0.219
France	-0.776*	Malta	-0.363**	United Kingdom	0.189

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Data: Eurostat.

The lower the β, is the less youth employment is driven by the business cycle. A negative coefficient suggests that the changes in youth employment are so dramatic that a rise in GDP is not sufficient to reverse the downward trend of youth employment. Such coefficients display important country-specific features within the EU. Employment patterns are highly dependent on local conditions, but some similar structural patterns appear for most of the EU countries.

2.1.3. The costs of youth unemployment for the EU

"We have one of the best-educated generation and we are putting them on hold. That is not acceptable"[1]. Enrico Giovannini, Italian minister of social affairs and employment.

2.1.3.1. The costs of youth unemployment on the current youth generation

"In advanced economies long-term unemployment has arrived as an unexpected tax on the current generation of youth" (ILO 2013 b, p 2)

Yet, youth unemployed find themselves in a joblessness trap. As youth unemployment reinforces itself, they find themselves in a really difficult situation to gain a professional experience that would result in stable employment.

Youth unemployment not only affects the unemployed but also the employed youth within the same generation. They witness a deterioration of their employment conditions. They find themselves experiencing a bigger fear over their job security.

[1]SciencesPo Town Hall Meeting, 28th of May 2013

It involves, more broadly, some reduced employment opportunities for the current youth generation. The rise of temporary and part time work is a clear sign of this trend.

This involves adverse social impacts as well as deteriorated well-being, health and social conditions for the youths (Ryan 2001). Eventually, youth unemployment is characterized by long lasting effects on the generation concerned (Bell & Blanchflower 2011). These *"scaring effects"* (Ellwood, 1979), can still hurt after two decades. It leads to a higher probability of being unemployed in the later years and lower wages. To a lower extent, such scaring effects also affect the generations which entered the job market at a period of high youth unemployment levels (OECD 2010 d).

2.1.3.2. The costs of youth unemployment on the EU

According to the International Monetary Fund (IMF) Managing Director, Christine Lagarde the magnitude of youth unemployment in Europe is so important that it could *"darken"* the overall EU recovery (Grobe 2013 & Stewart 2013). Those individual effects induce major challenges for the whole community. According to Eurofound, the economic loss of youth unemployment for the EU society amounts to €150 billion or 1.2% of European GDP (Eurofound, 2012). Such costs arise from the direct assistance to unemployed youths, but also from the reduced job and market opportunities as well as a lower tax and social contribution collection. *"Not taking advantage of the skills, passion and energy that young people bring is enormously costly for global growth"* (Mattias Lundberg, in Financial Times 2014).

"Perhaps the most important scarring is in terms of the current young generation's distrust in the socio-economic and political system" (ILO 2013 b, p 2). Indeed, youth unemployment also generates some sharp challenges to social cohesion, financial stability and social security sustainability. Furthermore, the youths who cannot manage to be integrated in the workforce could lose confidence in their societies' economic and social institutions. The rise in youth exclusion and distrust represents a major threat to national and European policy projects.

2.1.3.3. Reasons to act

European leaders, aware of the major youth unemployment threats, agreed to implement *"offensive"*[2] programs. The causes of youth unemployment are multiple and diversified. But, they mostly arise from a depressed economic environment, a mismatch between youth qualifications and job requirements and inadequate employment policies for the youths (Gomez-Salvador & Leinar-Killinger 2008). Most of these issues are characterized by country-specific features and would require coherent public sector interventions.

[2]François Hollande, SciencesPo Town Hall Meeting, 28th of May 2013

The next two sections will analyze two important determinants of youth unemployment on which EU based policies could have a clear mitigating impact: the youth inadequate qualifications and SMEs' constrained access to finance, that restrict them to hire young people.

2.2. The youth's skills mismatch challenges

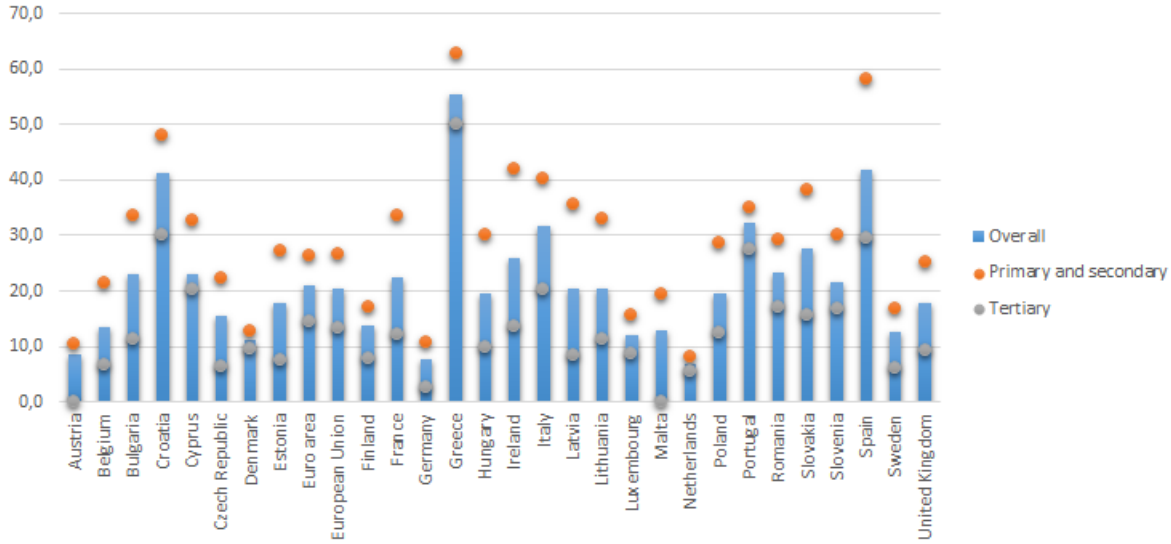
"An overriding reason for young people being held back is a lack of skills relevant to the workplace". (McKinsey 2014, p 1).

Among the European firms surveyed by the McKinsey Center for Government (2014), 61% *"were not confident they could find enough (youth) applicants with the right skills to meet their business needs"* (Mc Kinsey 2014, p 1). The widening gap between youth's qualifications and the job market skills requirements is considered as one of the major determinants of youth unemployment (Gomez-Salvador & Leiner-Killinger, 2008). The fact that employers and education providers are unlikely to assess youth skills readiness for the labor market in the same way reveals the magnitude of this youth skills mismatch (McKinsey 2014).

2.2.1. Youth skills mismatch and unemployment: overview

Depending on their level of educational achievement, young people are differently affected by unemployment. The following chart displays the unemployment ratio of the 15 to 34 years old, one to three year after the end of their last educational curricula. Unemployment is broken down by educational attainment, following the ISCE (International Standard Classification of Education) standards; Preprimary, secondary and post-secondary corresponds (0 to 4 level), first/second stage tertiary education (5 or 6).

Figure 2.4.: Youth unemployment ratio by education attainment



Data: Eurostat

It appears that there is a sharp connection between youth education level and youth unemployment. The following set of regressions assesses the connection between youth education and unemployment for the period 2001-2011.

Taking into account fixed effects, with some control for GDP and cohort size, the youth unemployed population is regressed against the youth graduate population for a given year, in a panel OLS framework.

Youth graduate population is broken down by education type: general or vocational. Eventually, such effects are measured with a lag of one year.

U_{it}^{y} is the youth unemployed population for a country i at time t;

$U_{i,t+1}^{y}$ is the youth unemployed population with a one year forward effect in comparison with the other data for a country i at time t; $Graduates_{it}$is the population who just graduated for a country i at time t;

$Graduates - General_{it}$is this the graduate population breakdown for general education and;

$Graduates - Vocational_{it}$, the graduate population breakdown for vocational, following ISCE standards.

$$Ln(U_{it}^{y}) = \alpha_i + \beta_i Ln(Graduates_{it}) + \beta_i Ln(GDP_{it}) + \beta_i Ln(TP_{it}^{y}) + \varepsilon_{it} \qquad \textbf{(1.8)}$$

$$Ln(U_{it}^{y}) = \alpha_i + \beta_i Ln(Graduates - General_{it}) + \beta_i Ln(GDP_{it}) + \beta_i Ln(TP_{it}^{y}) + \varepsilon_{it} \qquad \textbf{(1.9)}$$

$$Ln(U_{it}^{y}) = \alpha_i + \beta_i Ln(Graduates - Vocational_{it}) + \beta_i Ln(GDP_{it}) + \beta_i Ln(TP_{it}^{y}) + \varepsilon_{it} \quad \textbf{(1.10)}$$

Table 2.9.: Youth Education and unemployment

	(8) Ln youth unemployed	(9) Ln youth unemployed	(10) Ln youth unemployed
Ln graduates	-0.0312**		
	(-2.91)		
Ln GDP	0.0720*	0.0715*	0.0562
	(2.19)	(2.20)	(1.60)
Ln youth population	0.925***	0.933***	0.916***
	(17.07)	(17.37)	(16.52)
Ln General education		-0.0403***	
		(-3.67)	
Ln Vocational education			-0.0286*
			(-2.51)
Constant	-1.790*	-1.862*	-1.619*
	(-2.25)	(-2.36)	(-1.99)
Observations	270	270	260

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Data: Eurostat

$$Ln(U_{i,t+1}^{y}) = \alpha_i + \beta_i Ln(Graduates_{it}) + \beta_i Ln(GDP_{it}) + \beta_i Ln(TP_{it}^{y}) + \varepsilon_{it} \quad \textbf{(1.11)}$$

$$Ln(U_{i,t+1}^{y}) = \alpha_i + \beta_i Ln(Graduates - General_{it}) + \beta_i Ln(GDP_{it}) + \beta_i Ln(TP_{it}^{y}) + \varepsilon_{it} \quad \textbf{(1.12)}$$

$$Ln(U_{i,t+1}^{y}) = \alpha_i + \beta_i Ln(Graduates - Vocational_{it}) + \beta_i Ln(GDP_{it}) + \beta_i Ln(TP_{it}^{y}) + \varepsilon_{it} \quad \textbf{(1.13)}$$

Table 2.10.: Youth education and forward unemployment

	(11) Ln youth unemployed forward	(12) Ln youth unemployed forward	(13) Ln youth unemployed forward
Ln graduates	-0.0264		
	(-1.01)		
Ln GDP	0.0977	0.0984	0.0682
	(1.36)	(1.37)	(0.89)
Ln youth population	-0.0404	-0.0411	-0.0394
	(-0.55)	(-0.56)	(-0.53)
Ln General education		-0.0376	
		(-1.39)	
Ln Vocational education			-0.0195
			(-0.70)
Constant	4.355***	4.400***	4.459***
	(8.42)	(8.57)	(8.32)
Observations	297	297	286

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Data: Eurostat

Thus the negative correlation coefficient means that the graduating population for a given year in a given country tends to reduce the youth unemployed population for the same year in this given country. The fact that similar effects are observable with a one year lag effect supports the strength of this relation. General education seems to have a stronger negative impact on youth unemployment than vocational education. Such results arise from the fact that the General graduates' population includes higher ISCE levels of education than Vocational ones; especially tertiary education is included among the general graduates but not the vocational ones. It is consistent with the literature suggesting that the highest education levels and especially tertiary education lead to better labor market outcomes, especially for tertiary education (Biavaschi, Eicchorst, Giulietti; Kendzia, Muravyev, Pieters, Rodriguez-Planas, Schmidl & Zimmerman 2012). Controlling for ISCE levels within each category would have led to slightly different results; as evidence support that the prospects for middle vocational education graduates are better than the ones of middle general education graduates (CEDEFOP 2012 a).

According the International Labor Organization (2013 b), there are two types of

skills mismatch. *"The first type consists of mismatch between the supply and demand for skills, and is based on a comparison of the educational attainments of the employed and the unemployed. The second type concerns mismatch between the skills that young people possess and those required by their jobs"* (ILO 2013 b, p 4). Thus, young people can be affected by both under education and over education. Young workers seem far more exposed to such phenomenona than their more senior counter parts. If deteriorating economic conditions tend to increase under education as they narrow the least educated employment perspectives, they also affect over education as *"youth with higher levels of education are increasingly taking up jobs that they are overqualified to do"* (ILO 2013 b, p 5). Both dynamics are mutually sustaining each other, *"The growing phenomenon of over education therefore implies a crowding out of the ones at the bottom of the educational pyramid. The less educated youth find themselves at the back of the queue even for those jobs for which they are the best qualified"* (ILO 2013 b, p 5).

The table below indicates the incidence of under and over education for youth. It shows the magnitude of youth skills mismatch in the EU, in some countries more than 50% of the youth are either undereducated or overeducated for the job market. Skills mismatch appears stronger in countries where youth unemployment is higher.

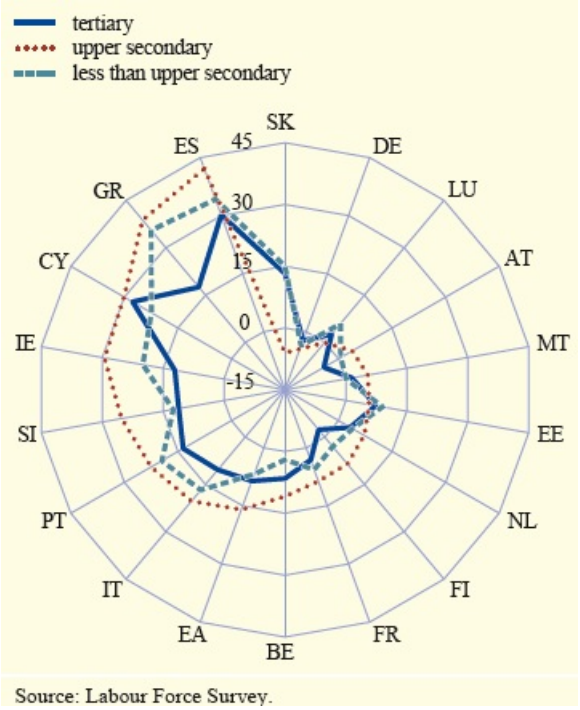
Table 2.11.: Under and over education in the EU as of 2010

Country	Youth over education	Youth under education	Country	Youth over education	Youth under education
Austria	8.7*	31.1*	Italy	5.3**	35.9**
Belgium	18.5	24.0	Latvia	17.4*	13.5*
Bulgaria	14.7	18.1	Lithuania	16.5	13.1
Croatia	13.3	6.3	Luxembourg	3.8**	39.6**
Cyprus	33.2	10.8	Netherlands	5.9	45.0
Czech Republic	6.8	18.2	Poland	11.6	23.2
Denmark	8.9	38.6	Portugal	9.0	36.6
Estonia	16.5	23.7	Romania	14.5*	29.4*
Finland	10.6	18.4	Slovakia	11.7	27.5
France	14.6	16.6	Slovenia	14.4	20.2
Germany	4.7	44.2	Spain	12.7	35.8
Greece	15.3	18.1	Sweden	11.1	19.7
Hungary	10.4	5.5	United Kingdom	24.0	25.5
Ireland	18.2	16.6			

* 2008 data
** 2004 data
Data: ILO

The following chart captures the sharp developments in both under and over education since the spur of the crisis.

Figure 2.5.: Change in youth unemployment by educational attainment - Percentage change 2007 vs 2013



From ECB 2014.

2.2.2. Youth skills mismatch and unemployment: theoretical foundations

"The route from schooling to employment is often depicted as long and perilous, unlike the short and direct routes presumed to be available to previous generations" Paul Ryan (2001, p 1).

Skills mismatch reveals a gap between the youth qualification and the skills requirements of the labor markets. It is a disequilibrium between demand and supply in the youth job market. Under education represents an excess demand for educated workers at the expense of the least educated ones. Over education implies that the demand for skilled jobs is not increasing as quickly as the supply of graduates into the job market (Gomez-Salvado & Leinar-Killingerr, 2008). Over and under education suggest a dissimilarity between the qualification gained in school and the jobs skills' requirements. On average, 10%to 1/3 of the youth is over educated, 20% are undereducated. This mismatch implies a disconnection between education contents and job's skills needs.

Education is supposed to prepare for the job market. However, the school to work transition process is complex for youth, as it creates two groups facing difficulties,

the *"poorly-integrated new entrants"* and the *"youth left behind"* (OECD 2010 d). In some countries as France, Greece, Italy or Spain, education does not facilitate access to employment. Some fields of education are particularly affected: economics, law, arts or humanities (ILO 2013 b). General education is characterized by a higher risk of skills mismatch. Education curricula which deliver skills more relevant to the labor market seem to be characterized by smoother school to work transition processes (OECD 2010 d).

Ryan (2001) has observed that school to work transition is became more complex because of deteriorated options for the least skills and a growing importance of job-skills' matching. This mismatch arises from labor market systems and policies, the business cycle and heterogeneities in jobs and skills delivery and requirements. It supposes information asymmetries when it comes to choose a degree or hire a youth. It eventually implies that training and education systems are not fully responsive to the labor market requirements and evolutions (CEDEFOP 2013 a). Skills mismatch trigger youth unemployment as young people cannot find a job matching their qualifications. Because of youth skills' lack of relevance, employers often choose not to hire them than taking the risk of having inadequatly skilled employees (Mc Kinsey 2014). In addition skills mismatch affects job quality and satisfaction. For the youths it influences negatively their wages and firms' productivity is reduced (ILO 2013 b).

2.2.3. Youth skills mismatch and unemployment: challenges to address

Skills mismatch represents an ambitious challenge to address. It supposes tackling both under and over education. Improving the responsiveness of education and training systems and creating more job opportunities for the youths is necessary. The least educated shall be provided education and training that would enable them to enter into the job market. The most educated who do not fully use their qualifications in their job ought to be provided additional training and guidance in order to find a position that would fit them. Those can be effectively addressed if employers can provide an adequate job for both non skilled and skilled youth.

Skills mismatch supposes that youth are not effectively prepared to enter in the job market and that employers cannot find the skilled workers they seek. Thus, while the number of unemployed youth is reaching new records, the job vacancies are spurring. According to the European Commission, in spite of the youth unemployment challenges, there are 2 million entry level job vacancies in the EU. Especially in the following fields: hotels and restaurant, health, transport, education, real estate, manufacturing, construction (CEDEFOP 2012 b). According to a survey by McKinsey (2012), midsize employers have 13 entry-level openings on average, 27 for large employers. Youth lack of skills is thus also harmful for businesses.

2.3. SMEs constrained access to finance and youth unemployment

2.3.1. SMEs constrained access to finance and youth unemployment: overview

Both the International Labor Organization (ILO 2013 - b) and European institutions as the European Investment Bank or the European Commission (EIB 2013 b, d & i) have identified SMEs constrained access to finance as one of the main causes of persistent youth unemployment.

SMEs account for 99.8% of the total European firms, 60% of total turnover and 70% of employment, they represent youth's main employer (ECB 2013 a). Their activity and therefore their turnover is really dependent on their access to finance because of their size and their quasi unique reliance on external bank financing (mostly bank financing). Higher risks of failure involve higher bank finance costs and rejection rates (Coeuré, 2012).

"Credit markets remain fragmented and actual credit volumes to non-financial corporations have contracted over recent years in many Member States, with significant cross-country differences. Lending spreads seem to relate not only to the credit quality of the borrower but also to geographical location, suggesting a wide divergence in financing conditions for companies in the Single Market. In parallel to the cross-country divergence in bank lending rates, the spreads between interest rates on small compared to large enterprises have also increased since end-2011" (European Commission c, p 4). That is captured by the European Central Bank Survey on Access to Finance (SAFE) which provides an overview of this constrained access to finance for SMEs. The indicators relative to SMEs perceived access to finance capture the actual financing constrains faced.

Table 2.12.: Percentage of firms for which access to finance is the most pressing problem.

Austria	6.6	Germany	11.0	Netherlands	12.1
Belgium	8.3	Greece	29.9	Poland	10.7
Bulgaria	18.1	Hungary	22	Portugal	17.8
Cyprus	14.3	Ireland	20.6	Romania	14.8
Czech Republic	11.5	Italy	14.2	Slovakia	16.5
Denmark	13	Latvia	12.5	Slovenia	27.5
Estonia	28.5	Lithuania	17.1	Spain	24.4
Finland	7.2	Luxembourg	9.2	Sweden	7.8
France	16.1	Malta	4.7	United Kingdom	13.3

Data: ECB SAFE, as of 30.11.2011

Table 2.13.: Percentage of firms stating their absence of confidence talking about financing and being able to obtain the desired result

Austria	14.7	Germany	19.7	Netherlands	14.7
Belgium	13.5	Greece	55.1	Poland	15.7
Bulgaria	26.8	Hungary	16.8	Portugal	27.5
Cyprus	18.6	Ireland	31.3	Romania	38.6
Czech Republic	15.7	Italy	29.4	Slovakia	5.9
Denmark	15.8	Latvia	4.0	Slovenia	8.0
Estonia	7.4	Lithuania	28.3	Spain	37.6
Finland	9.7	Luxembourg	10.3	Sweden	11.4
France	28.6	Malta	6.1	United Kingdom	23.2

Data: ECB SAFE, as of 30.11.2011

Although such measures of access to finance perception depend on national economic outlooks as well as financial development, they outline the difficulties faced by SMEs to obtain additional financing. This constrained access to finance alters the capacity of firms to develop consequently expand their workforce. Indirectly constrained access to finance for SMEs triggers and sustains youth unemployment. It appears that countries where access to finance for SMEs is the most constrained are also the most affected by youth unemployment.

The European Commission conducted a survey on SMEs access to finance (SMAF). It accounts for the percentage of SMEs for which access to finance is seen as the most pressing problem, the dependency of SMEs on external financing and the percentage of SMEs not applying to a bank loan because they fear a refusal. An index 100 represents the EU mean for 2007 (European Commission SMAF 2013).

Assuming that SMEs financing constrains affect youth unemployment with a lag effect of one year, a comparison of youth unemployment rates in 2012 with the 2011 SMEs perception index for access to finance captures the linkage between constrained access to finance and youth unemployment. Regressions with fixed effects are not significant. However, the underlying coefficient correlation between the SMAF index in year t and the youth unemployment rate in year t+1 is -0.17. A comparison of the two figures provides an overview of such inter linkages. Most of the countries with a 2011 SMAF index smaller than the 2007 EU average are characterized by relatively high youth unemployment rates: France, Greece, Ireland, Portugal or Spain.

2.3.2. SMEs constrained access to finance and youth unemployment: theoretical foundations

SMEs represent the backbone of the EU economy but also one of the first providers of training in the economy (Brunello, Garibaldi & Wasmer 2007). However, they have

Table 2.14.: 2012 youth unemployment vs 2011 perception of access to finance

	Youth unemployment	SMAF index		Youth unemployment	SMAF index
EU 27	22.8	100.6	Italy	35.3	104.9
Euro area	23.1	102.2	Latvia	28.4	111.2
Austria	8.7	120.6	Lithuania	26.4	96.3
Belgium	19.8	107.1	Luxembourg	18.1	95.1
Bulgaria	28.1	105.6	Malta	14.2	112.8
Cyprus	27.8	111.2	Netherlands	9.5	95.7
Czech Republic	19.5	109.8	Poland	26.5	111.9
Denmark	14.1	107.9	Portugal	37.7	94.7
Estonia	20.4	83.5	Romania	27.7	98.01
Finland	19.0	132.0	Slovakia	34.0	101.4
France	24.3	91.3	Slovenia	20.6	90.1
Germany	8.1	108.5	Spain	53.2	90.9
Greece	55.3	87.7	Sweden	23.7	107.7
Hungary	28.1	97.3	United Kingdom	21.0	100.9
Ireland	30.4	88.6			

Data: Eurostat and European Commission - SMAF

been deeply affected by the economic and financial crisis. SMEs "are particularly vulnerable to adverse real-financial feedback loops" (Coeuré 2012, p 1).

Because of a sluggish economic and financial environment and an apparent banking fragmentation across Europe, SMEs face a sharp degradation in their access to finance (EIF 2013). In normal economic and financial conditions lending to SMEs is already lower than lending to larger firms because of market failures. Indeed, costs of financing and credit rejection rates have sharply increased since 2007. This has been exacerbated by the sovereign debt crisis which undermines growth prospects and bank lending capacities (Coeuré 2012). This deterioration implies reduced amount available, higher interests rates and non interest rates borrowing costs. The liquidity position of SMEs has deteriorated since 2009 and the trend is still on-going (ECB 2013 a). Banking crisis and fragmentation within the EU make access to finance even more challenging for SMEs, as "firms in countries whose sovereign debt was under stress faced on average a 20% higher probability of being constrained than identical German SMEs" (Coeuré 2012, p 3). That is especially striking in Spain and Italy.

Reduced access to finance lowers the growth of SMEs, in comparison with larger firms (Almeida & Aterido 2009). Firms' access to finance has a direct effect on firms' employment choices. New investigations by Boeri and Garibaldi (2012) outline that financial shocks translate in the labor market. Indeed banking and financial crisises

put firms in a liquidity shortage position which tends to shut down operations and cut off jobs. This affects SMEs in a greater proportion as their dependency to external finance is stronger and their liquidity margin generally more limited. As they cut off jobs, the youth tend to be the first concerned as the last in is the first out (ECB 2014). Liquidity issues lead SMEs to cut their training costs, one of the drivers of sustainable employment opportunities for youth (Brunello *et al.* 2007). Besides, it seems even more challenging for SMEs to hire youth as their lack of experience involves higher hiring and training costs (Almeida & Aterido 2010).

This involves general equilibrium effects. The recession combined with shortened SMEs access to finance sustain a vicious cycle: SMEs are catalyst for growth, investment and employment if their business environment and access to finance deteriorate, they cannot grow and hire people which depresses even more the economy. Because of their specific features youth tend to suffer proportionally more than the other group age from such a situation.

2.3.3. SMEs constrained access to finance and youth unemployment: challenges to address

An improved access to finance would re boost youth employment (ILO 2013 a). This supposes easing SMEs access to finance as well as tailoring specific financing schemes to support SMEs costs related to hiring and training youth.

The first issue to tackle is banking fragmentation in the EU, the Banking Union currently under implementation by the European Central Bank, the European Commission and the European Council shall reduce this dynamic. However this may not be sufficient, SMEs in depressed economies often suffer from weak financial intermediaries. Therefore to bring additional financing to SMEs a multilateral or national public financial support to SMEs seems required.

Eventually, supporting SMEs access to finance could be included in a broader set of policies aimed at supporting youth employment and training. Indeed, improving SMEs access to finance through a public support shall also carry initiatives to bolster youth employment and training within SMEs.

3. Work based training to tackle youth unemployment: a literature review

Training is an investment undertaken by individuals and firms who expect future benefits from it (Boeri & Ours 2008). Firms and youth individuals both benefit from training. It is an insightful way to ease the school to work transition. However, and partly because of SMEs constrained access to finance, training for youth is insufficiently delivered. Tackling youth training under-provision requires a comprehensive public sector intervention.

3.1. Training schemes to improve the youth access to jobs and productivity

3.1.1. Work related training endows youth with skills relevant for the labor markets

Training schemes for youth refer to the initial part of vocational education. Vocational education differs from general and early education as it refers to learning processes providing skills and knowledge better connected to the firms' needs. It has an *"essential role in forming the physical, intellectual, mental and emotional capacities of individuals"* (Lazar & Lazar 2012 - p 3). Theory defines two kinds of training: general and specific (Becker 1964). General training refers to the delivery of skills and knowledge that could be useful for a broad range of jobs. Specific training is characterized by the provision of a few skills that are only relevant within a firm. This distinction is theoretical but it highlights the relevant of training schemes for youth. General training supports youth transition to the labor market; specific training increases their productivity for the employer providing it. In fact, vocational training is a mixture of general and specific training. Training is mostly industry specific, training acquired within a firm can be used in a broader range of positions within a broader industry field (Boeri & Ours 2008).

Employers are the main provider of training (Brunello *et al.* 2007). Job oriented training is a decisive component of vocational education. Skills development for

youth can intervene through: job shadowing, mentoring, school enterprise, technical preparation, summer jobs, internships and apprenticeships (OECD 2010 a). It can be delivered by a local college, a governmental program, a college program within a workplace, an employer provided program within the workplace, work-based learning by doing, private training within the workplace, private training outside the workplace, distance learning and e-learning (Jones, Beynon, Pickernell & Packham 2013). The following skills improve youth employment opportunities and firms' performance: work ethic, attitudes, teamwork, languages (local and foreign), oral and written communications, problem solving, creativity, computer literacy, basic math, leadership (OECD 2010 a). Vocational training provides youth with the productive skills easing their access to employment and inducing firms to hire them.

Eichhorst, Rodrigues-Planas, Schmidl and Zimmermann (2012) distinguish three types of vocational education models for youth:

- School based vocational training is characterized by quality education but the skills provided may lack of relevance for the job market needs.

- Dual system apprenticeship associates school based vocational training with an on the job training component. It has the advantage of providing the youth with practical skills and a broader standardized curricula. Some challenges could arise from the skills formalization and firms' involvement.

- Informal training refers to the provision of training within the firm and outside a dedicated knowledge framework. It is insightful and relevant for firms, but skills contents could be rather limited which could affect youth perspectives

These three models match with three different types of delivery identified by Koudahl (2010):

- State controlled model: School based. Contents, regulation and administration are handled by the State (France).

- Cooperative mode: Dual system apprenticeship (Denmark).

- Market model: Informal training. Market forces determine training and contents (United Kingdom).

Table 3.1.: Proportion of Vocational graduates among the mid-level graduates population 2009 (15-34 years old)

Austria	82	Germany	72	Netherlands	65
Belgium	55	Greece	*	Poland	70
Bulgaria	*	Hungary	62	Portugal	22
Cyprus	35	Ireland	21	Romania	58
Czech Republic	85	Italy	70	Slovakia	81
Denmark	55	Latvia	35	Slovenia	75
Estonia	35	Lithuania	40	Spain	35
Finland	60	Luxembourg	38	Sweden	58
France	60	Malta	32	United Kingdom	40

* Missing data
Data: CEDEFOP 2012

Table 3.2.: Share of workplace based programs among the vocational education graduates in 2009 (15-34 years old)

Austria	60	Germany	97	Netherlands	65
Belgium	15	Greece	*	Poland	70
Bulgaria	0	Hungary	42	Portugal	22
Cyprus	10	Ireland	25	Romania	8
Czech Republic	50	Italy	*	Slovakia	*
Denmark	80	Latvia	18	Slovenia	20
Estonia	30	Lithuania	100	Spain	12
Finland	5	Luxembourg	59	Sweden	27
France	38	Malta	42	United Kingdom	75

* Missing data
Data: CEDEFOP 2012

From the two tables above it seems that countries where youth vocational graduates are, proportionally, the more numerous are less affected by high youth unemployment level. The greater the proportion of work based training, the stronger this link appears.

Indeed, work based vocational education is more effective for the youth as it provide them with occupational specific and practical skills. *"*On *the job training is considered as one of the most important channels through which workers accumulate human capital"* (Feng & Zheng 2010, p 6). In particular, dual education is praised to *"provide the labor market with highly qualified labor which is able to adjust to new and changing conditions and introduction of new technology"* (Koudahl 2010,

p 3).It eases work mobility and provides insightful connections between education and firms. It eventually helps youth securing a job and transferring their skills (McKinsey 2012).

Hence, results from youth training programs exceed the results from training older workers (McKinsey 2012).For the young cohort short term job-search oriented training as well as long term human capital development oriented training appear both effective (Osikominu 2009). Such effects are higher when unemployment are high (Dolton, Makepeace & Treble 1994).

3.1.2. Work based training improves youth employment opportunities

"Taking the perspective of young people, a 'good job' is a job that initiates a long-term investment in and attachment to the labor market. A job combined with formal training is by definition a good job". (Biavaschi *et al.* 2012, p 3).

Vocational education improves employability (OECD 2008), for young people, occupation specific skills imply closer links with the labor market and a facilitated school to work transition (Biavaschi *et al.* 2012). It contrasts with general education which *"bears the risk of being only weakly linked to labor market demand"* (Biavaschi *et al.* 2012, p 17). Yet, at a similar level of education, the school to work transition for vocational education graduates is better than for general education graduates (Eichhorst *et al.* 2012). *"Vocational education and training add to general education and bring young people closer to the labor market"* (Biavaschi 2012 *et al.* 2012, p 15). Training facilitates labor market integration (Bartel 1995). Studies summarized by Biavaschi *et al.* (2012), outline "*an increased employment probability of participants in occupation specific training"* (Biavaschi *et al.* 2012, p 21). *"Apprenticeships performs significantly better in integrating youth into their first employment relationship by the higher labor market relation of their training"* (Biavaschi *et al.* 2012, p 22). It is also as an insightful way of integrating disadvantaged and lower skilled youths as it offers a second chance and mitigates school dropout. A comprehensive involvement of employers enhances job transitions, school performance (Polidano & Tabasso 2013) and reduces skills mismatch for the youth (CEDEFOP 2012 d).

Vocational education also seem to have some long lasting positive effects on career paths as it increases wages, job mobility, work satisfaction and flexibility (OECD 2008 a, Mincer 1981 and Parent 1999). Such effects are particularly relevant for the young populations in the early stage of their working life. Training also helps the youth developing relevant *softer skills*: confidence, memory, interpersonal skills, communication and self-esteem (Laal & Slamati 2012). Youth can enjoy non-monetary private benefits to vocational education: health improvement, human capital production within the household, household management, adaptation, motivation and self-satisfaction (McMahon 1997).

Although several quantitative analysis have been made on the impact of vocational education on school to work transition, no consistent analysis exists at an aggregate cross country level.

3.1.3. Provinding training to young people enhances firms' productivity

From a firm's point of view the decision to provide training can be seen as an investment. It is justified by the effects of training on workers performance (Holzer, Block, Cheatham & Knott 1993). *"The popularity of lifelong learning initiatives has also increased, because employers have discovered the advantage to invest in human capital development as a way to streamline economic efficiency and to combat the unemployment phenomenon".* (Lazar 2012, p 2). Training increases productive skills and productivity. It is particularly the case for youth deeply affected by skills mismatch.

Almeida and Carneiro (2009), use the internal rate of return tool to assess a firm's decision to provide training.

Internal Rate of Return:

$$\sum_{s=1}^{N} \frac{MB_{t+S}}{(1+r)^s} - MC_t^T = 0 \qquad \textbf{(2.1)}$$

MB_{t+S} is the marginal benefit of an additional unit of training in time t.

MC_t^T is the marginal cost of investment in training, given that all costs are supposed to incur in the first period and generate benefits in the following N periods.

r is the internal rate of return of the investment equalizing the present value of the net marginal benefits to zero.

MB_{t+S}, marginal benefit is estimated through the productivity function.

$$Y_{jt} = A_t K_{jt}^{\alpha} L_{jt}^{\beta} exp(\gamma h_{jt} + \theta Z_{jt} + \mu_j + \varepsilon_{jt}) \qquad \textbf{(2.2)}$$

Where Y_{jt} is the output of firm j in period t.

K_{jt} measures capital stock.

L_{jt} is the firm's total number of employees.

h_{jt} captures the stock of human capital per employee in the firm and;

Z_{jt} is a vector of firm workforce characteristics.

μ_j represents firm heterogeneity and ε_{jt} firm specific productivity shock.

$$h_{jt+1} = (1 - \delta)h_{jt}\phi_{jt} + i_{jt} \qquad \textbf{(2.3)}$$

h_{jt+1} is per employee stock of human capital.

δ corresponds to skills depreciation and;

ϕ_{jt} is a measure of employees turnover.

MC_t^T, marginal costs include payments to teachers and institutions as well as training equipment and its depreciation. Foregone productivity costs are already included in the previous productivity function.

Using this framework for large Portuguese manufacturing firms, Almeida *et al.* (2009) find an internal rate of return of 8.6%. It has been confirmed in the literature. According to Ann Bartel researches (2000), it appears that effects of training on firms measured Return on Investment (ROI) are larger than previously considered. Econometric studies show a ROI ranging from 49.7% (Bartel on professional employees) to 7% (Krueger & Rouse for lower-skilled). ROI observed on case studies could appear even more important (Bartel 2000). *"Such high returns suggest that company job training is a sound investment for firms that do train, possibly yielding comparable returns to either investments in physical capital or investments in schooling"* (Almeida *et al.* 2009, p 24). Returns are higher in countries where training incidence is rather low (Brunello *et al.* 2007). These results could be higher for the youth as their initial human capital stock is lower and could improve sharply with learning programs (Mincer 1981).

Furthermore, training improves SMEs performance and productivity through the following other channels: profitability, capabilities, business survival and growth (Jones *et al.* 2013). Training is part of the required increase in knowledge, skills, operational effectiveness that help SMES grow (Jones *et al.* 2013). It involves economies of scales making easier division of labor. Employers providing training to their employees save in recruitment and turnover costs. The hiring/selection process is indeed improved (Baron, Black & Lowenstein 1989). Training seems necessary to provide qualification, flexibility and motivation to the workforce (Jones *et al.* 2013). Employees' skills is a key asset, often source of competitive advantage. Consequently, the absence or insufficiency of training can constrain firms' performance (Jones *et al.* 2013).

Among the different econometric analysis on the returns of training, only a few focus on SMEs. Besides, no cross country analysis is available.

3.2. SMEs investments in training for youth are characterized by their insufficiency

3.2.1. Firms invest in training as they don't have to fully reward their employees with the productivity increase it generates

Following Becker's classic distinction (1964), there are two kinds of training, general and specific. General training can benefit to other employers, specific training only related to the current job position. The classic theory supports that general training should be beard by individuals and specific training by firms (Boeri and Ours 2008). Indeed, specific training increases workers' productivity only for the employer providing the training. General training enhances workers' productivity for many employers and is therefore risky as employees can move and use their skills in another firm, for higher wages. Therefore, in competitive markets and since employers cannot retained their employees, firms provision of general training seems challenging. It could be particularly striking for the youth as their limited resources cannot allow them to afford the relevant general training.

This previous distinction assumes competitive market where employers shall reward productivity increases to their employees, with higher wages. Nevertheless, evidence show that employers still provide general training. This arises from imperfect labor markets and especially monopsonic conditions. In non-competitive labor markets, firms have a market power over workers (Acemoglu & Pischke 1999). As a result, firms retain part of the benefits from a productivity increase as they don't have to compensate it in an equivalent wages increase (Boeri and Ours 2008). This compressed wage structure implies lower compensations during the training period (Acemoglu & Pischke 1999). Konings' estimates (2010) on returns to training for 170,000 Belgian firms supports this theory. On average, firms receive a 23% productivity premium whereas workers only obtain a 12% wage premium. Firms could also invest in general training which appears relevant for their needs and activities. Indeed, general business requires both general and specific training (Boeri & Ours 2008). The more firms have a market power on wage-setting the more they tend to provide training.

3.2.2. Market failures result in an underinvestment in training, especially for the youth

According to the CEDEFOP (2012 a), 38% of firms do not provide training in the EU. Underinvestment in training arise from market failures: incomplete capital markets, liquidity constraints, positive externalities, different private and social rates of return, time lag between investments and results and employee' hold up/leave issues and employees turnover (Parsons 1989). As a human capital investment, training is costly and intangible, therefore harder to fund (Becker 1962).

The current economic turmoil alters firms' financing capacities for training. Firms have less liquidity, the economic outlook is depressed and employment perspectives gloomy. Therefore, the needs and funds for training are reduced. Such challenges are exacerbated for the youth as they represent a riskier investment with higher initial costs.

3.2.3. SMEs constrained access to finance alters their ability to provide training to their younger employees

Evidence reveal that large and medium size firms tend to spend more on training than their smaller counterparts (OECD 2008 b). When firms with more than 250 employees allocate more than €700 per year and per employee for training, SMEs provide less than €400 (Brunello *et al.* 2007). Bigger firms are providing more training because of technology widespread and internal mobility (Bartel 1989), economies of scale and a higher absorption capacity for training fixed costs (Black, Noel & Zheng 1999). Larger firms have a greater ability to take risks which enable them to allocate more funds into training (Holtmann & Idson 1991). Eventually, bigger firms have a greater market power over their employees which enable them to benefit more from training.

SMEs' relative small size which induces a relatively lower training provision. Incomplete capital markets and financing conditions are particularly constrained for SMEs making it uneasy to borrow money in order to finance human capital. SMEs have a lower degree of monopsonic power and can hardly lock workers into longer contracts (Popov 2013). Besides, SMEs have fewer dedicated budgets, lower capabilities to provide on the job training and a low participation in government programs (Jones *et al.* 2013). Hours of training delivered within SMEs are less than half of the amount provided within bigger firms (Brunello *et al.* 2007). Due to their limited financial resources and size, SMEs tend not to foresee their training needs. They may be unaware of the benefits training may carry (Fraser, Storey, Frankish & Roberts 2002). *"Unobserved growth opportunities or managerial ability could be the main driving force behind the scale of the firm's on-the-job training program"* (Popov 2013, p 2). The reduced credit supply affects even more SMEs ability and willingness to undertake human capital investments.

Thus, SMEs appear to suffer from youth lack of skills. *"Europe small firms were more likely than large ones to report problems in their business due to a lack of skills. They also have the greatest problems in identifying and recruiting high-quality new hires and are less likely to work with education providers or other employers to tackle their skills problems"* (McKinsey 2014, p 12). It is a dramatic challenge for the youth as SMEs are their main employers.

It is important to understand which kind of SMEs provides training and what do they require to invest more in such field.

3.3. The public sector ought to catalyze delivery and funding youth training

"The creation of skills in people will respond to incentives to invest in the future" - William Easterly (2001, p 84).

Governments' interventions in training aim to reduce investments costs, tackle market imperfections and make training programs more relevant to the labor market realities (Boeri & Ours 2008). Such interventions are particularly necessary for the youth.

3.3.1. The case for a public sector involvement: youth training triggers significant public and social benefits

A public sector intervention in the delivery and financing of vocational training schemes appears fundamental, especially for the youth. Social returns are higher than private returns, revealing the existence of positive externalities to investments in training. It constitutes a strong case for public investments In addition, non-competitive labor markets provides an additional rationale for a public sector intervention (Brunello *et al.* 2007).

Human capital is one of the main driver of economic growth. The human capital and new economic growth theories provide an analytical framework.

Following Robert Lucas (1988), human capital is included in the firm's production function.

$$Y_t = F(\mu H N_t, K_t) H_t^{\alpha} \qquad \textbf{(2.4)}$$

Y is the output.

μ the proportion of time devoted to production; μH is thus the education level of employees within the firm.

N the number of persons and K the physical capital.

H_t^{α}, outside the equation represents the externalities effects of human capital on the overall economy.

It implies that the average level of education in the community influences the production function and that the level of education within the firm matters for the overall community. At a micro level a firm benefits from educational spillovers which, aggregated, enhance the overall economy's growth. Yet, human capital development involves internal benefits to the firm as well as broader benefits to the overall economy as theorized by the endogenous growth theory (Romer 1994 and

McMahon 1998). Training is part of human capital and generates significant economic growth effects (Mincer 1981). It increases human capital stock within the firm and for the overall economy (Romer 1994 & Martins 2004). In particular, low educated workers enjoy spillovers form trained workers (Acemoglu & Pischke 1999). It support technological change and contributes to job adaptation.

In addition, training contributes to deepen innovation, competitiveness, exports, foreign direct investment and employability, considered as substantial drivers of long term economic development (Laal 2011). This relation is persistent over time. It generates more productive and innovative communities. It guarantees that skills are up to date and helps firms to foresee new business and technology developments. Therefore, training increases the national income (Acemoglu & Angrist 2000). Market imperfections it justify a government intervention. Such effects are substantial for the youth as they constitute both the present and future labor force. A properly trained youth population that access to good jobs generates sustainable reduced social benefits expenses, productivity gains, externalities and higher tax revenues (OECD 2008 a). Training involves non-market returns as well as social benefit externalities, especially for the youth: improved population and health conditions, poverty reduction, environment enhancement, more stable family structure, community development, more efficient income redistribution (McMahon 1997). The overall benefits of training are greater for the EU than the US (Ryan 2001).

As of today, there are only a few studies on the actual effects of youth training on national and regional development in a European context.

3.3.2. The public sector provides support and incentives for SMEs offering training to young people

"Youth tends to be affected disproportionally from difficult demographic and economic conditions hampering access to the labor market and, in particular, to stable and well-paid jobs. However, comparative studies can show that institutions and therefore public policies make a difference. Well-designed pathways from school to work can help young people to make a successful transition and prevent societal and individual, potentially persistent damages from spells of unemployment or exclusion at a young age". (Biavaschi *et al.* 2012 - p 26-27).

As suggests Paul Ryan (2001), disappointing labor market policy results have induced policy makers to focus on education and training. Training young people is decisive as it helps the youth to enter into the labor markets, improves firms' productivity and benefits to the overall economy. However, without a public sector intervention, it is challenging to reach the right level of training delivery. Consequently, government interventions shall be implemented in order to correct market failures and make curricula more relevant to the economy's needs. It ought to set out a comprehensive framework invest in youth training and shape insightful incentives

to do so. The public sector ought to foster youth enrollment in vocational training, youth relevant skills building and youth access to employment. It shall pay a particular attention in avoiding damaging interventions (Ryan 2001) and addressing firms' credit constraints (Brunello *et al.* 2007).

Governments set the adequate framework for providing and financing vocational training schemes for youth. Through training systems' regulation, partnerships building, career and education guidance, the public sector clears the path and access to employment for the youth. Governments act as third party between employers and employees (McKinsey 2012). A general flexible framework should include curricula requirements, answering the needs for specific competencies. They ensure training mainstreaming and the delivery of basic skills. Regional/cluster level interventions seem more appropriate (Lagendijk & Cornford 2000). Eventually, it appears that targeting and institutional context matter more for efficiency than the type of measure (Biavaschi *et al.* 2012).

Another level of governments' interventions concerns the structure of incentives to counter market failures and support firms, especially SMEs investments in training for youth. Governments can provide subsidies or training funding schemes to stimulate private demand and supply for training. Such interventions can take the form of: public subsidies, tax exemptions or government guaranteed loans schemes (McMahon 1997). In addition, governments can include various assistance and inducement programs. Subsidies schemes seem necessary to make training within smaller firms possible for the youth. Such incentives have an impact on training provision (Brunello, Comi & Sonedda 2012). Evidence support that it could also induce young people to remain within the firms (Polidano & Tabasso 2013).Although several programs specifically target the youth, only a few of them strategically address SMEs' needs.

In order to bolster their catalyst roles, governments ought to see beyond and deepen their intervention to meet training needs. Such interventions are particularly requested for the youth and SMEs. First governments should formalize, systematize and scale up vocational training schemes. It supposes connecting employers, education providers and youth. Governments can be engaged in the design of training programs through the promotion of various insightful demand-driven approaches (McKinsey 2012). They could also better articulate diverse groups and mobilize new instruments (Eichhorst *et al.* 2012). In order to achieve better results it is necessary to gather a broad general support from employers, young people, trade unions and vocational education providers (OECD 2012 a). In addition governments shall help all the stakeholders to anticipate tomorrow's skills. Skills included in vocational education programs shall be delivered accordingly to the following principles: adjustment, adaptability, certification and assessment. Public sector interventions should aim to channel investments in broad, transferable skills. Governments should therefore favor sector wide skills collaboration and catalytic activities. Governments have to play a key role in promoting vocational education schemes for the youth, through a positive culture (McKinsey 2012). Eventually, this has to be completed

with the proper macroeconomic and employment policies.

3.3.3. Overview and assessment of the current public interventions targeting work base youth training

"There are at least three "general principles" that successful training policies would need to follow. First, a clear understanding of what the market and government failures and skills gaps are; second, making sure providers (public or private) have the incentives to respond to market demands and ensure quality (which often has to do with contracting and payment systems and not simply "involving employers" or "creating partnerships; third, ALMP schemes targeting the unemployed as well as early interventions for the youth at risk can be complementary actions to training systems in place for the workers. Vocational education and training exhibits highly diverse features in different world regions". (Biavaschi *et al.* 2012, p 85-86).

Biavaschi *et al* (2012), regional clusters classification, provides an assessment of current public interventions targeting the youth.

- Germany and its neighboring countries are characterized by dual vocational training programs which induces a smooth transition into the labor market. The government plays a key role in setting the adequate level of regulation and funding as well as coordinating the relevant partnerships with employers and trade unions. The overall system is considered as *"highly institutionalized"* (Biavaschi *et al.* 2012). *"The central role of the dual apprenticeship system is generally seen as the major reason for the low levels of youth unemployment in Germany and the relatively smooth transition from school to work for the majority of them*" (Biavaschi *et al.* 2012, p 33). It could also be interpreted in the following way: employers prefer to directly train young people rather than hiring skilled ones (Ryan 2001).
- Spain and other Mediterranean countries face a strong dualization of labor markets that could be explained by the flaws in the vocational training systems and their lack of work-based components. Vocational training which mostly relies on a school based provision does not manage to adequately integrate graduates. Such programs are not well-tailored (Biavaschi *et al.* 2012).
- In Anglo-Saxon countries vocational training systems are scarcely institutionalized. The formal competences provided through firm based experiences are not fully developed. This arises from an absence of government intervention. Vocational training is thus insufficiently funded. Firms' participation is also low.
- New EU Member States appear to be unwilling or unable to implement the adequate incentives for training provision. This sustains the skills mismatch.

Recalling the different vocational training models and systems presented above,

the cooperative model delivers more effective results than the market or the State controlled one.

Governments' initiatives aim to restore full employment and grant social cohesion (Panitsidou 2012). Consequently most of the initiatives target the least skilled and disadvantaged (Biavaschi *et al.* 2012). However, the current youth employment outlook implies a generalized employment crisis for the younger population which should result in a broader intervention. Yet, it has triggered specific initiatives from countries where the crisis is the most severe: France, Italy or Spain for instance. But the program implemented are characterized by a lack of formalization the absence of a comprehensive/systematic framework. The programs currently implemented do not seem sufficient to meet the current challenge.

This literature review provides a significant scope for improvement. In particular it seems necessary to connect better skills provision and job creation. According to a survey by Mc Kinsey center for government, 58% of youth state that practical, hands-on learning is an effective training approach. However, 24% of general education graduates and 37% of vocational said that the training the received was practical based (Mc Kinsey 2012). Constrained public finances necessitate a careful choice of instruments. An insightful strategy would be to mobilize a set of different instruments that would be refundable and help SMEs accessing to finance in order to fund training schemes. Co financing schemes directly targeting firms propose an interesting strategy, to properly shape behaviors, they shall change firms' marginal costs and benefits as well as investment decisions (Brunello *et al.* 2007). Thus, training loans to SMEs appear as a relevant policy to favor youth employment. However, it has never really been done, except in the UK (Fraser *et al.* 2002).

European financial and labor markets fragmentation call for a EU approach to youth employment challenges (Addison 1994). Vocational policy and youth are two long standing commitments of the European Union. The idea is to coordinate national economies and enhance the development of the common market. Such interventions can take the form of country level recommendation and program support. Mobilizing such instruments would constitute an appropriate leverage to implement innovative strategies to boost SMEs vocational training schemes for the youth.

4. The European Union youth unemployment toolkit and its impacts

Such a generalized but also heterogeneous youth employment crisis across the EU calls for different types of interventions. Hence, the European Union and its institutions can have a strong impact in the fight against youth unemployment.

4.1. The EC/EIB framework and policies in favor of youth employment

The **European Commission (EC)** - the "Government of the European Union"- and the **European Investment Bank (EIB)** - the "Bank of the European Union" - appear as the two best fitted actors to support youth employment as they can deploy important resources across countries.

4.1.1. The European Commission supports directly youth employment through targeted interventions in vocational education and training

4.1.1.1. The European Commission's ambition and framework for intervention in youth education and training

The 1958 Treaty of Rome constitutes the basis for European Communities interventions in the field of vocational training. In this founding text, the Commission is responsible for developing a common vocational policy. It has to set up a European Social Fund (ESF) to ensure workers productive employment through training and resettlement allowances. Since 1992 the treaty on European Communities includes a chapter dedicated to education, vocational training and youth (Addison & Siebert 1994).

Several initiatives put forward by the European Commission alongside its member States reinforced this focus on youth education and training. Among others, the

Europe 2020 constitutes an ambitious framework for a coordinated youth based vocational education and training policy. The idea is that European competitiveness and growth potential over the long run also rely on youth integration into the labor markets. It is a vision for the 21th century and puts forward three mutually reinforcing priorities: *Smart growth*, *Sustainable growth* and *Inclusive growth*. Education and training 2020 is a key part of this overall framework, it promotes employability, social cohesion, personal and professional development (European Commission 2010 a and b). Two of its *flagships* directly targets youth employment:

- *"Youth on the move"* which aims to improve education systems performance and facilitate young people labor market integration.
- *"An agenda for new skills and jobs"* which attempts to modernize labor markets, support skills development, enhance labor market participation and mobility. The focus is on school-to-work transition, promoted through work-based vocational education.

4.1.1.2. The European Commission instruments and policies to support youth employment through vocational education and training

The first instrument mobilized by the European Commission in this field is the EU budget, it provides funding to the European Social Fund. The ESF supports youth employment through subsidies for vocational training and employment creation. Young people represent, proportionally, an important beneficiary group of ESF funding: 37% (Ecorys 2012). ESF interventions target three focus groups: the early school leavers, the upper education leavers and the unemployed tertiary graduates. The priorities are youth occupational skills development through work-based training and education systems' direct assistance.

For the last programming period, 2007-2013, the ESF has supported youth vocational education and training as part of activities intending to improve regional cohesion, competitiveness and employment (Ecorys 2012). In depth, it has focused on:

- Enhancing Firms and young workers adaptability.
- Improving access to employment and labor market inclusion of the young job seekers and inactive people, including the most disadvantaged of them.
- Enhancing youth human capital through increased investment and reforms in education and training systems.
- Promoting institutional efficiency, partnerships and partners' involvement.

ESF funds and interventions are combined with national programs for a greater impact.

Table 4.1.: Participation of young people to the ESF Life Long Learning activities as percentage of total participants (2007-2010)

European Union (27)	29	Italy	14
Austria	31	Latvia	30
Belgium	32	Lithuania	15
Bulgaria	28	Luxembourg	18
Cyprus	12	Malta	30
Czech Republic	21	Netherlands	27
Denmark	21	Poland	33
Estonia	15	Portugal	10
Finland	15	Romania	27
France	41	Slovakia	21
Germany	52	Slovenia	14
Greece	8	Spain	37
Hungary	41	Sweden	15
Ireland	22	United Kingdom	35

Data: Ecorys 2012

In addition, the European Commission has designed two tools to boost youth vocational graduates' employment opportunities (European Commission 2010 a).

- *The European Skills and competences framework.* It provides a "common language" for skills, competences, qualifications and focuses on the output rather than the actual curricula. It takes the form of an online portal.
- *EURES - European Job Mobility.* It is the platform for job/training and placements mobility. It encourages and implements training mobility programs, the recognition of competencies and education partnerships.

On this basis, the European Commission coordinates Member States policies and interventions through country recommendations (European Commission 2010 a).

4.1.2. Thanks to its concessional financing solutions for SMEs, the European Investment Bank indirectly sustains youth employment

4.1.2.1. The European Investment Bank's ambition and framework for supporting SMEs access to finance

Created by the 1958 Treaty of Rome, the European Investment Bank is the largest multilateral development bank in the world. It finances the EU long term strategic priorities and especially the *"competitive knowledge based economy capable of sustainable growth"* as set in the Europe 2020 strategy (EIB 2011).

The EIB group is composed of two entities: the European Investment Bank (EIB) and the European Investment Fund (EIF).

- The European Investment Bank, thanks to EU Member States capital contributions, enjoys a AAA rating which enables it to channel at concessional terms the resources it mobilizes on financial markets. The EU Bank mostly provides favorable lending solutions to financial institutions or national/regional authorities to leverage the amount they allocate to the EU development priorities.
- The European Investment Fund is co-owned by the EIB and the EC, it deploys EIB/EC funds into riskier project mainly in the field of SMEs and innovation. It enables the EIB Group to finance riskier investments without undermining its mainstream activities.

SMEs access to finance, cohesion and knowledge economy constitute the three main priorities of the EIB group priorities; these indirectly benefit to young workers.

- SMEs support is only part of the EIB activities since 2005 but it has progressively gained a substantial importance and represents today 20% of the EIB portfolio (EIB 2013 h). The idea is to help SMEs overcome their difficulties to access funding. In particular, such solutions address cross-country lending disparities and encourage private banks lending.
- Education is a key component of the EIB projects through lending to national/regional authorities or direct financing of private institutions investing in related projects (EIB 2011). It stresses on:
  - The quality of education.
  - Vocational education and on the job training.
  - Tertiary education.
  - Education and training mobility.
  - Technology transfer between education institutions and firms.

4.1.2.2. The European Investment Bank tailored instruments for SMEs and national/regional authorities, indirectly sustaining youth employment

The main instrument used to support SMEs access to finance is the SMEs loan, it represents 95% of the EIB funding to SMEs. Such loans are channeled through the EIB network of financial partners/intermediaries: banks and financial institutions (230 of them in 24 member States). These intermediaries are responsible of granting the loans. They must provide a substantial financial advantage to SMEs in comparison of the other standard loans they may otherwise offer. Intermediaries have to match the EIB fund into the loan, generating a 1:2 leverage effect. Intermediaries bear the credit risk and are entirely responsible for loan allocation, due diligence

and re flow of funds to the EIB. SMEs shall be informed of the EIB financial support. Tangible and intangible investments are eligible as well as purchases, work in progress and working capital. Training investments are therefore compatible with the EIB loan. Between 2005 and 2012 €64bn have been invested in 300,000 SMEs (EIB 2013 h).

The EIB can also provide more innovative and tailored solutions for specific SMEs needs. .

- Risk credit guarantees.
- Mezzanine financing.
- SMEs loans securitization.
- Trade credit.

In addition, the EIF provides tailored solutions for riskier investments through R&D support, capital injections, advocacy and micro finance.

- Micro finance, for investments inferior to €25,000 within firms employing less than 10 people.
- Equity participation.
- Guarantees.
- Venture/growth capital
- The joint EIB – EIF initiative to support securitization
- Credit enhancement.

Figure 4.1.: Example of a EIB SMEs project generating employment

Source : EIB 2014 - f

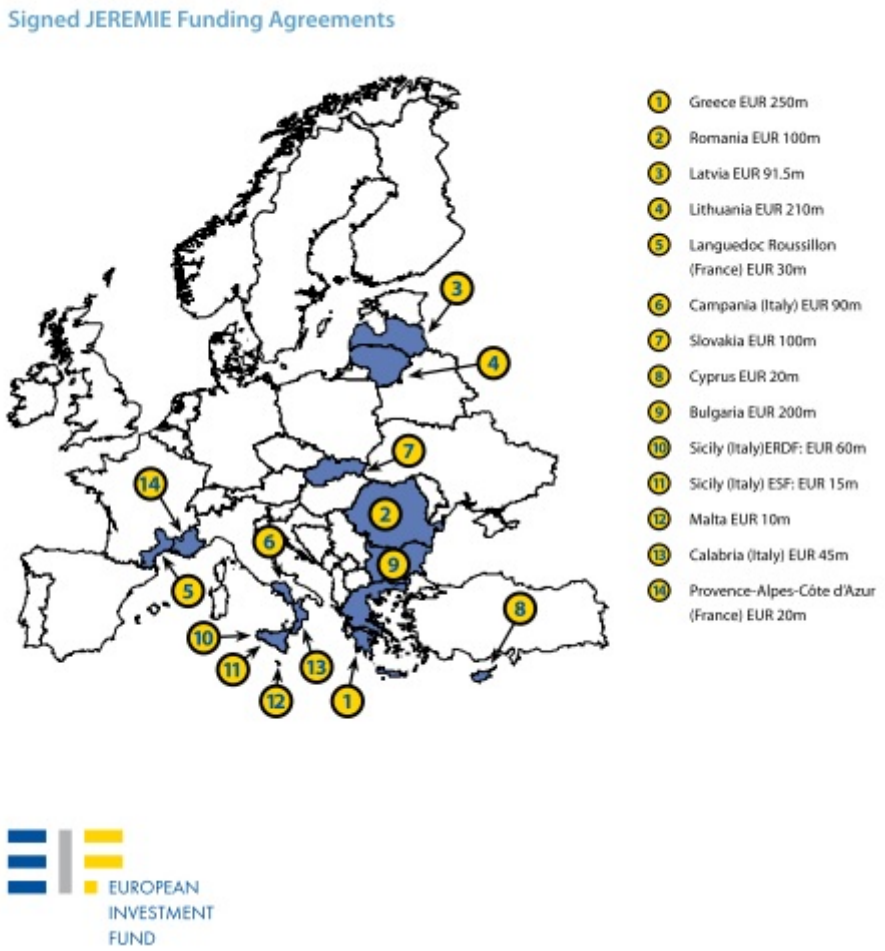
4.1.2.3. The European Commission - European Investment Bank joint initiatives

Contribution to the EU policy priorities is a core determinant for the EIB to finance its projects (EIB 2013 m). Because of their shared priorities and the synergies they can mobilize, the EIB/EIF and the EC have developed joint instruments in favor of SMEs. These initiatives based on risk sharing between the EC blend resources and the EIB market-driven ones. Resources from the EU budget are channeled into EIB lending products. The grant component from the EU budget structural funds reduces credit costs, the EIB channel leverages more refundable resources. For SMEs, such projects are implemented by the EIF.

Several key joint initiatives:

- *JEREMIE* - Joint European Resources for Micro to Medium Enterprises. National/regional authorities can deploy their EU structural funds into refundable market driven financial products to provide loans, equity, guarantees, credit enhancement and securitization to SMEs. The ring fence holding fund conceived is flexible and triggers co-financing and additional leverage.
- The *L4SME* (Loans for SMEs) complements structural funds for SMEs growth.
- The *Risk-Sharing Initiative* for SMEs.

Figure 4.2.: The signed JEREMIE agreements, as of 2012



Source: EIF 2012

4.1.3. The impacts of the EC/EIB policies on youth employment and SMEs: an assessment

Although the Europe 2020 strategy only started in 2010 it has so far been deeply challenged by the economic depression and constrained public finances. It is too early to assess the results of the ESF activities for the 2007-2013 programming period. During the 2000-2006 programming period, 600,000 Jobs have been created through ESF funded activities (European Commission 2010 c). In particular, 20-30% of the young people benefiting from an ESF project have found a job (Ecory 2012). These results can still be increased further as employment itself was not a direct objective; these activities which targeted more progression towards employment (Ecory 2012).

An internal independent evaluation led by the EIB revealed that the bank inter-

mediated SMEs lending does not primarily improve access to finance for the SMEs undeserved by banks due to their risk profile (EIB 2013 h). Indeed, financial intermediaries choose the larger and less risky SMEs for the EIB products, in comparison to their overall portfolio (EIB 2013 h). Hence, the EIB should possibly rely less on the loan instrument to support SMEs and consider alternative tools: equity participation, mezzanine finance or securitization. On average, a job is created for any SME loan granted (EIB 2013 h). It also sustains employment as firms did not reduce their workforce. In addition, undertaking such loans is correlated with a firm level productivity increase (EIB 2013 h). Until really recently youth employment did not constitute a priority for the EIB, therefore there is no assessment of the impact of EIB policies on this available yet. Including a youth employment condition as an eligibility criteria for an EIB financial support would help overreaching this goal.

4.2. The EU/EIB initiatives to mitigate the current youth unemployment crisis

The 28th of May 2013, the Berggruen Institute on Governance gathered several European leaders - including President François Hollande, Prime Minister Mariano Raroy, the EIB President Werner Hoyer and several senior member States senior ministers into a "Town Hall meeting". Organized in Paris at SciencesPo University, this meeting intended to set the "next steps for Europe"; given the current outlook, an important part of it was dedicated to youth employment. Hence, European leaders stated their strong ambition to support youth employment. They considered this situation as a "disaster" or a "catastrophe" (Enrico Giovannini). They expressed their concerns for a "lost generation" and "European unity" (Wolfgang Schäuble). They called for a New Deal for Europe" (Pierre Moscovici) aimed at rebuilding confidence.[1]

Yet, the ambition stated during this meeting shaped the solutions the European Commission and the European Investment Bank designed later in 2013. Since January 2014, the programs conceived are active.

4.2.1. The European Commission Youth Employment Initiative

4.2.1.1. The Youth Employment Initiative ambitions

"Combating youth unemployment is a particular and immediate objective, considering the unacceptably high number of young Europeans who are unemployed. All efforts must be mobilized around the shared objective of getting young people who are

[1] http://www.berggruen.org/councils/the-future-of-Europe/meetings/2013-05-28-paris-town-hall-europe-next-steps

not in education, employment or training back to work or into education or training within four months, as set out in the Council's recommendation on the "Youth Guarantee"" (European Commission 2013 c, p 2).

As set in the December 2012 Youth Employment Package, completed by the March 2013 Youth Employment Initiative, the European ambition is to attract more young people into training and employment, with a specific focus on women, minorities and the least advantaged. Through practical and achievable measures with immediate impact, the European Commission intents to improve training quality, delivery and relevance. Addressing the *"unacceptable"* 52 points gap divergences in terms of youth unemployment within the European Union is also stated as a priority (European Commission 2013 c).

This initiative sets the principle of a European "Youth Guarantee": the obligation for regional/national/regional authorities to guarantee a job or a training position to the Young NEETs.

4.2.1.2. The Youth Employment Initiative and the instruments to support it

The newly adopted Multiannual Financial Framework for 2014-2020 is endowed with €960bn in commitments. Smart inclusive growth and growth and employment are its two main priorities. The MFF also carries an investment plan for Europe granting additional lending to the economy and SMEs in particular. New instruments ought to be designed in order to maximize the impact of the EC interventions. The Youth Employment Initiative is endowed with €6bn from the European Budget. €2.1bn of them are front loaded, they can be used in the first two years of the MFF, allowing for immediate actions. Funds are directed towards individuals young NEETs, within the European regions where youth unemployment rates are higher than 25%. They will provide wage subsidies to support youth employment, student loans, micro finance and social enterprise development. Eventually, they could complement ESF funds for the youth guarantee implementation (European Commission 2013 a).

Yet, the EC calls for the member States, which regions experience youth unemployment rates higher than 25%, to implement a Youth Guarantee action plan. Other Member States are also invited to do so. Following a December 2012 Council recommendation, the Youth Guarantee ambitions to "ensure that all young people up to the age of 25 years receive a good-quality offer of employment, continued education, an apprenticeship or a traineeships within four months of becoming unemployed or leaving formal education" (European Commission 2012). Although that is the responsibility of member States, the EC can provide additional support through country-specific recommendations, best practices promotion and especially resource mobilization from the EU budget: Youth Employment Initiative, ESF and ERDF. In particular the ESF is planning to accelerate its investments supporting the youth integration into labor markets. The European Employment Initiative has also launched several other programs to support youth mobility. The Erasmus +

program and the EURES network will provide the framework for cross border mobility of trainees and trainers; it qualifies for ESF funding and will enhance skills relevance. The European Alliance for Apprenticeships Training and Dual training will provide a general support for training opportunities development (European Commission 2013 a).

4.2.1.3. The Youth Employment Initiative policy interventions

The YEI will promote investment in skills which shall tackle skills shortages and mismatches. The insight is to shape the right incentives for firms to hire, train and retain young people, through an easier access to finance. In particular, it will prioritize sectors with jobs creation potential: ICT, healthcare and green economy (European Commission 2013 a, b and e).

The ESF will specifically target measures aimed at improving school to work transition and addressing early leavers' inclusion into labor markets. It will also focus on apprenticeships/traineeships and especially initial vocational education modernization. Besides, the competitiveness and innovation framework program allows the ESF to allocate funds to SMEs hiring young people. The other programs created by the YEI deploy a labor mobility among the EU. Thus, this will improve school to work transition through high quality apprenticeships promoted abroad. It will also contribute to raising awareness around initial vocational education (European Commission 2013 a).

Recommendations to member States will particularly focus on vocational education modernization, skills mismatch mitigation and traineeships/apprenticeships relevance. As for the Youth Guarantee implementation, the Member States are urged to pay attention to partnerships, social partners' involvement, employment services support, career guidance, skills and knowledge frameworks' relevance, mobility and labor costs reduction for youth. (Re) creating some youth employment actions teams associating EC and member States experts for a deeper impact could be an insightful strategy (European Commission 2013 a).

Figure 4.3.: Youth Employment Initiative projects example

Slovakia: "following the ESF re-allocation, two national projects (worth EUR 70 million) were launched in November 2012 supporting job creation for young people under 29 in private and self-governing sectors in the regions with the highest levels of unemployment (target: 13 000 new jobs). The implementation of the projects to date has been successful, with micro enterprises and SMEs showing the greatest interest in offering work opportunities for young people. By mid-May 2013, more than 6 200 new jobs had been created (EUR 33.1 million contracted)"

Source: European Commission 2013 - a

4.2.2. The EIB "Skills and Jobs - Investing in Youth" program

4.2.2.1. The "Skills and Jobs - Investing in Youth" program ambition

According to the EIB President, Werner Hoyer, youth unemployment and cross border lending are Europe's *"mega problems"*.[2] Therefore, he stated that *"the EIB will do its utmost to support Europe´s fight against youth unemployment"*.[3]

This EIB intervention has been set up upon the request of EU Member States and the EC. Following the EIB 2012 capital increase and complementing the Youth Employment Initiative, this different type of intervention is conceived as an exceptional contribution on top of the EIB normal lending activity. The idea is to provide better access to finance for SMEs in order to support their investments in youth hiring and training. Yet, it considers that *"the persistently high youth unemployment rates in the EU – as well as their steep increase in recent months – are partly due to the lack of finance*" (EIB 2013 o, p 1).

The program has two equally endowed and interrelated components:

- *"Jobs for Youth"* - providing SMEs with better access to finance aimed at increasing youth employment perspectives.
- *"Investments in Skills"* - financing at concessional terms projects:
  - Investing in the skills of young people.
  - Improving the employability of young people.
  - Endowing them with a long term protection against unemployment.

4.2.2.2. The "Skills and Jobs - Investing in Youth" program and the instruments to support it

The "Jobs for Youth" component represents an extension of the EIB SMEs loan instrument. It aims to support SMEs creating or sustaining employment opportunities for young people. Therefore, the EIB will link additional SMEs financing to young people employment. It would be undertaken through an extension of the current EIB products available for SMEs: loans, credit guarantees, mezzanine financing and micro finance lending. Furthermore, the EIB is *"working to further adapt and refine our instruments in order to target them in line with the initiative's objective and offer attractive financing conditions to enterprises which recruit young people and/or put them in vocational training schemes"* (EIB 2013 o, p 4). SMEs growth, supported by a better access to finance shall promote youth employment. For its first year this program is endowed with €3bn, a review of the first projects will determine the scope for mainstreaming it.

[2]Paris Town Hall Meeting 28th of May 2013

[3]http://europa.eu/rapid/press-release_BEI-13-97_en.htm

The "Investment in skills" part intends to tackle job-related skill mismatches across the EU. Hence, the EIB will invest in long-term impact projects which bolster youth professional skills. This includes investment in facilities and vocational training scaling up. These investments are available to public or private institutions and can be mobilized for tangible as well as intangible investments. As the "Jobs for Youth" part, "Investment in skills" is endowed with €3bn for its first year (EIB 2013 o).

Besides, the EIB can leverage its operational and institutional capacity to strengthen its impact.

4.2.2.3. The "Skills and Jobs - Investing in Youth" program projects interventions

The "Jobs for Youth - Investing in Skills" program has been launched in August 2013 and the first projects agreements are signed. It supports broad employment measures implemented by private and public sector entities. It is open for all the 28 EU Member States, with a specific priority for regions where youth unemployment is higher than 25%. There are no formal requirement to apply for this scheme; supporting youth employment or youth employment training are, however, eligibility criteria. The loan allocation process is similar to the ones already applied by the EIB (EIB 2013 o).

- Private sector lending applies for SMEs with youth employment potential. Funding could finance investments, working capital and job related training costs. SMEs shall have a commitment in terms of young people employment. It could also support dedicated vocational training programs undertaken by corporates: investments and related expenditures. Such investments are also available for youth start up or firms which main shareholders are young people (EIB 2013 o).
- Public sector lending applies for:
  - Construction and upgrade of teaching building.
  - Investments in education infrastructure.
  - Changes in teaching, focusing on vocational training and dual education.
  - Student loans for professional training and mobility.
  - Scaling up and improving the quality of vocational training.

As of November 2013, the EIB had already approved €4.9bn for this initiative (€2.7bn for the Jobs for Youth pillar, €2.2bn for the Investing in Skills component)[4]. € 519m are have already been disbursed, mostly in Italy, but also in Greece, Poland and Spain (Bussi 2014).

[4]EIB press release 13th of November 2013, available online and listed in the bibliography

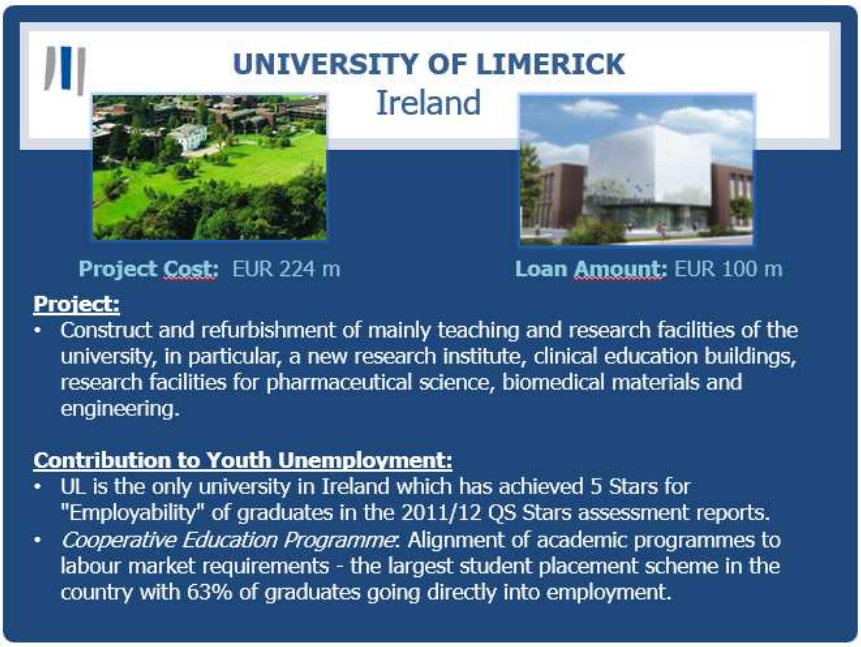
Figure 4.4.: "Jobs for Youth" - projects examples

- Greece: The EIB provided a €50m loan to Pancreta Cooperative Bank, it is the first Jobs for Youth scheme financed.
  - Pancreta Cooperative Bank will finance SMEs in the field of industry, commercial services, tourism.
  - Such SMEs must fulfill, at least one, of the following youth employment eligibility criteria: hiring at least one young person in the six month before or after receiving the loan and offering vocational training/internship/traineeships programs for young people.

- Italy : The EIB provided a €120m credit line to Intesa SanPaolo to promote youth employment in SMEs, midcaps and to support the creation and development of innovative start-ups.
  - Fostering new jobs for young people in the 15 to 19 age group.
  - SMEs and midcaps have to meet one of the following eligibility criteria: hiring at least one young worker in the six month before or after the loan request, providing vocational training programs or internships, working with schools, technical colleges or universities to employ young people or being owned by young shareholders, under 29 years old.

Source: EIB 2013 - g and EIB 2014 - a

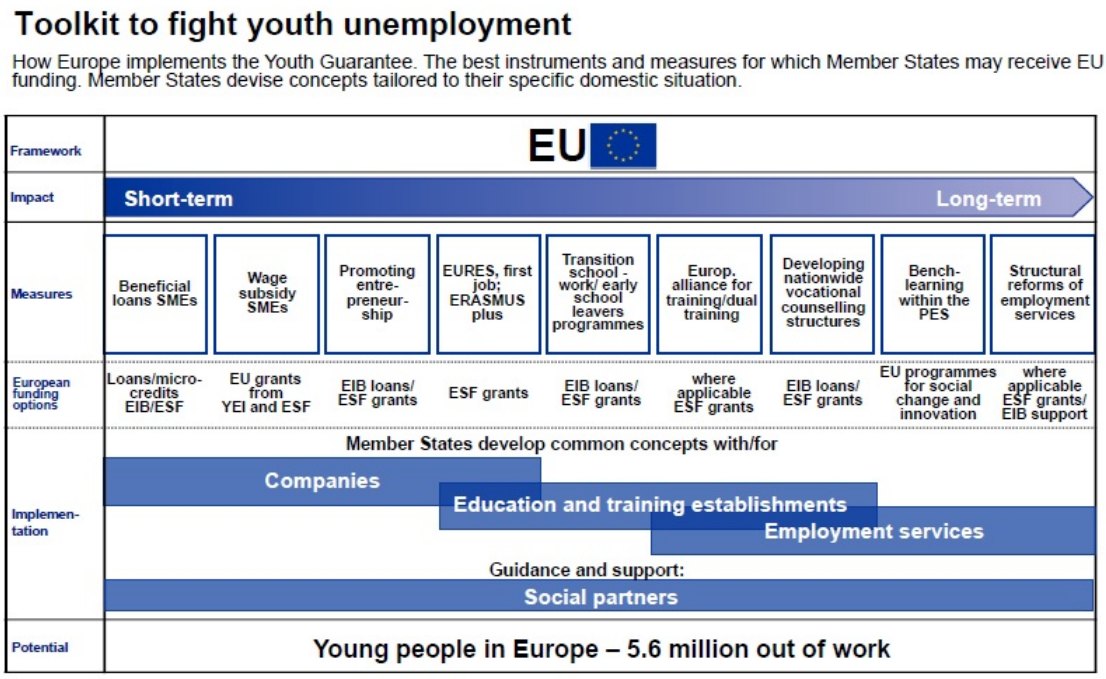
Figure 4.5.: "Investments in Skills" - project example



Source: EIB 2013 - o

4.2.3. EC/EIB initiatives complementarity and synergies

Figure 4.6.: The EC/EIB initiatives complementarity and synergies



Source: European Commission 2013 - e

The previous figure outlines the complementarity and synergies between the EC and EIB implemented initiatives to tackle the current youth employment crisis.

The 2014-2020 MFF provides a baseline to deepen EC/EIB joint initiative. The EC and EIB should provide joint responses where unemployment is the highest. In fact the two institutions have already collaborated for the *Skills and Jobs - Investing in Youth*, program, the EC provided the background and both institutions set up a working group to develop together the adequate operational and financial instruments.

This collaboration is expected to be deepen for greater impacts. Channeling EC grant money into EIB loans appears as a sharp way to deploy and leverage resources. The EIB and EC can agree on pre-financing or co-funding agreement. The most relevant approach is to guarantee an EIB loan on financial markets through a EC grant component. Indeed, the EIB AAA rating allows it to borrow on financial markets with a leverage of 1:8. Furthermore, the EIB loans to SMEs are usually co-financed at 50% by the financial intermediary. Yet, an EC €1bn grant component

channeled through the EIB would allow it to deploy €16bn of financing for youth employment (European Commission 2013 e).

In depth, the EC and the EIB have already agreed on some joint financing instruments:

- The CIP/COSME (Competitiveness for SMEs) guarantee schemes for SME lending. Arising from the competitiveness framework of the EC, it is a €2.3bn loan facility for SMEs. It will provide loan guarantees, risk finance and reimbursable equity financing.
- New risk-sharing mechanisms to channel earmarked structural funds for youth employment through the EIB instruments.
- Some common initiative to stimulate the loan securitization market for SMEs.

In addition both the EC and EIB can enter into partnership agreement with national or local governments to bolster stakeholders reach and resources on specific local youth unemployment issues. It is for instance the case of the EC Youth Employment Action teams (European Commission 2013 c) or the specific financial agreements the EIB signed in France or Greece (EIB 2013 e).

4.3. The relevance, scope for success and limitations of the EC/EIB initiatives

4.3.1. Relevance: a broad framework to promote youth employment in the EU, addressing skills mismatch and SMEs constrained access to finance

These programs recently designed by the EC and EIB are ready to be implemented. They seem relevant to tackle the current youth unemployment crisis as they address several key challenges. Furthermore, this is handled within an integrated and consistent framework building on these institutions' successes. The EC and EIB assume that the youth unemployment challenge mostly arise from an under-development of work-based education and a constrained access to finance for firms Therefore, connecting SMEs access to finance and job creation as well training opportunities seems to be the adequate approach to promote and sustain youth employment. EIB staff confirmed the *"very positive"* reception of these SMEs based solutions, demonstrating their relevance.[5] In particular, some Italian banks have been really active in seeking and activating these funds. Several Italian banks' senior managers have publicly stated their interest for this project (Bussi 2014).

The provision of financing solutions to SMEs is associated to youth employment and training eligibility criteria. Such projects mitigate market failures and banking

[5]The people contacted within the EIB are listed in the acknowledgments

fragmentation and attempt to shape the right incentives for SMEs to invest in youth. The toolkit of financial solutions available to SMEs shall account for their specific needs to finance training and hiring costs.

This goes alongside with the development of a comprehensive framework for youth initial vocational education. Indeed, these projects intent to address both under and over education. The idea is to improve school-based vocational education and to bolster on-the-job training for youth. The ESF is planning to enhance its impact by targeting better its programs on employment creation rather than just training provision.

4.3.2. Scope for success: stakeholders' responsiveness as well as instruments' relevance

A successful implementation of these initiatives will depend partners' responsiveness as well as the appropriateness of the financial instruments used. A successful outcome is sustainable employment opportunities for youth over the long run. Besides, the EC and the EIB shall address the shortcomings of their previous policies.

The Youth Employment Initiative and the Skills and Jobs Investing in Youth programs will be effective if the partners they target are receptive. National/regional authorities as well as SMEs will be receptive if such tailored solutions address their needs, are easy to implement and support their long term economic opportunities. For the Youth Employment Initiative, the policies implemented must be consistent and coordinated with national policies. For the EIB *Jobs for Youth Investing in Skills* program it is determining to ensure its credibility and relevance. Furthermore, in order to maximize its impact it is necessary to attract SMEs in need. Given the limited amount of resources, targeting is a key issue.

The financial instruments mobilized impact the project's effectiveness as well the magnitude and length of its benefits. Hence the EC and especially the EIB ought to pay attention to the instruments they will mobilize to support youth employment. In particular, it could be insightful to consider other tools than debt which is costly and over-used. In addition, the EIB evaluation report outlines that EIB SMEs intermediate loans do not benefit the firms that really need it. Both institutions are committed to mobilize appropriate innovative instruments. The first review of the projects implemented will provide a baseline to determine the kind of tools required. A medium term objective would be to set up a platform with EU member states in order to mobilize, leverage and channel EU and national resources for youth employment projects (Bussi 2014).

A brief and early assessment of both programs has been delivered by the two institutions:

- **Youth Employment Initiative.** Concerning the Youth Guarantee *"experience has shown, for example in Austria and Finland that this investment pays*

off" (European Commission 2013 e, p 3). *"A Youth Guarantee does have a fiscal cost for Member State Governments. However, the costs of not acting are far higher. The International Labor Organization has estimated the cost of setting up Youth Guarantees in the Eurozone at EUR 21 billion per year. But the European Foundation for Living and Working Conditions has estimated the current economic loss in the EU of having 7.5 million young people out of work or education or training at over 150 billion euros in terms of benefits paid out and lost output".* (European Commission 2013 e, p 4).

- **Skills and Job - Investing in Youth.** So far, there is no data available yet concerning the impact of the EIB projects over youth employment. It is also a new priority for the EIB. However, it has a proven track in financing skills acquisition through public sector education infrastructures, training programs and a strong experience in SMEs financing. Some early impacts of its increased lending to SMEs in the countries that display the highest rates of unemployment are actually already visible. Close to €20bn have been invested in SMEs by the EIB in 2013, it is estimated to sustain employment for 2 million people (EIB 2013 i). This contra-cyclical support also ambitions to correct market fragmentation within Europe and the Euro area; lending in countries under EC macroeconomic adjustment program has increased (EIB 2013 i). In addition, the EIB revised its programs assessment framework. The newly designed 3 Pillar Assessment includes "an increased growth and employment" an ex ante criteria to select its projects for financing. The employment effects are a mandatory core indicator of the EIB ex ante projects due diligence. This shall entail a greater employment outreach of the EIB projects (EIB 2013 m). The challenge for the EIB is to include a youth employment component as eligibility criteria. A program assessment is planned for mid-2014, if required, it will be *"adapted to the needs of final beneficiaries"* (EIB 2013 o).

4.3.3. Initiatives limitations and shortcomings: insufficient resources and the need for a broader intervention

"These proposals make for good sound-bites—no small concern for southern Europe's embattled leaders, or indeed for Mrs Merkel two months before an election. But, in practice, they are likely to disappoint. They suffer from the same flaws that have plagued the European Union's response to the crisis over the past three years: a lack of boldness, an incomplete analysis of the problem and an excessive faith in copying German policies" (The Economist 2013, p 2).

European leaders stated pretty strong ambitions when they announced these initiatives to tackle youth unemployment. Nevertheless, observers and specialists pointed out that the projects to implement may not produce decisive results. According to them, the amounts allocated are insufficient and EU youth unemployment challenges is part of a bigger macroeconomic problem.

First, the amount allocated may seem insufficient compared to the SMEs financing needs. Total credit to non-financial corporations in the peripheral economies declined by €137 billion between the end of 2010 and the third quarter of 2012 (Fergusson 2013, p 3). Thus, *"The pledge of €8 billion over two years is the equivalent of less than 0.1% of GDP a year for the eligible countries, or €850 a year for every young European in those countries who is neither in work, nor training nor education"* (The Economist 2013, p 2). Yet the calibration of these initiatives seem too small to generate the millions of new jobs to tackle the youth unemployment crisis. Besides, SMEs needs may be broader than access to finance; business services, broader support for exports, value chains and competitiveness are required.

"Yet the plans that were under discussion in Paris strike us as grossly inadequate. Even more worrying, they risk distracting E.U. leaders from what really needs to be done to revive the European economy" (Fergusson 2013, p 2). Europe's youth unemployment issues could be mostly derived from broader macroeconomic issues. Therefore, structural reforms would be more relevant to solve this issue especially in the field of labor policy and banking supervision. *"Training and apprenticeships are a good idea, but they will do little to help Europe's young jobless unless governments also succeed in boosting growth. The main reason youth unemployment has soared in southern Europe is the depth of the recessions in those countries"* (The Economist 2013 - p 2).

Those broader macroeconomic structural reform are outside the scope of this analysis as they mostly rely on Member States political agenda and willingness. Nevertheless, such measures must complement SMEs access to finance and youth training initiatives for greater results (Brunello *et al.* 2007). It arises from the two first Chapters of this thesis that skills mismatch and firms constrained access to finance fundamentally impair youth employment opportunities. The effects of most of the policies proposed by the EC/EIB have been already assessed. Tackling firms' lack of finance and youth's lack of training through a common instrument: SMEs financing to hire and train youths could therefore appear as a relevant strategy. In order to guide policy makers with relevant policy and management recommendations it is important to assess the relevance of these particular initiatives.

It supposes that:

- SMEs require a better access to finance to hire and train youths.
- Firms would benefit from youth training and are more likely to hire and train young people if they receive financial assistance from the EC/EIB.
- Vocational training development can make a real difference in terms of youths' access to employment, on a regional basis.

5. SMEs loans to bolster youth employment and training: an assessment

Providing loans to SMEs to improve their access to finance and thus easing their ability to hire and train young people appears as the most innovative part of the EC and EIB initiatives. However, unlike the other ones, this measure targets indirectly youth employment. It could have therefore less predictable outcomes, as it may be unclear if firms actually do need a better access to finance to hire and train more youth. Such programs have already been implemented to boost training and employment for youth or for SMEs in Italy or in the UK (Maton 1999 and Brunello *et al.* 2012). But, it seems to be the first time that public financial support would target both SMEs access to finance and the youth. Besides, the EC and EIB stated in their program presentations that the projects' contents and tools are still under development and could evolve during the program implementation.

Thus, this chapter aims to provide an analytical framework to assess if providing public financial support to SMEs is both relevant and sufficient to increase youth employment and training opportunities. It would also analyze the programmatic features susceptible of achieving better results. Such analyses are fundamental to determine the firms' specific needs and the options more likely to be effective. This empirical part takes a demand driven approach, the EC/EIB initiatives are relevant only if they answer to firms' needs and behavior. In addition, a regional analysis intends to assess the actual effects of vocational education on youth activity outcomes. Such results provides a baseline to better calibrate the EC/EIB initiatives.

The following research questions are explored:

- Do firms need a better access to finance to solve their skills issues?
- Are firms providing training more productive and more likely to create employment?
- Can initial vocational education improve regional development and youth job matching?

It is to be noted that firm-level data do not provide any data specifically related to the youth population. However, general conclusions from firm level observations could be even more relevant for the youth as this population class tends to suffer more from skills mismatch and constrained access to finance.

5.1. Lack of finance and lack of skills: understanding and mitigating the connection

5.1.1. The EC ECB Survey on Access to Finance of SMEs (SAFE) dataset: summary statistics and research questions.

5.1.1.1. Dataset description and summary statistics

The micro data of the EC ECB survey on the access to finance of SMEs is used for the first part of this assessment. This unique dataset provides key useful data relative to nearly 14,000 European SMEs characteristics and financing needs. It is considered as representative for both the four largest activities and the four largest euro area countries (ECB 2013 b).

The latest available dataset is used, data range from April to September 2013.

Table 5.1.: Number of firms by country

Country	Firms	Country	Firms	Country	Firms	Country	Firms
Austria	501	Estonia	100	Italy	1,000	Portugal	500
Belgium	500	Finland	501	Lithuania	301	Romania	500
Bulgaria	502	France	1,002	Luxembourg	100	Slovakia	300
Croatia	100	Germany	1,000	Latvia	200	Slovenia	100
Cyprus	100	Greece	500	Malta	100	Spain	1,001
Czech Rep	429	Hungary	500	Netherlands	500	Sweden	507
Denmark	500	Ireland	500	Poland	1,011	UK	1,000

Source: EC ECB SAFE Dataset 2013

Table 5.2.: Firms by employment size

Employment size	Number of firms	%
From 1 employee to 9 employees	4,387	31.55
From 10 employees to 49 employees	4,517	32.48
From 50 employees to 249 employees	3,813	27.42
250 employees or more	1,189	8.55

Source: EC ECB SAFE Dataset 2013

Table 5.3.: Firms by turnover size

Turnover size	Number of firms	%
Up to €2m	6,629	47.67
More than €2m and up to €10m	3,584	25.77
More than €10m and up to €50m	2,324	16.71
More than €50m	992	7.13
[DK/NA]	377	2.71

Source: EC ECB SAFE Dataset 2013

This rich dataset mostly includes the smaller SMEs, likely to suffer from a constrained access to finance and potential sources of employment for the youth. Among the variables listed, one is particularly important for the purpose of this research: the availability of skilled staff or experienced managers as one of the most pressing problems. SMEs surveyed were asked to determine on a rank of 1 to 10, how much pressing this problem was; 1 standing for not pressing at all and 10 for extremely pressing. This gives a good benchmark of the lack of skills faced by firms.

Lack of skills appears as a very pressing issue for SMEs with more than 65% ranking it as 5/10 and more. More than 30% of firms put this issue on a scale 8 or more out of 10. In some of the countries affected by high youth unemployment rates that is a particularly pressing issue: France, Ireland, Italy or Poland for instance.

Another variable of great interest is the ranking by SMEs of access to finance as one of the most pressing problem on a scale similar to the previous one.

Table 5.4.: Availability of skilled staff or experiences manager as one of the most pressing problems

	Skilled	**Staff**	**Finance**	**Access**
Lack of skilled staff or Finance as a pressing problem	Number of firms	% of firms	Number of firms	% of firms
1	1,812	13.19	2,623	19.40
2	1,024	7.45	1,144	8.46
3	1,104	8.04	1,166	8.62
4	834	6.07	762	5.63
5	2,088	15.20	1,894	14.01
6	1,109	8.07	848	6.27
7	1,586	11.55	1,003	7.42
8	2,097	15.27	1,552	11.48
9	790	5.75	771	5.70
10	1,293	9.41	1,760	13.01

Source: EC ECB SAFE Dataset 2013

On average it seems that access to finance affects less SMEs than access to skills,

however access to finance seems to be resented in greater magnitudes. Cyprus, Greece, Italy, Poland, Slovakia or Spain are particularly affected. SMEs are allowed to provide answers for different items in the most pressing problems section. It appears that the ones which have allocated a high score to the availability of skilled staff are more likely to rank access to finance as one of their most pressing problems. Skills and finance issues affect all SMEs types.

The SAFE dataset also provides data regarding SMEs employment creation or destruction, 40% of them generated employment creation and more than 22% of them reduced their workforce over the last three years. The dataset includes variables relative to the various financial instruments used and required by firms. This represents a great input for the following section of this assessment. SMEs mostly rely on bank loans but have witnessed a degradation in bank loan availability, admitting for the European banking crisis. Bigger SMEs deploy a wider toolkit of instruments to finance their needs. This dataset lists the use of grants or subsidized loans among these instruments. It is consequently possible to assess the needs for the kind of instruments the EC and the EIB intend to provide. The scope for a public intervention in favor of SMEs clearly appears in the answers provided by SMEs concerning the factor that would ease their access to finance. 70% of SMEs list the access to guarantees for loans as an important factor for their access to future financing, 78% of SMEs call for tax incentives. Measures to facilitate equity investments in SMEs or make it easier for SMEs to obtain the existing public schemes are requested by SMEs in similar proportions.

5.1.1.2. Research questions

This rich and unique dataset provides a framework to analyze the characteristics and needs of firms that recognize that access to finance and the availability of skilled employees are pressing problems.

5.1.2. A firm level data analysis of firms' lack of skills and finance

Because the dataset is uniquely composed of categorical variables, the following regressions are performed using probit or ordered probit regression techniques with categorical variables as controls for specific effects. This analysis is a cross-sectional one. Although the data provided by the ECB include multiple years, the anonymization procedure used do not allow to treat those data as panel ones. As a matter of consistency, firms employing more than 249 employees are excluded from this study.

The regression performed below use some of the specifications provided by Görg & Strobl (2005), Holzer *et al.* (1993) and Popov (2013).

5.1.2.1. The characteristics and needs of SMEs lacking a skilled workforce

This part of the regression analysis aims to determine the various characteristics of SMEs considering that the lack of skills is one of their most pressing issues.

To capture the connections between SMEs lack of skills and their size, sector or country of origin, the following regression is set.

$$Skills\,Issue = \alpha + \theta\,Size + \delta\,Sector + \gamma\,Country + \varepsilon \qquad \textbf{(5.1.1)}$$

$Skills\,Issue$ is the dependent variable, it takes a value from 1 to 10; 10 representing highest score to rank this pressing issue. It is determined from the following model:

$$Skills\,Issue = \begin{cases} 0 & if \quad Skills\,Issue \leq 1 \\ 1 & if \quad 1 < Skills\,Issue \leq 2 \\ 2 & if \quad 1 < Skills\,Issue \leq 3 \\ 3 & if \quad 1 < Skills\,Issue \leq 4 \\ 4 & if \quad 1 < Skills\,Issue \leq 5 \\ 5 & if \quad 1 < Skills\,Issue \leq 6 \\ 6 & if \quad 1 < Skills\,Issue \leq 7 \\ 7 & if \quad 1 < Skills\,Issue \leq 8 \\ 8 & if \quad 1 < Skills\,Issue \leq 9 \\ 9 & if \quad 1 < Skills\,Issue \leq 10 \end{cases}$$

α is a constant.

Size includes categorical variables to control for firms' size: micro (less than 10 employees) or small (less than 50 employees).

Sector includes categorical variables to control for firms' sector: industry, trade or services; construction is the omitted value.

Country includes dummy variables to control for country of origin. It accounts whether the SME is located in a country deeply affected by the economic recession: Cyprus, Greece, Ireland, Italy, Portugal and Spain.

ε is the error term.

A smaller size as well as being from a country deeply affected by the economic recession do not have a positive effect on firms' expressed lack of skills. It could arise from the fact that such firms may struggle with other issues. To a similar extent there is no evidence for an industry related lack of skills issue.

Table 5.5.: Characteristics of SMEs listing the lack of skills as one of the most pressing problems

	(5.1.1) Availability Pressing Coefficients	skilled staff problem t statistics
Micro Firm	-0.246***	(-8.20)
Small Firm	0.0174	(0.61)
Industry	-0.0475	(-1.16)
Trade	-0.200***	(-4.94)
Services	-0.0653	(-1.68)
Country Crisis	-0.364***	(-14.20)
Observations	8008	8008

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The following regression adds to the first one so as to assess the linkages between firms' lack of skills and firms' lack of finance.

$$Skills\,Issue = \alpha + Finance\,Issue + \theta\,Size + \gamma\,Country + \varepsilon \qquad \textbf{(5.1.2)}$$

$Finance\,Issue$ is a categorical variable that can take a value from 1 to 10 and captures the importance of access to finance for firms. 1 is the null categorical value as it corresponds to an absence of financing constraints; 10 is the higest one. Firms's credit constraints are not always obsevable (Popov 2013). However, a high score given to this question reveals a strong concern and therefore suggests that the firm may face a constrained access to finance.

$\alpha, Size, Country, \varepsilon$ are the same parameters than used above.

The connection between lack of skills and lack of finance clearly appears, with significant results. The more a firm lists access to finance as a pressing issue the more it tends to also list lack of skills as a challenge faced. The effects of finance issue on the lack of skills seem stronger and stronger as the lack of finance is becoming more and more pressing issue. The relation holds the other way around, but lack of finance induces more the lack of skills than the opposite.

Table 5.6.: Lack of Skills lack of Finance Linkages

	(5.1.2) Availability skilled staff Pressing problem Coefficients	t statistics
Finance Issue: 2	0.145**	(3.10)
Finance Issue: 3	0.268***	(5.76)
Finance Issue: 4	0.243***	(4.71)
Finance Issue: 5	0.402***	(10.06)
Finance Issue: 6	0.471***	(9.38)
Finance Issue: 7	0.483***	(10.11)
Finance Issue: 8	0.522***	(12.54)
Finance Issue: 9	0.361***	(6.99)
Finance Issue: 10	0.549***	(13.39)
Micro Firm	-0.284***	(-10.44)
Small Firm	-0.0155	(-0.59)
Country Crisis	-0.452***	(-18.18)
Observations	8772	8772

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This dataset provides enough data and variable to analyze the kind of financing firms facing a lack of skills would be more likely to require to support their external financing needs. This could constitute a rationale to consider the financial toolkit to be mobilized by the EC and the EIB.

The following regression is performed.

$$Skills\,Issue = \alpha + \varpi\, Instruments + \theta + \gamma + \varepsilon \qquad \textbf{(5.1.3)}$$

The terms are similar to the really first equation except that $Instruments$ is a categorical variable capturing the type of financing instruments firms would require to finance their needs. It could be a loan, another loan provided among other by a non bank agency, some equity financing or a mezzanine financing scheme.

Table 5.7.: The financial tools likely to be required by SMEs affected by a lack of skills

	(5.1.3) Availability skilled staff Pressing problem	
	Coefficients	t statistics
Loan	0.0726**	(3.05)
Other loan	0.0280	(0.66)
Equity	0.0403	(0.68)
Mezzanine	0.108	(1.35)
Micro Firm	-0.268***	(-9.82)
Small Firm	0.000201	(0.01)
Country Crisis	-0.393***	(-16.05)
Observations	8772	8772

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Although those results are not all very significant, they display interesting insights concerning the financing needs of firms lacking skills; beyond conventional bank loans, which are the main providers of SMEs finance. The more likely a firm requires mezzanine schemes or equity financing, the more it faces skills issues.

5.1.2.2. The determinants of firms lacks of finance

This section focuses on the determinants of firms' constrained access to finance as well as the effects of such lacks. A second part is dedicated to the financing needs of such firms.

$$Finance\,Issue = \alpha + \rho\,Turnover + \theta\,Size + \delta\,Sector + \gamma\,Country + Debt + \varepsilon \quad \textbf{(5.1.4)}$$

$Finance\,Issue$ is the dependent variable. It takes a value from 1 to 10; 10 representing highest score to rank this pressing issue.

It is determined from the following model:

$$Finance\,Issue = \begin{cases} 0 & if \quad Finance\,Issue \leq 1 \\ 1 & if \quad 1 < Finance\,Issue \leq 2 \\ 2 & if \quad 1 < Finance\,Issue \leq 3 \\ 3 & if \quad 1 < Finance\,Issue \leq 4 \\ 4 & if \quad 1 < Finance\,Issue \leq 5 \\ 5 & if \quad 1 < Finance\,Issue \leq 6 \\ 6 & if \quad 1 < Finance\,Issue \leq 7 \\ 7 & if \quad 1 < Finance\,Issue \leq 8 \\ 8 & if \quad 1 < Finance\,Issue \leq 9 \\ 9 & if \quad 1 < Finance\,Issue \leq 10 \end{cases}$$

α is a constant.

Turnover is a categorical variable, proxy for SMEs annual turnover, it can be between € 2 and € 10 million or between € 10 and € 50 million. A categorical variable is also included to specify whether this turnover has risen or not over the last three years; it takes the value of 2 if it has risen from more than 20%, 1 if has risen from less than 20%

Size includes categorical variables to control for firms' size: micro (less than 10 employees) or small (less than 50 employees).

Sector includes categorical variables to control for firms' sector: industry, trade or services; construction is the omitted value.

Country includes dummy variables to control for country of origin. It accounts whether the SME is located in a country member of the Economic and Monetary Union where finance constraints can be specific. It also captures whether the firm is located in a country deeply affected by the crisis or not.

Debt is a dummy variable specifying whether firm debt level increased over the last six months.

ε is the error term.

From the following table, it appears that firms' specific characteristics such as size or industry do not seem to drive an expressed issue in terms of access to finance. Besides, it seems that variables directly affecting firms' financing conditions as the national origin or the increased level of debt or turnover have stronger effects on the stated lack of finance. Lack of finance arises more from the provision of finance side than from SMEs characteristics one.

Table 5.8.: Characteristics of SMEs for which access to finance is a pressing problem

	(5.1.4) Access to finance Pressing problems	(5.1.4) Access to finance Pressing problems
Turnover 2-10m	-0.0214	
	(-0.69)	
Turnover 10-50m	-0.181***	
	(-4.34)	
Turnover growth Less than 20%		-0.165***
		(-6.38)
Turnover growth More than 20%		-0.0807*
		(-2.33)
Debt	0.486***	0.464***
	(16.26)	(15.48)
Micro Firm	-0.0376	0.0191
	(-0.97)	(0.63)
Small Firm	-0.0144	0.0428
	(-0.45)	(1.49)
Industry	-0.0888*	-0.0902*
	(-2.15)	(-2.17)
Trade	-0.0936*	-0.114**
	(-2.30)	(-2.80)
Services	-0.162***	-0.134***
	(-4.12)	(-3.40)
EMU	0.180***	
	(7.25)	
Country Crisis		0.302***
		(11.47)
Observations	8008	8008

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The following framework analyzes the tools SMEs lacking finance use and require.

$$Finance\,Issue = \alpha + \varpi\,Instruments + \theta\,Size + \gamma\,Country + \varepsilon \qquad \textbf{(5.1.5)}$$

Instruments corresponds to the instruments used and to the ones required.

Table 5.9.: SMEs constrained access to finance: instruments used and instruments required

	(5.1.4) Access to finance Pressing problems	(5.1.4) Access to finance Pressing problems
Used Retained earnings	-0.0600*	
	(-2.40)	
Used Grants subsidized loans	0.0547	
	(1.72)	
Used Credit line	0.382***	
	(16.09)	
Used Bank loan	0.277***	
	(11.02)	
Used other loan	0.217***	
	(7.35)	
Used Debt securities	0.0617	
	(0.85)	
Used mezzanine	0.126	
	(1.76)	
Used equity	0.00206	
	(0.05)	
Loan		0.0242
		(1.01)
Other loan		-0.0220
		(-0.51)
Equity		0.260***
		(4.34)
Mezzanine		0.208*
		(2.55)
Micro Firm	0.196***	0.0556*
	(6.91)	(2.03)
Small Firm	0.138***	0.0756**
	(5.15)	(2.86)
Country Crisis	0.342***	0.336***
	(13.76)	(13.63)
Observations	8772	8772

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Among the external financial instruments used by firms, grants or subsidized loans, debt securities and equity seem to have the lowest effect on the expressed constrained access to finance. On the other hand, the more a firm is likely to require equity or mezzanine financing the more it states a challenging access to finance. It implies that firms which prefer mobilizing such financial instruments are more constrained in their access to finance. The types of instruments identified here are similar to the ones identified for firms' lacking skills. However, the equity and mezzanine financing coefficients are bigger in the relation above, suggesting a stronger need for those firms. It could also be explained by firms' unobservable characteristics. Although the coefficients are not all significant they bring an overview of the type of financing used and required by firms listing the lack of finance as a pressing problem. Last but not least, the significant and relatively positive coefficients associated with lack of finance and bank loans or credit lines characterize the banking crisis Europe is facing. Firms mostly relying on bank finance are more strongly affected by a lack of finance.

5.1.2.3. Micro foundations of employment generation

The EC ECB SAFE dataset also includes a variable relative to firms' employment generation. Yet another categorical variable, the employment generation one specifies whether firms have seen their workforce grow from more than 20%, less than 20% or if it has remained the same or gotten smaller.

Therefore the following model provides a useful framework to specify the characteristics of firms generating employment.

$$Employment\,Generation = \alpha + \rho\,Turnover + \theta\,Size + \delta\,Sector + \gamma\,Country + Skills + Finance + \varpi\,Instruments + \varepsilon \quad \textbf{(5.1.6)}$$

$Employment\,Generation$ is the dependent variable it takes a value between 0 and 2. 0 if the workforce has gotten smaller or remained the same, 1 if the workforce has increased from less than 20% and 2 if it has risen from more than 20%. It is determined from the following model:

$$Employment\,Generation = \begin{cases} 0 & if \quad Employment\,Generation = 0 \\ 1 & if \quad 0 < Employment\,Generation \leq 1 \\ 2 & if \quad 1 < Employment\,Generation \leq 2 \end{cases}$$

α is a constant.

$Turnover$ is a categorical variable, proxy for SMEs annual turnover, it can be between € 2 and € 10 million or between € 10 and € 50 million.

Size includes categorical variables to control for firms' size: micro (less than 10 employees) or small (less than 50 employees).

Sector includes categorical variables to control for firms' sector: industry, trade or services; construction is the omitted value.

Country includes a dummy variable to control for country of origin. It specifies whether the firm is located in a country deeply affected by the crisis or not.

Skills is a dummy variable which takes the value of 1 if firms allocated a score equal or superior to 5 when determining how problematic the lack of skills was.

Finance is a dummy variable which takes the value of 1 if firms allocated a score equal or superior to 5 when determining how problematic the lack of finance was.

Instruments corresponds to various financing instruments required by firms lacking skills, namely: Grants and subsidized loans, Debt securities, Mezzanine financing and Equity.

ε is the error term.

Even though these coefficient are not all significant, this table provides a firm data basis to employment creation in Europe. Turnover size does not seem to induce much employment generation. On the other size, firms' size seem to be positively related to employment creation, meaning that the smaller firms are less likely to generate employment. A firm operating in industry and trade is less likely to increase its workforce, probably because such sectors are more exposed to the business cycle. In opposition, belonging to the services sector is correlated with an increased workforce. The geographic controls are negatively and significantly correlated with employment creation, admitting for financial and labor markets fragmentation in Europe. If the lack of finance negatively impacts employment creation, a firm considering the lack of skills as a pressing issue is more likely to increase its workforce. Eventually, the mobilization of equity or grant/subsidized loans induces positively and significantly employment creation.

Table 5.10.: Identification of firms most likely to generate employment

	(5.1.6) Employment Generation	(5.1.6) Employment Generation	(5.1.6) Employment Generation
Turnover 2-10m	0.0380	0.0380	0.0292
	(1.07)	(1.07)	(0.82)
Turnover 10-50m	0.0243	0.0179	0.00711
	(0.51)	(0.38)	(0.15)
Micro Firm	-0.431***	-0.406***	-0.394***
	(-9.51)	(-8.93)	(-8.62)
Small Firm	-0.0189	-0.0157	-0.00901
	(-0.51)	(-0.43)	(-0.24)
Industry	-0.0154	-0.0165	-0.0289
	(-0.32)	(-0.34)	(-0.59)
Trade	-0.0468	-0.0363	-0.0434
	(-0.97)	(-0.75)	(-0.90)
Services	0.0584	0.0573	0.0556
	(1.27)	(1.24)	(1.20)
EMU	-0.0623	-0.0818*	-0.0674*
	(-1.95)	(-2.55)	(-2.09)
Country Crisis	-0.298***	-0.252***	-0.269***
	(-8.59)	(-7.14)	(-7.56)
Skills		0.225***	0.225***
		(7.47)	(7.47)
Finance		-0.104***	-0.116***
		(-3.70)	(-4.10)
Used Grants or subsidized loans			0.182***
			(4.77)
Used debt security			0.150
			(1.64)
Used Mezzanine			-0.121
			(-1.36)
Used Equity			0.186***
			(3.42)
Observations	8008	8008	8008

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.1.2.4. The firms most likely to benefit from a grant or a subsidized loan

Among the variables relative to the types of financing tools used by SMEs, one of them refers to Grants or subsidized loans, therefore it is possible to grasp an overview of the firms most likely to receive such concessional financing.

Similarly to the previous analysis, the following framework is used:

$$Grant\,Subsidized\,Loan\,Used = \alpha + Employment\,Generation + \rho\,Turnover + \theta\,Size + \delta\,Sector + \gamma\,Country + Skills + Finance + Debt + \varepsilon \qquad \textbf{(5.1.7)}$$

Grant Subsidized Loan Used is the dependent dummy variable, it takes a value of 1 if the firm has benefited from a grant or a subsidized loan over the last six months.

α is a constant.

Employment Generation is a categorical variable it takes a value between 0 and 2. 0 if the workforce has gotten smaller or remained the same, 1 if the workforce has increased from less than 20% and 2 if it has risen from more than 20%.

ρ is a categorical variable is included to specify whether this turnover has risen or not over the last three years; it takes the value of 2 if it has risen from more than 20%, 1 if has risen from less than 20%

Size includes categorical variables to control for firms' size: micro (less than 10 employees) or small (less than 50 employees).

Sector includes categorical variables to control for firms' sector: industry, trade or services. Construction is the omitted value.

Country includes dummy variables to control for country of origin. It captures whether the firm is located in a country deeply affected by the crisis or not.

Skills is a dummy variable which takes the value of 1 if firms allocated a score equal or superior to 5 when determining how problematic the lack of skills was.

Finance is a dummy variable which takes the value of 1 if firms allocated a score equal or superior to 5 when determining how problematic the lack of finance was.

Debt is a dummy variable specifying whether firm debt level increased over the last six month.

ε is the error term.

Table 5.11.: Determinants of firms benefiting from grants or subsidized loans

	(5.1.7) Use grant or Subsidized loan	(5.1.7) Use grant or Subsidized loan	(5.1.7) Use grant or Subsidized loan
Industry	0.253***		
	(4.03)		
Trade	0.0384		
	(0.60)		
Services	-0.00371		
	(-0.06)		
Micro Firm	-0.481***	-0.547***	-0.550***
	(-10.29)	(-12.47)	(-12.46)
Small Firm	-0.212***	-0.272***	-0.281***
	(-5.15)	(-7.11)	(-7.31)
Country Crisis	0.202***	0.229***	0.212***
	(5.34)	(6.27)	(5.69)
Employment Growth less than 20%		0.108*	0.110*
		(2.55)	(2.56)
Employment Growth more than 20%		0.161*	0.165**
		(2.55)	(2.59)
Turnover growth Less than 20%		0.0715	0.0799
		(1.71)	(1.91)
Turnover growth More than 20%		0.156**	0.160**
		(2.64)	(2.71)
Debt		0.307***	0.271***
		(7.78)	(6.76)
Finance			0.223***
			(6.21)
Skills			0.0497
			(1.34)
Constant	-0.987***	-1.030***	-1.194***
	(-16.47)	(-27.06)	(-24.07)
Observations	8008	8772	8772

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Belonging to the industry sector seems to be a significant driver of grant or subsidized loan reception. This probably arises from voluntary industrial policies implemented by certain countries. The effect of other sectors is marginal. A smaller firm size involves a lower use of grants/subsidized loan, implying a critical size to benefit from such financial tools. Firms which have increased their workforce or turnover over the last three years are more likely to use grants or subsidized loans. This relation is stronger and more significant for employment generation than for turnover growth. This could relate to two effects: grants or subsidized loans generate employment; and/or such instruments specifically target employment support initiatives. Firms that consider access to finance as a pressing issue are also more likely to use grants or subsidized loans. This effect is very weak and insignificant for firms lacking skills. This maybe reveals that some financing support schemes are available for firms lacking finance but are insufficiently developed for firms lacking skills. Eventually, firms that have seen their debt level rising during the last six months are more likely to have used a grant or a subsidized loan during the same period. It could imply that the use of such instruments increases firms' debt burden.

5.1.3. Main findings, critical review and policy insights: using non debt instruments to tackle skills and finance constraints

5.1.3.1. Findings, review and limitations

The analysis performed confirms that skills and finance issues could be interrelated, affecting firms' development. This issue appears less striking for the micro enterprises as because of their really small size they may face different issues. Firms lacking of skills and finance seem to be really constrained by the banking channel, consequently they require alternative sources of funding: equity or mezzanine financing. Firms using such financing instruments are more likely to generate employment. Grants and subsidized loans have some effects on employment generation and they seem to benefit to firms financially constrained. On the other hand, smaller firms and firms facing a skills issue are less likely to benefit from public grants or subsidized loans.

Because of the broad variety of data provided by this dataset, this analysis is rather unique, however it confirms some of the results in the literature. Grants or subsidized loans are likely to stimulate employment (Görg & Strobl 2005 and Fraser *et al.* 2002). A constrained access to finance may arise from the banking channel and sustains the lack of skills through a reduced investment in training (Popov 2013).

Two features of this dataset features could limit the accuracy of these findings. The use of categorical variables only, which does not allow for more sensitive analysis and the impossibility to treat these data as panel ones. Furthermore, these results apply to the SMEs surveyed overall workforce, no youth specific effect is captured

as data do not allow for this. This general data trend has already been observed by Ryan (2001). However, taking into the account the finding exposed in the previous chapters, it could be argue that such dynamics are even stronger for young workers are lack of skills and finance deeply affect them. Thus, these results still constitute a baseline for policy makers who shall properly outreach and target youth.

5.1.3.2. Policy insights

The scope and needs for the EC/EIB programs is revealed by this first assessment. Lack of skills and lack of finance are somewhat connected; firms constrained in their financing or skills availability perspective request a public financial support.

On the other hand, it could be interesting not to channel such support through the banking channel so as to focus on some alternative instruments actually requested by firms lacking skills and finance: equity or mezzanine financing. Besides, the EC/EIB initiatives shall be implemented so as to specifically target firms lacking skills and the smallest ones.

5.2. Firms providing training: determinants and results

5.2.1. The EU-EFIGE/Bruegel-Unicredit dataset: summary statistics and research questions

5.2.1.1. Dataset description and summary statistics

The EU-EFIGE/Bruegel-Unicredit dataset is a database collected within the European Firms in a Global Economy: internal policies for external competitiveness (EFIGE), supported by the EC Directorate General Research and coordinated by the think tank Bruegel. This database presents quantitative and qualitative information on about 150 firm-level items: firms' structure, workforce, investment, export and internationalization, market structure and competition, financial structure. Data constitute a representative sample at country level for the manufacturing industry of around 15,000 firms in seven European countries: Austria, France, Germany, Hungary Italy, Spain and United Kingdom. Data have been collected in 2010 and include some items relative to firms' behavior during the crisis (Bruegel 2012).

Table 5.12.: EFIGE firms surveyed by country and size

Size	AUT	FRA	GER	HUN	ITA	SPA	UK	Total
Employees: 10-19	132	1,001	701	149	1,040	1,036	635	4,694
Employees: 20-49	168	1,150	1,135	176	1,407	1,244	805	6,085
Employees: 50-249	97	608	793	118	429	406	519	2,970
Employees: over 250	46	214	306	45	145	146	108	1,010
Total	443	2,973	2,935	488	3,021	2,832	2,067	14,759

Source: EU-EFIGE/Bruegel-Unicredit dataset 2010

The EU-EFIGE/Bruegel-Unicredit dataset is particularly interesting for this study as the variables included in the workforce category offer some items relative to firms' provision of training to their employees. In particular, there are two items: the percentage of employees who have received formal training in 2008 and a categorical variable specifying of this training was mostly in-house or outside the firm. The data provided do not allow to perform some more qualitative analysis as no information is available on the actual training amount or content. However, for a cross country analysis, the data included are fairly unique.

Table 5.13.: Firms' formal training provision

Country	Number training firms	% of training firms	% training firms (In-House)	% training firms (Outside)	Mean % employees trained	Median % employees trained
Austria	323	86	33	67	16.9	10
France	2,301	84	58	42	17.9	10
Germany	2,167	84	41	59	17.8	10
Hungary	275	62	33	67	10.0	3
Italy	1,556	54	49	51	8.7	1
Spain	2,231	83	53	47	22	12
UK	1,480	77	54	46	18.6	10

Source: EU-EFIGE/Bruegel-Unicredit dataset 2010

Except for Italy and Hungary, the patterns of training provision are fairly similar across the seven European economies surveyed. However, the share of in-house and outside the firm training differs widely from a country to another.

5.2.1.2. Research questions

The broad variety of firms characteristics data as well as the unique variables relative to firms' provision of training, offers a really insightful framework to analyze the micro foundations of firms decision to train and its various effects.

5.2.2. Micro foundations of firms' decision to provide training and its effects on firms' productivity and employment

Because the dataset is only provides data for a year, the following regressions performed are cross sectional ones. It uses probit, OLS and 2sls with instrumental variables techniques. As a matter of consistency, firms employing more than 249 employees are excluded from this study.

The regression performed below use some of the methods provided by Barrett & Connell (1999), Görg & Strobl (2005), Holzer *et al.* (1993) Konings & Vanormelingen (2010) and Popov (2013).

5.2.2.1. Determinant characteristics of firms training provision

The following regressions aim to assess how firms' characteristics influence firms' decision to provide training. Probit techniques assess the decision to train as a dependant variable. OLS regressions are performed with the percentage of employees trained as dependent variable. It makes possible to assess both firms' decision to train and the amount of this provision.

The following model is set up

$$Training = \alpha + \theta\, Size + \psi\, Workforce + \phi\, FCharacteristics + \gamma\, Country + \varepsilon \quad \textbf{(5.2.1)}$$

$Training$ is the dependent variable. In the case of probit regressions it is a dummy variable, it takes the value of 1 if the firm provided training to at least 1% of its employees, 0 if not. In the case of OLS regressions it is the percentage of employees within the firm that received training.

α is a constant.

$Size$ includes a dummy variable to control for firms' size: small (less than 50 employees).

$Workforce$ includes variables to control for firms' workforce: % of white collars, % of blue collars, % of unskilled and apprentices, % employees involved in R&D, % university graduates and % foreign employees.

$FCharacteristics$ includes variables to control for firms' specificities: percentage of turnover invested, dummies for firm belonging to a group, turnover superior to €10 million, labor flexibility, global exporter, FDI and family/individual ownership, R&D. A sector control is not relevant here as firms belong to the manufacturing industrial sector and the anonymization procedure used does not allow to differentiate the various sub sectors.

Country includes dummy variables to control for country of origin; the countries for which the bigger fixed effects are observed: Austria, Germany, Hungary, Italy and Spain.

ε is the error term.

Table 5.14.: Determinant Characteristics of firms' training provision 1/3

	(5.2.1) Probit Training decision	(5.2.1) OLS % employees trained
Small Firm	-0.733***	-5.610***
	(-20.26)	(-12.53)
AUT	0.194*	-1.238
	(2.31)	(-1.07)
GER	0.105**	-0.827
	(2.81)	(-1.57)
HUN	-0.610***	-8.360***
	(-9.31)	(-7.91)
ITA	-0.742***	-8.971***
	(-23.19)	(-17.96)
SPA	0.132***	4.478***
	(3.64)	(8.61)
Constant	1.477***	22.47***
	(38.97)	(48.49)
Observations	13623	12606

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Although OLS and probit coefficients are not comparable, it appears that training decision and training provision amounts have similar patterns. Roughly, a small firm is less likely to provide training to its employees. Firms' national origins also play an important role as revealed the important and significant negative coefficients for Hungary and Italy in comparison of the other geographical controls.

Table 5.15.: Determinant Characteristics of firms' training provision 2/3

	(5.2.1) Probit Training decision	(5.2.1) OLS % employees trained
Small Firm	-0.680***	-6.142***
	(-6.00)	(-4.25)
% white collars	0.00439	0.0235
	(1.20)	(0.46)
% skilled blue collars	-0.000788	-0.0401
	(-0.24)	(-0.83)
% unskilled and apprentices	-0.00389	-0.0719
	(-1.10)	(-1.37)
% employees involved in R&D	0.00546	0.140**
	(1.63)	(3.08)
% university graduates	0.000662	0.0973*
	(0.20)	(2.09)
% foreign employees	-0.000949	0.0147
	(-0.29)	(0.31)
AUT	0.0465	-5.833
	(0.15)	(-1.55)
GER	0.0557	-4.429*
	(0.43)	(-2.54)
HUN	-0.591**	-13.34***
	(-3.17)	(-4.47)
ITA	-0.411	-11.87***
	(-1.94)	(-3.67)
SPA	0.450**	4.524*
	(2.87)	(2.16)
Constant	1.479***	26.67***
	(4.85)	(6.08)
Observations	1117	1045

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Workforce composition does not seem to be an important and significant driver of firms' training. Training decision is maybe more driven by firms' strategic choices.

Table 5.16.: Determinant Characteristics of firms' training provision 3/3

	(5.2.1) Probit Training decision	(5.2.1) OLS % employees trained
Small Firm	-0.451***	-1.486**
	(-10.53)	(-2.73)
Inestment as % turnover	0.00431***	0.0395***
	(8.41)	(5.47)
Group	0.371***	3.514***
	(9.35)	(6.85)
Turnover 10m	0.254***	4.236***
	(5.28)	(6.95)
Labour flexibility	0.179***	0.850
	(5.66)	(1.77)
Global exporter	0.0120	-0.196
	(0.38)	(-0.45)
FDI	0.0741	0.374
	(0.87)	(0.37)
R&D	0.446***	4.443***
	(17.09)	(11.60)
Family/individual owner	-0.0285	-1.298**
	(-0.96)	(-3.11)
AUT	0.221*	-1.196
	(2.51)	(-1.04)
GER	0.0922*	-0.771
	(2.32)	(-1.43)
HUN	-0.392***	-5.864***
	(-5.83)	(-5.54)
ITA	-0.734***	-8.460***
	(-21.85)	(-16.74)
SPA	0.108**	4.613***
	(2.82)	(8.65)
Constant	0.670***	14.25***
	(11.45)	(17.55)
Observations	13612	12596

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This finding is confirmed by this table which reveals that firms' managerial characteristics are key drivers of training provision. Indeed firms belonging to a group tend to provide relatively more training than other firms. The opposite relation holds for individual/family owned firms. R&D is an important driver for training decision and provision. Labor flexibility also seems to be a key driver of training, it could be seen as a proxy for firms monopsonic power over its employees. Firms' international activity slightly influence training provision. However, it could also just be an indicator of firms' productivity (Helpman 2003). Turnover size is also a significant cause of training. Last but not least, firms seem to treat training and investment as two different items, as the link between investment as a percentage of turnover and the percentage of employees trained is fairly weak. Adding other controls such as productivity, employment creation and country dummy do not change the magnitude and significance of the coefficients previously determined.

All this supports the fact that training is provided by firms making conscious choices over their production function. Besides, the existence of a critical size as a determinant for firms' decision to train seems to be confirmed (Almeida & Aterido 2010, Bartel 2000, Hotmann & Idson 1991).

5.2.2.2. SMEs financing and training provision

It is also possible to analyze the interaction between firms' training provision and financing structure. Therefore, the effects of constrained access to finance and public financial support on training are assessed. In addition the linkages between firms' financing needs and training provision are studied.

This model, inspired by Popov (2013), provides a framework to analyze the linkages between firms constrained access to finance and firm delivery.

$$Training = \alpha + \theta\, Size + Finance\, Constraint + \Theta\, Financing\, Conditions + \phi\, FCharacteristics + \gamma\, Country + \varepsilon \qquad \textbf{(5.2.2)}$$

$Training$ is the dependent variable. In the case of probit regressions it takes the value of 1 if the firm provided training to at least 1% of its employees, 0 if not. In the case of OLS regressions it is the percentage of employees within the firm that received training.

α is a constant.

$Size$ includes a dummy variable to control for firms' size: small (less than 50 employees).

$Finance\, Constraint$ includes two dummy variables that reveal firms constrained access to finance; namely: credit refusal and increased cost of financing. This is consistent with the literature (Popov 2013).

$Financing\, Conditions$ includes dummies variables to control for firms' financing conditions: turnover reduction and long term relationship with the main bank.

FCharacteristics includes variables to control for firms' specificities: dummies for firm belonging to a group and family/individual ownership.

Country includes categorical variables to control for country of origin; the countries for where the highest financing constrained are observed: Italy and Spain.

ε is the error term.

Table 5.17.: Firms' constrained access to finance and training provision

	(5.2.2) Probit Training decision	(5.2.2) OLS % employees trained
Credit constraint	-0.106 (-1.66)	-0.635 (-0.67)
Increased cost of financing	-0.0811* (-2.27)	-0.971 (-1.87)
Long term bank relation	0.0909** (2.60)	0.380 (0.76)
Turnover reduction	-0.0483 (-1.32)	-1.386** (-2.63)
Group	0.371*** (6.85)	4.089*** (5.97)
Family/individual ownership	0.00648 (0.17)	-1.010 (-1.82)
ITA	-0.737*** (-18.15)	-7.589*** (-12.20)
SPA	0.143** (3.09)	6.470*** (10.09)
Small	-0.648*** (-13.77)	-3.779*** (-6.59)
Constant	1.449*** (23.28)	21.39*** (26.79)
Observations	8208	7589

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Although they are not really significant, some negative effects of constrained access to finance over firms' training appear. The weakness observed could arise from the magnitude of the controls or other unobservable characteristics.

The following model analyzes the linkages between training and public financial support. It is directly inspired from Görg & Strobl (2005). It is to be noted that some public financial support dedicated to training could false this relationship, they are, however, not too widespread in Europe (Bassanini *et al.* 2005). The number of observations is reduced as public financial support only concerns a limited number of firms.

$$Training = \alpha + \theta\, Size + Financial\ Support + \psi\, Workforce + \phi\, FCharacteristics + \varepsilon \quad \textbf{(5.2.3)}$$

$Training$ is the dependent variable. It is the percentage of employees within the firm that received training.

α is a constant.

$Size$ includes a dummy variable to control for firms' size: small (less than 50 employees).

$Financial\ Support$ includes dummies variables for firms' financial support (Financial Incentives or Tax Incentives) as well as their origin: National or European.

$Workforce$ includes variables to control for firms' workforce that could drive the reception of public financial support: dummy variable for employment creation and % of unskilled and apprentices.

$FCharacteristics$ includes variables to control for firms' specificities that could drive the reception of public financial support: dummies for global exporter, FDI, R&D, investment as percentage of turnover.

ε is the error term.

A positive but insignificant relationship is found. Tax incentives seem to be more effective than financial incentives for training provision, however this feature could arise from the fact that tax incentives may target more training than financial incentives do. European incentives also seem to induce more training than national ones, probably because of their requirements and the fact that European incentives mainly aims at supporting firms' competitiveness (Addison 1994). The controls used shall reduce the self-selection issues. A productivity control does not affect the magnitude and significance of the coefficients obtained.

Table 5.18.: Public financial support and firms' training provision

	(5.2.3) OLS % employees trained	(5.2.3) OLS % employees trained
Financial incentives	0.896 (0.26)	
Tax incentives		3.170 (0.59)
National incentives	-2.034 (-0.47)	1.110 (0.15)
European incentives	-1.040 (-0.29)	1.686 (0.31)
Increased workforce	2.429 (1.80)	2.581 (1.91)
% unskilled and apprentices	-0.0379 (-1.83)	-0.0393 (-1.90)
Investment as % of turnover	0.0459* (2.36)	0.0498* (2.56)
Small firm	-3.270** (-3.19)	-3.117** (-3.02)
Global exporter	2.957** (2.66)	3.059** (2.74)
FDI	0.887 (0.47)	0.830 (0.43)
R&D	4.965*** (4.50)	4.785*** (4.33)
Constant	20.24** (2.70)	14.32 (1.20)
Observations	1985	1966

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The following framework provides an overview of training firms' financing needs.

$$Training = \alpha + \theta\, Size + Financing\, Needs + \phi\, FCharacteristics + \varepsilon \qquad \textbf{(5.2.4)}$$

Training is the dependent variable. It is the percentage of employees within the firm that received training.

α is a constant.

Size includes a dummy variable to control for firms' size: small (less than 50 employees).

Financing Needs includes dummies variables for firms stated financing needs: equity, venture capital, short term bank credit, medium term bank loan, securities, public funds, tax incentives.

FCharacteristics includes variables to control for firms' characteristics that could drive their financing needs: dummies for global exporter, FDI, R&D, investment as percentage of turnover, group or family/individual ownership.

ε is the error term.

It appears that firms stating equity, venture capital or public funds among the instruments required to meet their financing needs are more likely to provide training in a larger amount. That is particularly interesting for the EC/EIB initiatives as their schemes ought to reinforce the training potential of firms already providing training. This regression table reveals the need for such European initiatives as the coefficient associated to public funds support is both really strong and really significant. Some country and productivity controls do not affect the relation observed. Controlling for the type of training, in-house or outside the firm do not change much the magnitude of such relations. However, in-house training seems to be less affected by financing constraints and more driven by financial and tax incentives. Outside the firm training may require a greater firm spending, therefore, financing constrained affect its delivery.

Table 5.19.: Training firms' financing needs

	(5.2.4) OLS % employees trained
Equity	0.159 (0.13)
Venture capital	1.971 (0.73)
Short term bank credit	-1.651 (-1.84)
Medium term bank loan	-0.954 (-0.94)
Securities	-0.481 (-0.19)
Public funds	5.729*** (3.41)
Tax incentives	-0.815 (-0.36)
Small firm	-2.921** (-2.66)
R&D	6.316*** (6.80)
Investment as % of turnover	0.0369* (2.11)
Global exporter	-3.530*** (-3.48)
FDI	2.327 (0.95)
Group	5.377*** (4.19)
Family/individual ownership	0.339 (0.34)
Constant	15.48*** (8.70)
Observations	2357

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.2.2.3. The effects of training on productivity

The effects of training on productivity have been proven already by the literature (Bartel 2000), however the uniqueness of this dataset enables to test for the occurrence of such effects from a cross country perspective. In addition, it can control for productivity differences between in-house training and outside the firm training.

$$ln\,TFP = \alpha + ln\,Training + \theta\,Size + Public\,Support + \phi\,FCharacteristics + \gamma\,Country + \varepsilon \quad \textbf{(5.2.5)}$$

$ln\,TFP$ is the logarithmic transformation of the semi-parametric algorithm proposed by Levinsohn and Petrin to assess firm level productivity. It was included among the dataset variables.

α is a constant.

$ln\,Training$ is the logarithmic transformation of the percentage of employees within the firm that received training (Overall, In-House, Outside).

$Size$ includes a dummy variable to control for firms' size: small (less than 50 employees).

$Public\,Support$ includes dummies variables for firms receiving financial support from the public sector: financial and tax incentives.

$FCharacteristics$ includes variables to control for firms' specificities that could drive firms' productivity: dummies for global exporter, FDI, R&D and stock of human capital relative to the mean.

$Country$ includes categorical variables to control for country of origin; the countries for which the bigger fixed effects are observed: Austria, Germany, Hungary, Italy and Spain.

ε is the error term.

Because of the dataset features, this regression can only be performed on a cross sectional basis. In order to control for endogeneity, a second regression using an instrumental variable within a two stage least square regression technique is performed. It has been seen before that the fact that a firm belongs to a group or not influences its training decision, this finding is also supported by Almeida and Aterido (2010). Being part of a group should not affect individual firms' productivity. Therefore, $ln\,Training$ is instrumented by a dummy variable taking the value of 1 if the firm belongs to a group.

$$\text{Instrumental Variable: } ln\,Training = \text{i.firm group.}$$

To control for the results of different types of training the following regressions types are performed three times: for training in general, in-house training and outside the firm training.

Table 5.20.: Training and productivity

	(5.2.5) OLS Ln TFP	(5.2.5) 2SLS Ln TFP	(5.2.5) OLS Ln TFP	(5.2.5) 2SLS Ln TFP	(5.2.5) OLS Ln TFP	(5.2.5) 2SLS Ln TFP
Ln percentage training	0.0274*	0.847**				
	(2.03)	(3.18)				
Ln percentage training in-house			0.0452*	0.618		
			(2.18)	(1.59)		
Ln percentage training outside					0.00900	1.231*
					(0.47)	(2.45)
HK	0.0846**	-0.0286	0.0601	0.00756	0.113*	-0.139
	(2.61)	(-0.50)	(1.29)	(0.12)	(2.49)	(-1.09)
R&D	-0.0219	-0.150*	-0.0556	-0.126	0.00365	-0.132
	(-0.68)	(-2.50)	(-1.19)	(-1.75)	(0.08)	(-1.42)
Financial incentives	-0.00293	-0.0229	0.0629	0.00379	-0.0761	0.0198
	(-0.08)	(-0.46)	(1.19)	(0.05)	(-1.44)	(0.21)
Tax incentives	0.0488	-0.0390	0.0366	0.00346	0.0585	-0.110
	(1.29)	(-0.67)	(0.69)	(0.05)	(1.08)	(-0.97)
Small firm	-0.201***	-0.0924	-0.186***	-0.131	-0.223***	-0.204*
	(-5.62)	(-1.55)	(-3.85)	(-1.95)	(-4.10)	(-2.25)
FDI	0.130	0.126	0.180	0.141	0.0525	0.102
	(1.69)	(1.23)	(1.63)	(1.09)	(0.48)	(0.56)
Global exporter	-0.0170	0.0366	-0.0000595	-0.00436	-0.0389	0.105
	(-0.49)	(0.74)	(-0.00)	(-0.08)	(-0.80)	(1.05)
AUT	0.00541	-0.178	-0.439	-0.120	0.0927	-0.757
	(0.02)	(-0.39)	(-0.61)	(-0.14)	(0.24)	(-1.05)
GER	0.324***	0.347***	0.388***	0.322**	0.210*	0.216
	(5.23)	(4.18)	(4.27)	(2.84)	(2.39)	(1.48)
HUN	0.521***	0.860***	0.725***	0.625**	0.370**	0.985**
	(4.79)	(4.72)	(3.63)	(2.61)	(2.81)	(2.96)
ITA	-0.00692	0.435**	0.0649	0.169	-0.114	0.847*
	(-0.16)	(2.83)	(1.10)	(1.72)	(-1.88)	(2.08)
SPA	0.00585	-0.139*	0.109*	-0.0180	-0.121*	-0.311**
	(0.16)	(-2.03)	(2.12)	(-0.17)	(-2.23)	(-2.61)
Constant	7.833***	5.678***	7.715***	6.132***	7.983***	5.069***
	(140.65)	(8.08)	(95.34)	(5.69)	(99.74)	(4.22)
Observations	4654	4654	2335	2335	2307	2307

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This table reveals different but positive and significant effects of training on firm-level total factor productivity. The use of an instrumental variable confirms that this relation holds and corrects potential endogeneity issue. First stage post estimation test considers the instrument used as weakly biased, implying that it is perfectible. However, the results for this instrument's post estimation are better than for the other instruments tested (labor flexibility for instance). Between the two regression types, the coefficient differ slightly, however, it seems that in-house training has greater returns on total factor productivity than outside the firm training. This relation holds even with some country and firm characteristics fixed effects. It shall constitute a relevant incentive for firms to invest in training and implement relevant work place learning structures.

Performing similar regressions with investment as a percentage of turnover as an independent variable instead of training provides similar but weaker results; suggesting that for this dataset, the effects of training on observed productivity are greater than the investment ones.

5.2.2.4. The effects of training on employment

Eventually, to assess the relevance the EC/EIB initiatives, it is important to determine if firms providing training to their employees would also generate employment.

The following framework provides the basis for such analysis.

$$Increase\,workforce = \alpha + Training + \theta\,Size + \psi\,Workforce + \phi\,FCharacteristics + \varepsilon \qquad \textbf{(5.2.6)}$$

$Increase\,workforce$ is the dependent variable, it represents the workforce increase in percentage over the last year.

α is a constant.

$Training$ corresponds to the percentage of employees trained, as whole in-house or outside the firm

$Size$ includes a dummy variable to control for firms' size: small (less than 50 employees).

$Workforce$ includes variables to control for firms' workforce: % of white collars, % of blue collars, % of unskilled and apprentices, % employees involved in R&D and % university graduates.

$FCharacteristics$ includes variables to control for firms' specificities that could drive employment creation: a dummy variable for labor flexibility

ε is the error term.

Table 5.21.: Training and job creation

	(5.2.6) Increase workforce	**(5.2.6)** Increase workforce	**(5.2.6)** Increase workforce
% employees trained	0.0745		
	(1.74)		
% employees trained in-house		0.0583	
		(1.40)	
% employees trained outside the firm			0.0369
			(0.67)
% white collars	-0.0763	-0.0195	-0.00699
	(-0.99)	(-0.25)	(-0.09)
% skilled blue collars	-0.0921	-0.0731	-0.0524
	(-1.20)	(-0.93)	(-0.66)
% unskilled and apprentices	-0.0918	-0.0465	-0.0319
	(-1.12)	(-0.54)	(-0.37)
% employees involved in RD	-0.0317	0.000804	-0.01368
	(-0.44)	(0.01)	(-0.18)
% university graduates	0.0186	0.0466	0.0635
	(0.31)	(0.78)	(1.07)
Labor flexibility	4.266	5.379	5.744
	(1.34)	(1.72)	(1.82)
Small	5.908*	5.426*	5.326*
	(2.59)	(2.46)	(2.40)
Constant	10.53	6.558	5.284
	(1.50)	(0.91)	(0.71)
Observations	199	172	172

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A positive but slightly weak and insignificant relation arises from this table. It shows that firms providing training to their employees are more likely to hire and probably train them. The lack of data available for firms' job creation within this dataset certainly accounts for the lack of significance of such results. Similar magnitude of result is found when controlling for temporary or permanent job creation. However, the coefficients are stronger for permanent job creation, admitting that firms desire to retain the employees they have trained. Country fixed effects do not affect the relation observed. Adding a total factor productivity control do not change either

the magnitude or significance of the coefficients. However, total factor productivity strongly drives job creation.

5.2.3. Main findings, critical review and policy insights: supporting the current training firms and bolstering other firms' ability to undertake such investment

5.2.3.1. Finding, reviews and limitations

Training provision - at a firm level - seems to arise from some firms' size and country-specific characteristics. Firm training delivery seems to be associated with a critical size necessary to undertake such investments. Firms within a group are more likely to provide training to their employee. Credit constrains affect training investment but in lower proportions than in the literature. The reception of various unspecified public financial support influences the decision to train and the amount of training provided. Training has some fairly significant effects on firms' productivity. Training firms also seem more likely to generate employment. These two effects appear stronger with in-house training. Firms requiring venture capital, equity financing and public funds are more likely to provide training and in larger amounts to their employees.

Most of these results are consistent with the previous literature. Bigger firms tend to provide more training than their smaller counterparts (Barron & Black 1999). Firms belonging to a group are more likely to train their employees (Almeida & Aterido 2010). Finance constraints affect firms training delivery (Popov 2013). Public sector financial incentives boost training investment (Görg & Strobl 2005 and Fraser *et al.* 2002). Firm-level investments in training has some positive impact on productivity and employment (Kluve, Schmidt, Ours & Vandenbussche 2002 and Konings & Vanormelingen 2010). This analysis adds to the previous results as it specifies the types of financing training firms are more likely to require and states that in-house training could be more effective.

This dataset is limited to the manufacturing industrial sector and data can only be treated on a cross-sectional basis. These two features could undermine these results and generate some endogeneity issues. The instruments are not totally unbiased. However, here the purpose is to assess the needs and scope for the EC/EIB programs, not necessarily to determine the sense of the relation. For instance, there are maybe some endogeneity issues in the relation between firms training and employment generation. But, from a European policy-maker perspective the program is as relevant if training firms create more jobs or if firms generating employment are more likely to provide them training; both dynamics tackle youth unemployment issues. The interest for the EC and EIB is to understand well firms' needs and requirements to calibrate well their initiatives. As for the previous analysis, these results are valid for the firms workforce treated as a whole. Indeed, the EFIGE

dataset does not include any specific information on the workforce's age and youth employees. However, as training is more risky for young people - implying higher costs but potentially higher results - the overall dynamics observed could be even stronger for the younger cohorts of the workforce. Again, these results on SMEs financing and returns of training shall constitute a guide for policy action to promote support youth training in a relevant fashion.

5.2.3.2. Policy insights

In order to be effective the EC/EIB initiatives need to support the firms already providing training and the ones that cannot do it for exogenous constraints. The scope for such programs is revealed by the fact that most training firms require public financial support. Low investments in training and constrained access to finance are also connected, fields into which the EC and EIB intend to play a striking role.

In order to bolster the effects of their initiatives, the EC and EIB shall also target the type of financing instruments training firms are likely to require the most: venture capital and equity. So as to boost firms' productivity and employment generation capacity, the EC and EIB could focus on in-house training which seems more effective than outside the firm training. Eventually, the EC and EIB could also design some tailor made solution to make training possible for the smallest firms constrained in their ability to undertake such investments.

5.3. Youth unemployment and initial vocational education: regional dynamics

5.3.1. Eurostat regional data and research question

5.3.1.1. Dataset description

A regional analysis is performed to assess the effects of initial vocational training on various regional economic and employment variables.

Therefore, the following data provided by Eurostat are analyzed:

- Youth unemployed, youth population, NEETS population, early leavers' population and student population.
- Vocational education attendees by International Standard Classification of Education (ISCED) levels: Level 3 upper secondary pre vocational and vocational education; Level 4 post-secondary not tertiary pre vocational and vocational education; Level 5 first stage of tertiary education, programs practically oriented.

- Economic active and employed population by vocational education graduates by ISCED level.
- Various measures of economic growth.

Those data are provided on a regional basis for the 270 NUTS2 regions composing the European Union. Data from 2002 to 2012 are used. Such approach provides a sharp analysis of the regional patterns of youth unemployment as well as vocational education development effects.

5.3.1.2. Research questions

Regional data relative to the attendance of vocational education and the outcomes of its graduates provides an insightful framework to analyze the patterns and development effects of vocational education on economic and employment convergence, job matching and youth unemployment. The specific features of regions in which the proportion of youth not in education, employment or training (NEETS) is greater than the EU mean are also examined.

Such assessment determines the actual effect of vocational education on economic and employment development and intends to specify which kind of vocational education is the most effective and where the needs for it are the most important.

5.3.2. Including a vocational education component to the empirics of economic growth, unemployment and job matching

Youth unemployment and skills mismatch challenges have strong country/regional patterns. In order to tackle them properly, it is important to understand these regional foundations. The idea is to complement the empirics of regional economic and employment dynamics with a vocational education component. It aims to assess if it can have significant effects on such dynamics and where it is the most required.

This part uses the frameworks developed to analyze the empirics of economic growth (Barro and Sala-i-Martin 1992 & Mankiw, Romer and Weil 1992) and unemployment (O' Higgins 2012). It is consistent with the regional analysis of Brunello *et al.* (2012).

5.3.2.1. Regional effects of vocational education on economic and youth employment convergence

Developed by Barro, Sala-i-Martin and Mankiw (1992), the concept of convergence provides a rationale to understand the empirics of economic growth on a regional basis.

Convergence is declined in two concepts:$\sigma - Convergence$ and $\beta - Convergence$.

$\sigma - Convergence$ indicates that the dispersion of real per capita income decreases over time within a group of economies.

$\beta - Convergence$ is a measure of the partial correlation between growth in income over time and its initial level (Young, Higgins and Levy, 2007). Is both coefficient are negative, it indicates that the relatively least developed economies are catching up on the developed ones.

$$\beta - Convergence: \ \beta \ln\left(\frac{Y_{it}}{Y_{i,t-1}}\right) = \alpha - \beta \ln(y_{i,t-1}) + \mu_{it} \qquad \textbf{(5.3.1)}$$

Where α is a constant.

(y_{it}) and $(y_{i,t-1})$ correspond respectively to the GDP per capita of the economy i at time t and GDP per capita of the economy i for the previous period.

μ_{it} represents regional and time series fixed effects. Two additional effects are included. A dummy variable for the regions where the NEETS rate is over the European Union mean in 2013. And a proxy for vocational education development which corresponds to the logarithm of the rate of vocational students over the overall student population.

$$\sigma - Convergence: \ \sigma\left(\frac{Y_{it}}{N}\right) = \alpha - \sigma\left(\frac{Y_{i,t-1}}{N}\right) + \mu_{it} \qquad \textbf{(5.3.2)}$$

Where α is a constant.

$(\frac{Y_{it}}{N})$ and $\left(\frac{y_{i,t-1}}{N}\right)$ correspond respectively to the GDP per capita of the economy i at time t in proportion of the overall mean and GDP per capita of the economy i for the previous period in proportion of the overall mean.

μ_{it} represents regional and time series fixed effects. Two additional effects are included. A dummy variable for the regions where the NEETS rate is over the European Union mean in 2013. And a proxy for vocational education development which corresponds to the logarithm of the rate of vocational students over the overall student population.

To analyze the effects of vocational education, a proxy for vocational education development is thus included into the region/time series fixed effects. Besides, the concepts of $\sigma - Convergence$ and $\beta - Convergence$ offer an insightful framework to analyze economic dynamics across regions. They are also used to assess the convergence/dispersion patterns in terms of youth employment across European regions. Consequently, youth employment rates replace measures of GDP in the previous set of equation.

Performing a panel analysis using an OLS regression techniques with fixed effects provides the following results in terms of economic convergence and youth employment convergence.

Table 5.22.: Economic convergence and vocational education

	(5.3.2) GDP/ capita variation	(5.3.2) GDP/ capita as share of the EU mean	(5.3.2) GDP/ capita variation	(5.3.2) GDP/ capita as share of the EU mean
Ln GDP t-1	-0.233***		-0.371***	
	(-21.83)		(-17.79)	
Share GDP t-1		0.733***		0.643***
		(48.55)		(23.79)
High NEETS rate	-0.0106***	-1.123***	-0.0181***	-1.403***
	(-3.70)	(-6.06)	(-3.66)	(-4.89)
Ln VET development			0.0312	1.648
			(1.48)	(1.31)
Constant	2.342***	26.39***	3.736***	34.72***
	(22.05)	(17.79)	(18.00)	(11.44)
Observations	2118	2118	811	811

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This table reveals partial convergence as there is evidence of $\beta - Convergence$ but not of $\sigma - Convergence$. It implies that although growth rates are converging, income dispersion keeps increasing. Vocational education development accelerates the convergence process.

As for economic convergence, as there is evidence of $\beta - Convergence$ but not of $\sigma - Convergence$ for youth employment rates. It means that although youth employment rates in the relatively less development tend to catch up on the more developed ones, disparities are widening. Vocational education development reduces the magnitude of $\beta - Convergence$ and lowers the disparities found on youth employment. It implies that vocational education can play a key role in lowering youth employment disparities across Europe and ought to be bolstered in the regions deeply affected by youth unemployment challenges. Vocational education appears as important factor to lower regional economic and youth employment disparities across Europe. Moving into a more sensitive analysis, when distinguishing by vocational education level, the dynamics are similar. However, the effects of vocational education previously observed tend to be stronger for higher levels of vocational education.

Table 5.23.: Youth employment convergence and vocational education

	(5.3.2) Youth employed variation	(5.3.2) Youth employed as share of the Eu mean	(5.3.2) Youth employed variation	(5.3.2) Youth employed as share of the EU mean
Ln youth employed t-1	-0.848***		-0.788***	
	(-39.25)		(-22.43)	
Youth employed share of the EU mean t-1		0.735***		0.395***
		(41.57)		(10.48)
High NEETS rate	0.0397	-0.208	0.0190	-3.102
	(0.90)	(-0.09)	(0.27)	(-1.27)
Ln VET development			0.290	-9.925
			(0.90)	(-0.91)
Constant	5.369***	25.66***	5.510***	27.70
	(38.81)	(11.61)	(8.82)	(1.37)
Observations	2452	2322	972	931

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.3.2.2. Vocational education and youth employment: regional analysis of youth labor market outcomes

To analyze the performance of vocational education, it is insightful to determine how it interacts with labor market outcomes in Europe.

Inspired from Dolton *et al.* (1994), the following model assesses the vocational education to employment transition process.

$$\ln\left(youth\,employment_{it}\right) = \alpha_{it} + \beta \ln\left(VET\,population_{i,t-1}\right) + \Omega \ln\left(\mu_{it}\right) \qquad \textbf{(5.3.3)}$$

Where α is a constant.

$(VET\,population_{i,t-1})$corresponds to the vocational education attendees for the previous period, separated between ISCED level 3-4 and level 5, to differentiate the effects of early vocational education and more advanced practical curricula.

μ_{it} represents regional and time series fixed effects. It includes the youth population, the early leaver population and a measure of GDP per capita at period t.

Regions for which the NEETS rate is superior to the 2013 EU average are studied separately.

The panel analysis is performed through OLS regressions with fixed effects.

Table 5.24.: Vocational education and labor market outcomes

	(5.3.3) Ln youth employed	(5.3.3) Ln youth employed High NEETs rate region
Ln VET population level 3-4 t-1	0.561 (1.82)	0.582 (1.62)
Ln VET population level 5 t-1	0.107 (1.78)	0.0485 (0.58)
Ln youth population	-0.00352 (-0.01)	0.774 (0.73)
Ln early leavers	0.117 (0.55)	-0.114 (-0.35)
Ln GDP/capita	-0.636 (-1.19)	-0.870 (-1.08)
Constant	5.422 (0.70)	4.503 (0.39)
Observations	623	289

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Because data could be insufficient, these results lack significance. However a positive relation is observed between the vocational education populations at the previous period at the youth employed during the following period. It proves the positive labor market outcomes induced by vocational education, such effects are also observed for the regions where the NEETS rate is high and seem to be more important for the lowest level of vocational education.

5.3.2.3. Vocational education and youth inactivity: regional patterns

Analyzing vocational education performance also supposes to determine its effects on youth unemployment.

Inspired from O'Higgins (2012) and Dolton *et al.* (1994), the following model assesses the effects of vocational education on youth unemployment and inactivity (NEETs).

$$\ln(youth\,unemployed_{it}) = \alpha_{it} + \beta \ln(VET\,population_{i,t-1}) + \Omega \ln(\mu_{it}) \qquad \textbf{(5.3.4)}$$

$$\ln(NEETs) = \alpha_{it} + \beta \ln(VET\,population_{i,t-1}) + \Omega \ln(\mu_{it}) \qquad \textbf{(5.3.5)}$$

Where α is a constant.

$(VET\,population_{i,t-1})$corresponds to the vocational education attendees for the previous period, separated between ISCED level 3-4 and level 5, to differentiate the effects of early vocational education and more advanced practical curricula.

μ_{it} represents regional and time series fixed effects. It includes the unemployed population over 25 years old, the youth population, the early leaver population and a measure of GDP per capita at period t.

Regions for which the NEETS rate is superior to the 2013 EU average are studied separately.

The panel analysis is performed through OLS regressions with fixed effects.

Table 5.25.: Vocational education and youth inactivity

	(5.3.4) Ln youth unemployed	(5.3.4) Ln youth unemployed High NEETs regions	(5.3.5) Ln NEETs population	(5.3.4) Ln NEETs population High NEETs regions
Ln VET population level 3-4 t-1	-0.178	-0.371***	-0.0757	-0.0784
	(-1.94)	(-3.74)	(-1.36)	(-1.47)
Ln VET population level 5 t-1	-0.0198	-0.00615	-0.0429***	-0.0396**
	(-1.10)	(-0.28)	(-3.93)	(-3.30)
Ln unemployed 25 years and over	0.310***	0.295***	0.118***	0.0725*
	(6.96)	(5.14)	(4.41)	(2.36)
Ln youth population	0.649**	0.415	0.568***	0.293
	(3.05)	(1.36)	(4.39)	(1.78)
Ln early leavers	0.114	0.190*	0.246***	0.213***
	(1.81)	(2.18)	(6.47)	(4.54)
Ln GDP/capita	-1.040***	-1.241***	-0.855***	-0.994***
	(-6.00)	(-5.24)	(-8.25)	(-7.83)
Constant	9.999***	14.84***	8.761***	11.94***
	(4.38)	(4.55)	(6.37)	(6.81)
Observations	640	305	658	306

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Consistently with the previous results, there is a negative relation between the youth unemployed/inactive population and the vocational education population. As for the previous analysis such effects are stronger for the lower levels of vocational education. This could arise from the fact that there are more labor market opportunities for the lower level vocational education graduates. The weaker effects of higher vocational education level may be seen a sign of skills mismatch induced by inadequate vocational education provision. Eventually the weaker negative relation between vocational education population and the NEETs population implies, that some stronger forces influence youth inactivity. Therefore, adequate initiatives should specifically address the issue of vocational education accessibility and attractiveness.

5.3.3. Main findings, critical review and policy insights: modernizing all levels of vocational education to lower youth inactivity

5.3.3.1. Finding, reviews and limitations

This last part of the analysis provides a rationale for decision-makers to invest in initial vocational education as it drives economic and youth employment convergence. It shows that focusing on skills provision rather than simply on employment opportunities is probably a more sustainable approach. Initial vocational education positively impacts the job matching process and its development significantly lower youth unemployment. However, the effects of vocational education on youth inactivity are more limited; admitting that some specific efforts shall be made in order to ease youth access to initial vocational education. The effects of vocational education seem more effective for its lower levels. It could be a sign of curricula inadequacy and over-education. It implies, that initial vocational education should be systematized and tailored for all the type of positions along the value chain.

Such results recall some of the literature findings: youth training influences school to work transition (Dolton *et al.* 1994), vocational training eases the job matching process (Black & Barron 1989). Educational development has some effect on economic convergence (Mankiw *et al* 1992). Regions in which more training is provided tend to have better labor market outcomes (Brunello *et al.* 2012)

The Eurostat regional data relative to vocational education are somewhat limited and some variables are sometimes missing, which could undermine these results. In addition the variables used do not allow to perform sensitive quality analysis. Especially, data relative to training cannot differentiate for the type of training provided, just its educational level. Therefore, one main finding of literature that on-the-job training tend to be more effective than school based vocational education (Black & Barron 1989) cannot be drawn from the data. However, the insight found

on the EFIGE dataset that in-house training tends to be more effective for firms productivity and employment generation could support this literature finding.

5.3.3.2. Policy insights

Again, the scope for the EC/EIB initiatives is proven as focusing on vocational education for the youth appears to be a sustainable approach in terms of longer term economic and labor market performance.

In order to maximize their interventions, European institutions shall target all levels of vocational education, for all kinds of professional positions; targeting young people entering in the labor market. The relevance of vocational education programs ought to be addressed. Such approach shall focus on the European regions where youth inactivity rates are the highest. Eventually, the weak relation between vocational education attendees and NEETs population supposes that vocational education should be made more accessible and maybe more relevant in order to tackle youth inactivity. In this field also the EC/EIB can play a decisive role.

6. Operational recommendations for deeper impacts on youth and SMEs

"We repeat our offer to further maximize the impact of the Youth Employment Initiative and the EIB's youth employment programme. It therefore makes a lot of sense for the EU Commission and the EIB to join forces in the implementation of new financial instruments that are tailor-made for creating badly needed jobs for young people."[1] Werner Hoyer (EIB 2013 i).

Such initiatives cannot solely solve the whole EU youth unemployment challenges. However it can still make a significant difference when addressing youth skills mismatch and constrained SMEs' funding for hiring and training. Properly calibrated, the EC and EIB initiatives can play a maximum catalytic effect and leverage other initiatives so as to foster better labor market outcomes for young people. The European institutions hold a strategic standpoint, able to channel important resources and to connect and influence national governments, young people, SMEs, education providers and financial intermediaries. Such action ought to shape incentives and set the adequate frameworks in order to fix youth unemployment at its roots. Provided in such an environment, the EC/EIB youth employment initiatives would be fully effective.

The EC and EIB must target their interventions to the promotion of youth employment and training within SMEs. It supposes to address SMEs size constraints, access to finance and operational support. In addition, such initiatives ought to be channeled through the financial instruments required by SMEs: equity, venture capital and mezzanine financing. Vocational education and in particular work-base vocational education appear to facilitate the school to work transition and reduces the youth skills mismatch. Therefore, the EC and EIB must ensure the systematization of such schemes within SMEs. It calls for an active involvement of all the stakeholders as well as setting the environment for SMEs to take part in such activities. A comprehensive policy shall target youth and SMEs. It ensures the existence of the relevant partnerships and set the conditions to mainstream such schemes.

Yet, the previous parts have revealed the relevance of such initiatives and provided several insight on how they ought to be calibrated, from a bottom-up perspective.

[1]Paris the 12th of November 2013. EIB 13th of November 2013, EIB website news release

Such initiatives have just been agreed upon and are still to be operationally designed. Therefore, from the insights previously outlined, this chapter is going beyond and formulate some sharp innovative recommendations for an effective delivery and implementation of such initiatives. Within the current EU institutional framework, this chapter proposes operational policy, programmatic and financial orientations in order to better target, partner and mainstream such initiatives. Several case studies complement and illustrate these recommendations. For this topic as for many of other ones there are no one size fits all approach. However, these insights aim to focus the EC/EIB initiatives on the kind of approach that could effectively trigger sustainable employment opportunities for the youth. Public financial support to SMEs will be an effective approach to tackle youth unemployment if it targets well youth and SMEs' needs within an insightful vocational education framework.

6.1. Policy support: building sound patterns for SMEs investment in training

This section addresses the overall orientations the EU institutions ought to support and push for in order to make SMEs' investments in youth training easier and more effective.

6.1.1. Frameworks for work place skills development

From a purely policy point of view, the EC and EIB shall connect better their vocational education initiatives with their SMEs youth support in order to leverage the synergies between those two intervention types and bolster sustainable employment opportunities for youth.

It supposes to develop a global and flexible framework which ensures firms participation. The idea is to set up a systematic fashion to expand training (Biavaschi *et al.* 2012). Therefore, vocational curricula ought to be transparent and flexible. Programs shall focus on employability, general and specific skills quality. Curricula might be relevant enough for the labor market needs but avoid narrow specializations in the meantime. All types and level of vocational training have to be concerned. Supporting firms' certification as well as pedagogical innovation appear as relevant strategies. Combining general and specific skills seem determining. Therefore, it is necessary to target in-house training and support training investments for firms suffering the most from a lack of skills.

- The European institutions shall push for clearer vocational education programs focusing on employability.
- The EC and EIB ought to target their investments towards education institutions and firms developing sustainable on-the-job learning programs.

6.1.2. Multi stakeholders' partnerships

In this field, to ensure the best policy outcome, it is striking to support the establishment of the relevant partnerships. All the stakeholders shall collaborate to move in the same direction and support youth employment initiatives' efficiency. All stakeholder should be considered as partners and the European institutions must induce their involvement for youth employment policies.

Similarly to what already exists in Australia, some Stakeholders integrators must be created. The idea is to associate governments, education providers and employers in program coordination and curriculum design. In Australia the Workforce Productivity Agency is a system integrator, which ensures that workforce development is handled in partnership with businesses and local authorities (Mc-Kinsey 2014). Therefore, employers are involved in skills development (Mc-Kinsey 2012). In particular, the Australian Group Training Organizations manage training opportunities and placements for SMEs and connect with education providers to monitor skills delivery (Mc-Kinsey 2014). Developing curricula in partnership with businesses guarantee skills standardization and relevance. The required competences are therefore provided, based on business tasks to perform on the job. Concretely this could take the form of core courses for general skills and modules for business specific skills. Such approaches have been particularly effective in the energy or automotive sectors. Indeed, a regional or sectorial base appears as the best standpoint to promote such collaboration. Chambers of commerce could be an effective relay in such a cluster approach. Public Private Partnerships may be a good governance mode.

To maximize their outreach, the EC and EIB could directly enter into partnership agreements with national/local governments as well as education providers or private actors. It has already been done in France or Italy and shall be fostered in order to deepen any single actors' impact (EIB 2013 e).

- The European institutions should push for the implementation of stakeholder's integrators on a national basis at least. It could be an insightful basis to simplify current policy interventions. The EURES platform and the European Alliance for Apprenticeship could constitute insightful basis.
- The EC and EIB support may be conditioned to the establishment of relevant partnerships between firms and vocational education provider, on a local or sectorial basis.
- The EC and EIB could specifically channel their investments through regional/sectorial clusters directly targeting youth employment.
- The EC/EIB can directly partner with national/local institutions in order to ensure the implementation of a common and consistent strategy.

6.1.3. Youth employment integrators

Taking the youth perspective is also fundamental. In order to target better their needs and foster their labor market integration, it is necessary to inform them better and connect their expectations with the opportunities SMEs can offer them.

Creating some youth employment integrators is therefore a recommended strategy. Such institution could take the form of a job agency specifically targeting the youth. It ought to be service-oriented and have a broad vision of labor market dynamics. It shall focus on youth personal skills development, needs' assessment and work base and job placement. The idea is to follow youth individual needs through long term personal action plans. Young people seeking for employment shall be provided advice and personal support The German Federal Employment Agency is a relevant example (Mc-Kinsey 2014).

- The European institutions ought to push for the creation of employment services specifically targeting and supporting young people.
- The EC and EIB could also invest in private initiatives providing such services.

6.1.4. Information dissemination and awareness raising

An insightful policy to support the effectiveness of such initiatives is to stir up young people's awareness. It is determining to make them know the existence and outcomes of employment and training programs specifically targeting them. The idea is to communicate, advertise on such initiatives but also make them more accessible and easing part of the procedures.

A first step is to develop and disseminate information in order to develop young people's knowledge. Transparency and evaluation are key as they would enable youth to track trajectories and perspectives. It will support the efforts of youth employment integrators. Knowledge sharing will be thus encouraged. Career Coach in the USA is a private institution successfully performing such mission (Mc Kinsey 2012). A second step is to support young people's enrollment into such vocational or work base learning program. To enlarge its audience, it is determining to improve technical education's social perception. Communication is part of this strategy, it shall aim at emphasizing on the values of achievement and creating a status. Branding and promotion will support awareness raising and attract more motivated students. The Singapore Institute for Technical Education has managed to improve the social image of technical education, stressing on the concrete professional outcomes of vocational education.

This branding and communication exercise should also target financial institutions and SMEs; making them aware of these projects will increase their participation and eventually youth employment.

- European statistical offices coordinated by Eurostat shall track and disseminate information relative to young people labor market opportunities and training placements.
- A coordinated and comprehensive European branding exercise could raise young people awareness and improve the status of vocational education. It shall communicate on a large audience and directly addresses the youth. The EU managed a similar achievement through the Erasmus program. It will be a way to bring closer young people and European Institutions. The Erasmus + program could be a starting point.
- The EC and EIB ought to launch an ambitious communication campaign towards financial institutions and SMEs susceptible to participate in these programs. In particular, the EIB should leverage its network of financial intermediaries and urge them to advertise its program towards their SMEs clients.

6.2. Program contents: easing SMEs training provision for youth

This section proposes concrete programs contents to make SMEs investments in training for youth more relevant and affordable.

6.2.1. Supporting SMEs capacity to train youth through stakeholders' collaboration

SMEs have specific size and capabilities issues that prevent them from investing in training. In conjunction with the stakeholders' integrators, SMEs shall be incentivized to set up, in partnership, their own training capacities.

Through a regional/sectorial approach, SMEs could set up joint training programs. The idea is to support training firms and improve SMEs training capacities. Such support can be provided by the EC/EIB, national/local governments, education providers or other businesses. It could take the form of in house training, firms set up of technical academies, and establishment of Mock workplace within education facilities as it has been done in India by Cisco (Mc-Kinsey 2014). Bigger firms also happen to provide training to smaller firms present on their value chain, as it has be done by SK Telecom in Korea. In such capability building effort, the key support shall arise from the sectorial or regional cluster. Some group training organizations designing and implementing joint training programs could catalyze and leverage training activities for SMEs.

- In coordination with national/local governments, the EU institutions shall push for the implementation of agencies fostering SMEs training capacities.

- The EC and EIB shall target investments in SMEs training capacities, channeled through local governments, education providers or other private businesses.
- As eligibility criteria, the EC and EIB could add the participation of SMEs into training content design partnerships.

6.2.2. Resource mutualization and technology use to make SMEs investment in training for youth more affordable

Cost is another major constraint in firms' decision not to provide training. Especially for young people, the use of technology and SMEs resources mutualization can play a decisive role.

Firstly, technology helps reducing training costs and enables to target better SMEs training needs. Indeed, it could be the basis for more effective/tailor made training programs, complementing broader vocational education curricula with individual practical modules. It is particularly relevant for youth as they are generally more technology friendly. Such technology could easily be scaled up and could include: Online programs for theory; face to face practical learning. Flexible instruction models could therefore be developed through: distant learning, streaming technology, serious games, immersive learning, collaboration forum or online assessment. Such training programs could be based on standardization and open access and therefore ensure low costs for SMEs. For instance, the Youth Technology Foundation delivers training videos and quizzes via MMS messaging service (Financial Times 2014). SMEs training capacity building would support the use of technology. Secondly, another approach is intercompany training. Going further the previous section, SMEs could pool their training resources and set up in coordination some external training programs, corresponding to their business segment or geographical area. Americana is an example of such strategy, in the United States, for the health industry (Mc Kinsey 2014). It could bolster: knowledge sharing, the use of technology, hard and soft skills delivery. Flexibility is essential for this kind of modular collaboration. To participate in such programs, firms must be incentivized to collaborate.

- The EC/EIB could invest in SMEs training technology, either financing SMEs needs or supporting SMEs training technology providers. For this specific matter and as a way to reduce costs, EC/EIB products could also only target training investments for youth.
- Within clusters, intercompany training ought to be incentivized. The EC/EIB could support politically and financially public and private initiatives moving into this direction.
- The EC/EIB financial instruments may also be channeled through pools of SMEs, directly targeting their common training activities.

6.2.3. Favoring youth entrepreneurship and self-employment

Entrepreneurship and self-employment are considered as sharp policies to address youth unemployment and skills mismatch (Biavaschi *et al.* 2012). Comprehensive youth employment support programs should bring a better support to youth entrepreneurship.

This involves promoting young entrepreneurs' access to finance and tailor made support services. Mature businesses and university patronage as well as micro credit and cooperatives are relevant strategies.

- The EC/EIB could invest in mature businesses or educational institutions supporting youth entrepreneurs programs.
- The EIF could developed a specific instrument within its "risky" portfolio to finance young people's businesses. Some EU funds could complement it.

6.2.4. Targeting the required skills

In order to be effective and within the framework previously proposed, training programs for young people must match current skills needs and anticipate the future ones.

Assessed, such skills needs ought to be properly delivered. The youth employment integrator could deliver such a service. The idea is to adopt a long term perspective and specifically target priority sectors where skills are particularly scarce. At the moment, such priority sectors lie in the "middle skills gap": information and communication technology, digital economy, health, trade, high skill manufacturing, social care and green economy. For such positions, young people need generic skills as well as cognitive, vocational and occupational skills. In order to the shape a productive workforce for the future, young people shall also be directed towards high skills vocational programs. Therefore, social skills, language, problem solving, technology environment, literacy/numeracy as well as creativity, critical thinking, communication and collaboration are to prioritize (OECD 2012 a).

- The EC/EIB could specifically focus their investments on skills development for firms facing a skills shortage today or tomorrow. A sectorial eligibility criteria could therefore be added.
- The EC/EIB investments in vocational education providers shall target future skills needs.

6.3. Financing instruments: channeling in a better way resources for youth training

This section refers to the financing instruments the EC and EIB can mobilize and develop. The financing instruments used do not only enable to leverage more resources, they can also determine part of the policy outcomes. A careful calibration of such instruments will support more sustainable employment opportunities for the youth, as they shape the right incentives and ensure stakeholders participation.

6.3.1. Cost sharing between SMEs, young people and local governments

Consistently with the previous part, SMEs training costs could be shared between stakeholders. Such share shall be made accordingly to the respective benefits of vocational education.

Indeed, Vocational education increases firms' productivity, employment and wages as well as regional development. Therefore, sharing training costs seems consistent and ought to be systematized. It supposed a careful assessment of vocational training for youth costs and benefits for all the stakeholders. A way to do so already exists: vocational schools built by local governments, operated by firms whom employees implicitly accept lower wages. Implemented through Public Private Partnerships, such options could also provide a sound basis to develop the adequate educational framework and intercompany pooling of training resources. In Riviera del Brenta, in Italy local SMEs operating in the luxury sector partnered with the local politecnico calzaturiero, partly funded by local authorities. The SMEs involved have pooled their training resources within this institute which offers training opportunities for local workers or job seekers. Such approach would be a way to connect better the EC/EIB investments in SMEs and with their investments in vocational education. The previous recommendations exposed shall constitute a basis for such collaboration. This cost sharing principle could also involve the EU with its member States.

- The EC/EIB could fund jointly SMEs and local authorities or education providers to set up such schemes. The Public Private Partnership structure is a way to leverage more resources.
- The EC/EIB should support the creation of a joint European and National based instrument to gather and invest resources to finance youth employment initiatives. Such instrument could be financed through the issuance of *"common bonds"*. It may appear interesting for private investors as well.
- EC/EIB/EIF specific risk sharing instruments could foster cost sharing among all the stakeholders.

6.3.2. EC/EIB non bank intermediated financing for SMEs training young people

Mobilizing the banking channel to support young people's employment and training opportunities within SMEs is maybe not the most insightful. SMEs are more likely to request other sources of financing. SMEs already carry an important share of debt in their financing structure. Furthermore, youth unemployment and SMEs constrained access to finance often arise from a similar cause: national economic turmoil which could be a cause or a consequence of a weaker banking sector. Eventually, the way EIB and EC intermediated loans are channeled could address better European financial market fragmentation and SMEs constrained access to finance. Indeed, such loans are allocated to commercial banks which finance SMEs. Although, the EIB/EC funds reduce the costs of financing for the SMEs targeted, those costs still depend on the commercial banks' rates and the way they finance themselves on the markets. Another shortcoming has been revealed by the EIB SMEs support evaluation (EIB 2012 h). Financial intermediaries tend to support the SMEs champions that would have obtain financing anyway and not the ones really constrained in their access to finance. Since SMEs access to finance and youth unemployment are deeply connected, it is important to make sure that SMEs constrained in their access to finance can benefit from a EC/EIB financial support. Therefore, these institutions, shall opt for a direct support and mobilize other channels than indirect financing through commercial banks. Besides, developing such products could provide some sound patterns to lower SMEs dependency on banks.

Obtaining a financial support from the EC/EIB should be made easier, in order not to prevent lower capacities SMEs to access them. The financial instruments available for the youth employment initiatives must target firms' needs and be relevant to finance training. Guarantees and guarantees funds could be a good approach (OECD 2013 d). SMEs constrained in their skills or their access to finance as well as the ones providing training require equity, securitization or mezzanine finance. The European Commission and the European Investment Bank Group shall therefore mobilize alternative tools to support those initiatives. In particular, the EIF, co funded by the EIB and EC could provide such tools. The idea would be to create liquid equity market for SMEs and to revive the structured market credit for SMEs. The European legislator shall agree on the EC/EIB joint securitization instrument allowing for securitization of new and existing SMEs loans portfolio and risk pooling (European Commission 2013 b). It requires a €10bn investment from EC/EIB, making possible €100bn investment for a million SMEs. EC/EIB risk sharing instruments as well as their venture capital and micro finance instruments could play a key role. Mobilizing a non intermediate banking channel would attract investors, pool risks and generate economies of scale. It can even constitute a sound basis for cooperation to set up some of the previous policy or programmatic recommendations. The joint EU/national based instrument may be calibrated to develop such products.

- The EC/EIB should carefully use non bank loans instruments such as equity participation or mezzanine finance. Institutional investors could channel such funds.
- Asset Back Securities funds ought to be created and developed for SMEs in Europe. The EC and EIB/EIF have the initiative and financial engineering to do so. It could be interesting to connect with the European Central Bank which is probably considering a new Long Term Refinancing Operations (LTRO) instrument, against which financial institutions could only use securitzed SMEs Assets as collateral (Masera 2014).
- The EC and EIB shall develop some specific tailor made risk sharing instruments. The EIB would provide subsidized loans which risk could be cover and guaranteed thanks to some EC grants from structural funds. To this extend, it could be really interesting and relevant to either add a youth employment component to the JEREMIE program or create a similar program for youth employment. It would bring greater resources and flexibility.
- To reach these goals, the EC and EIB/EIF could set up some joint financing instruments with regional governments, to address youth unemployment locally.
- Such policy may require a further capital increase for the EIF; it supposes speeding up the €5.5bn capital increased over the next 7 years agreed in December 2013. Another strategy could be to open more of the EIF capital to private investors or European Union member States.

6.3.3. Developing a market for SMEs' youth training investments

Properly implemented these previous recommendations would create a market for SMEs investments in training for youth. In order to mobilize more resources, a market for private investors could be further developed. The idea could also be to channel private finance from young people and their families as well as SMEs.

Deferred/income contingent loans could be developed and undertaken by young people or SMEs. Only a small portion of the training costs is paid when the training is provided, the rest is repaid later, with the first financial returns of the training decision. Such technique has been successfully implemented in India with the *Learn now pay later* program (Mc Kinsey 2012). Yet, credit guarantees or cover bonds provide a way to ease bank financing conditions. However, part of Europe's youth unemployment challenges could lie in Europe's dependence on Bank financing. Therefore, using other instruments could be a sustainable way to leverage more resources, especially for small training programs within SMEs. Equity financing is required by SMEs; to make it possible for the smaller one, a shared equity approach could be adopted, equity investors will fund a pool of SMEs mutualized

into a common fund. This could serve as a basis for the cluster collaboration type recommended for SMEs. Innovative finance mechanisms could also be insightful: peer to peer platforms, social media crowd funding, micro finance. Attracting other investors seems necessary. Again, the joint EU/national instrument can be used as basis to foster such developments.

- The EC/EIB could support politically, logistically and financially the rise of such initiatives. It would a way to implement the proper safeguards and attract investors. Some risk sharing mechanisms linking all the stake holders could be implemented.
- Part of the EU youth employment initiatives branding exercise could be connected to the development of new financing instruments and the attraction of other investors. This could be a specific focus for EC/EIB risk sharing initiatives.

6.3.4. Favoring young people's ownership of their training and employment opportunities

Eventually, another option could be stimulate young people's ownership of their employment and training opportunities. It could be of importance as it could target better young people and offer them more sustainable employment opportunities.

This could be channeled through young people's direct equity participation in the SMEs hiring and training them. Therefore SMEs will receive a direct funding when they hire or train young people. In return young people will have a direct share in the SMEs employing them. Such instrument will address a SMEs financial need, will stabilize youth employment and will enable young people to accumulate wealth. Yet, a key challenge in such a strategy is young people lack of financial resources. Nevertheless, EC/EIB funds could also be channeled directly to young people employed by SMEs rather than by SMEs employing young people. Then, in the form of an equity participation, young people will finance their hiring and training costs. It is also a way to incentivize young people to remain within the firm that trained them.

For instance, the following structure could be considered. When a young person is hired by a SME which provides him training, he brings an amount of equity equally matched by the EC/EIB. This participation remains in the firm for a couple of years or while the young person is employed in it. When, employment and training financial returns appear for the firm and the individual, the equity participation could be refunded to the EC/EIB. The firm and the young person could mutually share earnings and benefits, the individual conserves his stake in the society. The only limitation to this approach is that it channels fewer resources than financial markets do. However, with €6bn, the EC/EIB could fund a €1,000 equity participation per young person unemployed in the European Union. Such approach could be sustainable if the previous recommendations are properly implemented and training costs

are reduced and mutualized. To be consistent, a youth ownership based approach could only finance individual training costs. However, this can be a way to better target individual training provision and eventually a more insightful personal professional development and greater employment prospects.

- The EC/EIB could consider and support financing strategy based on young people's ownership. Some pilot programs could be implemented to test the effects and limit the risks.
- The EC/EIB shall use such techniques to channel its funds for youth entrepreneurship programs.
- The EC/EIB in coordination with member States or local government could design and fund individual learning accounts for youth NEETS or unemployed.

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A. Source of the data used in Chapters 2 and 5

Metadata

A full description of the data used for the regressions performed in chapter 2 and 5 is available, thanks to the owners of the data. They can be found in the following publications.

Eurostat data

Metadata provided by Eurostat explain the data used. In particular, the analysis performed in section 2.1, 2.2 & 5.3, use the Eurostat Labor Force Survey (LFS) data. LFS metada are available online:

http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/en/employ_esms.htm

The EC/ECB SAFE dataset

European Commission and European Central Bank Survey on the access to finance April to September 2013. (2013). Frankfurt: European Central Bank. Questionnaire available online.

Survey on the access to finance of SMEs - User guide for the anonymised dataset. (2013). Frankfurt: European Central Bank.

The EU-EFIGE/BRUEGEL-UNICREDIT dataset

Altomonte, C., & Aquilante, T. (2012). The EU-EFIGE/BRUEGEL-UNICREDIT dataset. Bruegel Working Papers, 2012/2013, 1-22.

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B. Abstract

"We risk having a generation that hasn't held a job. Personal dignity comes from working [...] Young people are in a crisis".
Pope Francis - July the 22nd, 2013.

Youth unemployment is a critical issue across the European Union with 5.5 million people unemployed among the 18-24 years age group (23.3% unemployment rate). Evidence reveals that youth unemployment in the EU mainly arises from two sources. Firstly, young people lack some of the relevant skills for the labor market. Secondly, firms' ability to hire them is challenged by a constrained access to finance. In reaction, European leaders have implemented "offensive" programs (F. Hollande). Among them, leading initiatives sponsored by the European Commission (EC) and the European Investment Bank (EIB), aim to provide subsidized loans to Small and Medium Enterprises (SMEs) for hiring and training young people. This approach seems relevant and sustainable as it addresses the two sources of youth unemployment and ought to combine jobs opportunities with skills development.

This thesis assesses the relevance and scope for effectiveness of concessional loans provision to SMEs as a strategy to bolster youth employment and training opportunities. Starting with a comprehensive analysis of the EU youth unemployment, it outlines the rationale for a public intervention supporting SMEs based vocational training programs for youth. In addition, it exposes the main instruments mobilized in this field by the EU institutions. Through a deep demand-driven firm level and regional analysis, it determines both the needs and expected returns of such initiatives. Eventually, these results associated with a review of some successful case studies, set out the most effective programmatic, policy and financing intervention types, which ought to be scaled up within the EU.