



European  
Commission

ISSN 2443-8014 (online)

# Investment in the EU Member States

## An Analysis of Drivers and Barriers

INSTITUTIONAL PAPER 062 | OCTOBER 2017

EUROPEAN ECONOMY



*Economic and  
Financial Affairs*

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Luxembourg: Publications Office of the European Union, 2017

KC-BC-17-062-EN-N (online)  
ISBN 978-92-79-64708-6 (online)  
doi:10.2765/811958 (online)

KC-BC-17-062-EN-C (print)  
ISBN 978-92-79-64707-9 (print)  
doi:10.2765/90037 (print)

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# Investment in the EU Member States

## An Analysis of Drivers and Barriers

### Abstract

The EU is entering its fifth consecutive year of growth. GDP is now higher than before the crisis and the employment rate has increased, thanks in part to reforms in a number of Member States. However, the investment rate is still below its pre-crisis average and is slowly recovering.

This report analyses the main barriers and drivers to investment in Europe.

For the past two years, the Investment Plan for Europe has contributed to making smarter use of EU financial resources through the European Fund for Strategic Investments. As of September 2017, the Fund has approved operations worth around €236 billion in growth enhancing investment projects. The Investment Plan also provides technical assistance to investment promoters through the European Investment Advisory Hub and ensures transparency of investment projects through the European Investment Project Portal. The Investment Plan also aims to remove regulatory and non-regulatory barriers to investment in Member States, at both national and EU level. This is important as weaknesses in the business environment and rigidities in labour and product markets hinder the reallocation of resources and can weaken investment in dynamic firms and sectors.

The first part of the report analyses recent investment developments in EU Member States and identifies the main macro and micro economic determinants of investment. It also shows that reform efforts to address investment barriers have been mostly done during the crisis, but the pace of reforms has slowed down since then. The current recovery period is however offering a new window of opportunity, which should not be missed. Due to the legacies from the crisis and other structural weaknesses, economies in most Member States need to better allocate resources towards productive and dynamic firms/sectors, and reforms are still vital for investment dynamism.

The second part focuses on business regulation and public administration, using indicators and a recent Eurobarometer survey on the perception of business environment in Europe. Despite improvement in most Member States, firms' perceptions of the business environment remain rather negative in some countries.

The last part of the report discusses the importance of investment in intangibles and analyses the main barriers to investment in both tangible and intangible. Intangible investments play an important role in creating value for companies and economies. The report presents empirical evidence that shows that intangible investments are sensitive to the regulatory framework, the availability of skills and the level of research and development (R&D).

## ABBREVIATIONS AND SYMBOLS USED

### COUNTRIES

AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
EU	European Union
FI	Finland
FR	France
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom
US	United States

### ACRONYMS

AE	Allocative efficiency
AMR	Alert Mechanism Report
CEEC	Central and Eastern European Countries
CIT	Corporate Income Tax
CMU	Capital Markets Union
CSR	Country specific recommendations
DTF	Distance to frontier
EA	Euro Area
EFSI	European Fund for Strategic Investments
EIAH	European Investment Advisory Hub
EIPP	European Investment Project Portal
EPL	Employment Protection Legislation
EUR	Euro
FDI	Foreign Direct Investment
GBP	British pound
GDP	Gross domestic product
GFCF	Gross Fixed Capital Formation
GVA	Gross value added
ICT	Information and Communication Technologies

NA	National Accounts
PCA	Principal components analysis
PMR	Product Market Regulation
PPPs	Public-Private Partnerships
R&D	Research & Development
SMEs	Small and Medium Enterprises
SNA	Systems of National Accounts
TFP	Total factor productivity
ULC	Unit labour costs
USD	United States Dollar
VfM	Value for Money

## ACKNOWLEDGEMENTS

This report was prepared in the Directorate-General for Economic and Financial Affairs under the direction of Marco Buti, Director-General, Kerstin Jorna, Deputy Director-General and Mary Veronica Tovsak Pleterski, Director of the Directorate for Investment, growth and structural reforms.

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Statistical assistance was provided by Vitor Martins and editorial assistance was provided by Vittorio Gargaro and Yolanda Segui Dominguez.

The report has benefited from useful comments and suggestions by colleagues in Directorate-General for Enterprise and Internal Market (GROW), Research and Innovation (RTD), Employment (EMPL), Secretariat General (SG), the members of the Economic and Policy Committee (EPC), the Working Group on the methodology to assess Lisbon related structural reforms (LIME) and the European Investment bank.

Each chapter has been used as background documents for discussions in the Economic Policy Committee in the context of the Third Pillar of the Investment Plan.

Comments on the report would be gratefully received and should be sent to:

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## OVERVIEW

Investment weakness in a post-crisis context....

The EU is entering its fifth consecutive year of growth. The accommodative monetary policy and the broadly neutral fiscal policy stance in the euro area, as well as a lesser sense of policy uncertainty in the EU and a stronger global economy are all supportive of growth but the conditions for a more pronounced rise in economic activity, including stronger investment, are still lacking. GDP is now higher than before the crisis and the employment rate has increased, thanks in part to reforms in a number of Member States, but the investment rate is still below its pre-crisis average and slowly recovering.

... the recovery of investment is hindered by the legacy of the crisis in some countries

Some countries that were hit particularly hard by the crisis experienced sharp falls in both public and private investment. Although these economies have started to recover, the legacy of the crisis is still weighing on the pace of investment growth in some cases. Most of catching-up economies also saw investment decline during the crisis, but the decrease in private investment was milder than in the countries hit hardest by the crisis. Moreover, public investment has been more resilient, at least partly owing to the supportive role of EU funds. However, the new 2014-2020 programming period has not yet translated into a strong uptake of new projects. In other euro area and non-euro area countries, investment has been more stable but still markedly below long term trends, until the gradual recovery since 2014. This persistent weakness of investment is particularly striking in large economies where investment levels had been low even before the crisis.

The Investment Plan provides a favourable framework for investors in Europe...

Financing conditions are an important determinant of investment and efforts have been made to improve these conditions in Europe. The Investment Plan for Europe, launched in 2015, makes smarter use of new EU financial resources, through the European Fund for Strategic Investments. Up to September 2017, the fund has approved operations covering 607 growth-enhancing investment projects, worth around €36 billion, in the fields of network infrastructure, the low-carbon economy, research and innovation, resource and energy efficiency, as well as projects by SMEs and mid-caps. The Investment Plan also provides technical assistance to investment promoters through the European Investment Advisory Hub and ensures transparency of investment projects through the European Investment Project Portal. Finally, the third pillar of the Investment Plan aims to remove regulatory and non-regulatory barriers to investment in the Member States and at the EU level. At EU level, actions are taken to reinforce the Single Market, notably the Capital market Union (CMU), the further deepening of the Single Market for goods and services, and the realisation of the Digital Single Market. Other initiatives have also been adopted in the context of the Energy Union, and the Circular Economy package. In parallel, the EU Better Regulation agenda seeks to simplify the legal framework and to reduce the regulatory burden.

...and removing barriers to investment is crucial in a post-crisis context

While uncertainty about future economic conditions and expected profits plays a key role in driving investment, microeconomic factors also contribute to investment dynamism. Weaknesses in the business environment and rigidities in labour and product markets hinder the reallocation of resources and can weaken investment in dynamic firms and sectors. Moreover, these barriers, by increasing administrative hurdles, can contribute to delaying projects or postponing investment decisions. In this report, empirical results show that both macroeconomic and microeconomic factors have a significant impact on investment.

Removing microeconomic barriers to investment may be especially relevant in the current post-crisis context. During periods of recession, economies tend to scale down or discontinue their less productive units to make space for more productive activities. However, this 'efficiency-enhancing effect' of a recession may be diluted when capital markets are imperfect. Indeed, barriers to resource reallocation are more likely to linger when firms, particularly SMEs, face credit constraints. This remains an issue in some countries, in which bank lending is expected to remain subdued as banks' balance sheets continue to be burdened by the high level non-performing loans. This report shows that not only have investment rates declined in most sectors since the crisis but those sectors that have been expanding have done so with lower-than-average investment rate growth in most countries.

The business environment affects companies' decisions to invest....

Improving the business environment is one of the main ways that a country can improve its economy. It involves acting on multiple dimensions. A supportive business environment would ideally provide better conditions for firms' entry and exit, ensure well-functioning product and labour markets, facilitate access to finance, increase the efficiency of public administration and the judicial system, as well as avoid corruption. In this report the focus is on improving business regulation and the efficiency of public administration. Business regulation embeds specific regulations that are central to the functioning of the private sector. It includes areas such as creating and scaling up a business, getting credit, protecting minority shareholders, enforcing contracts, resolving insolvency and closing a business. Companies have also to deal with public administration. Paying tax, compliance costs, but also the predictability and stability of legislation are part of companies' daily life. All these dimensions influence a firm's decision to invest through different channels – entry in a market, expanding in new activities/markets and modernising equipment.

...firms see big differences across the EU and more efforts are needed to improve the business environment in many countries

During the crisis, many EU Member States, especially those that were most affected by crisis, undertook structural reforms to improve the business environment. As a result, most countries have improved their business environment compared to the pre-crisis period, particular with regards to the conditions for starting a business. Nevertheless, firms' perceptions of the business environment remain rather negative in some countries and there are large differences in these perceptions across the EU. According to a recent Eurobarometer survey, EU firms, particularly small and young ones, have a rather negative opinion of the quality of public administration and the ease formalities linked to running a business

Investment in intangibles also matters, and has been resilient to the crisis...

Some areas of investment, such as research and development, showed resilience to the crisis partly because they were less exposed to fiscal consolidation. Some of this resilience, however, could be indicative of the wider shift towards the knowledge economy being a stronger driving factor than business cycle fluctuations. This is good news as investment in R&D contributes to productivity growth. Other investments related to knowledge creation such as skills, training, information and communication technology, as well as intellectual property, also play an important role in creating value for companies and economies. Investments in such 'intangibles,' however are not adequately captured in public accounts, which makes it challenging to estimate them.

The share of investment in intangibles in the economy is lower in Europe than in the US

The share of intangible investment in the economy tends to be lower in the EU than in the US, in particular when it comes to assets such as innovative property (including R&D) and economic competencies (training, branding or business processes). Data between 1997 and 2013 show that although the EU has made improvements, the gross value added (GVA) share of intangible assets remains below that of other advanced economies.

Barriers to investment differ between tangible and intangible assets

The barriers to investment in intangible assets- such as specific market failures, unfavourable financing conditions and a lack of skills- are quite specific and different from the barriers to investment in tangible assets. This report presents empirical evidence that shows that intangible investments are sensitive to the regulatory framework, the availability of skills- particularly in tertiary education- and to R&D intensity.



# Part I

Investment developments in Member States

# 1. INVESTMENT EVOLUTION IN THE POST-CRISIS CONTEXT

## 1.1. INTRODUCTION

Investment is crucial for increasing the growth potential of EU countries. Capital accumulation raises the productive capacity of the economy by boosting labour productivity. Different types of investment affect growth in different ways: for example, investments in equipment and infrastructure increase the productive capacity of the economy; public investment can, among other things, help to correct market imperfections that cause underinvestment. Finally, investments in intangibles have a crucial role for growth and productivity especially in developed economies like the EU, and higher levels of investment in these assets are generally associated with higher growth rates of GDP per capita.

However, investment rates in EU countries have dropped since the crisis and, in spite of a gradual recovery in the last couple of years, they still linger below their long-term averages. Whether this decline implies that there is an investment "gap" in the EU is subject to debate for several reasons.

First, secular trends in the European economy may justify a decline in investment rates. In particular, shifts in activity – away from manufacturing and towards services – can, in principle, change the "equilibrium" investment rates. In the European case, this shift does not seem sufficiently big to explain the decline in investment. <sup>(1)</sup>

Second, investment in some Member States was artificially boosted by the credit boom of the period 2000-2007: the boom led to overcapacity in construction and, therefore, pre-crisis investment rates are not necessarily the right benchmarks. However, the drop of investment rates due to the crisis goes beyond what was warranted following the real estate bubble.

This chapter analyses the evolution of investment in the EU before and after the crisis. It identifies, in a descriptive way, trends in investment rates in EU countries and the respective challenges and

<sup>(1)</sup> Section 1.4 below. Moreover, as the growth rate and the working-age population falls, so does, other things equal, the potential growth rate of the economy. This implies, in turn, lower equilibrium investment rates. However, these trends are at least partially offset by migration flows.

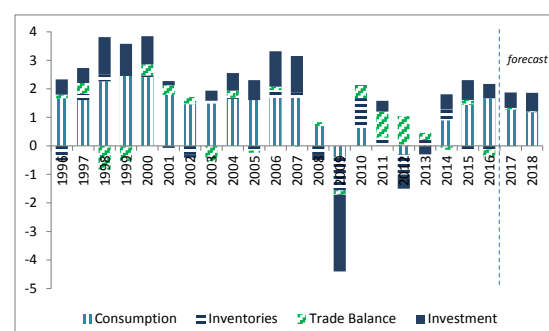
attempts at identifying the relative importance of cyclical and structural factors in explaining investment weakness. It is organized as follows. Section 1.2 presents stylized facts on investment developments in the EU. In Section 1.3, the sectoral dimension of investment is discussed, using a shift-share decomposition of investment rates. Section 1.4 attempts at grouping EU countries based on investment trends since the crisis. Section 1.5 looks forward at the recovery of investment (or lack thereof) in EU countries, focusing on recent forecasts. Section 1.6 concludes.

## 1.2. STYLIZED FACTS

**The EU is entering its fifth consecutive year of growth.** Macroeconomic policies, notably the very accommodative monetary policy and the broadly neutral fiscal policy stance in the euro area, a lesser sense of uncertainty in the EU and stronger global growth, are all supportive of growth but, the conditions for a more pronounced rise in economic activity, including stronger investment, are still lacking. <sup>(2)</sup>

**The contribution of investment to growth remains low.** GDP is now higher than before the crisis and the employment rate has increased, also benefitting from the reforms adopted in a number of Member States (Graph I.1.1), but the investment rate is still below the pre-crisis average.

Graph I.1.1: Contributions to GDP growth, EU-28



Source: AMECO

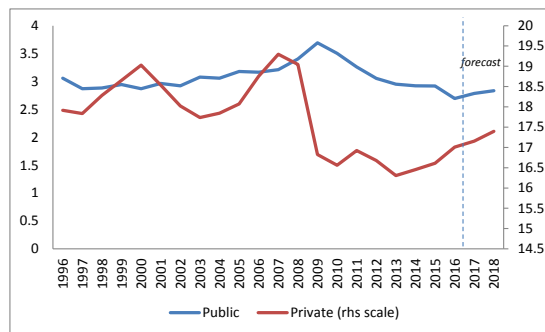
**In spite of improved financing conditions, investment is held back by legacies inherited**

<sup>(2)</sup> European Economic Forecast- Spring 2017, European Economy Institutional Paper 053.



from the crisis, as well as by structural deficiencies dating back to the pre-crisis years. In several Member States, non-performing loans, high private and public debt and deleveraging processes, as well as the ongoing balance sheet repair in the banking sector continue to weigh on investment. At the same time, some Member States with persistent current account surplus still have a record of low total investment compared to their economic fundamentals. <sup>(3)</sup>

Graph I.1.2: Public and private investment rates, EU-27



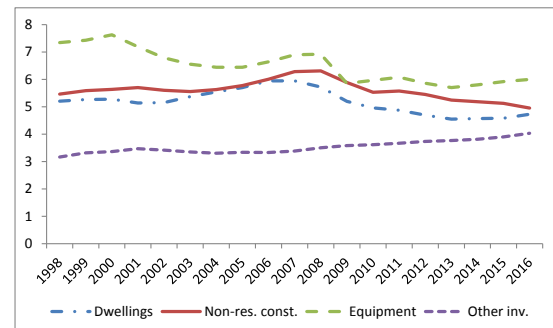
% of GDP. HR excluded because data are not available before 2001.  
Source: AMECO

**Investment is weak both in the private and public sector** (graph I.1.2). Private investment rates in the EU are still well below the pre-crisis average, even without considering the years 2005-2007 when the "irrational exuberance" of the real estate bubble made total investment soar in some countries. <sup>(4)</sup> Moreover, public investment rates have declined as well, especially due to budgetary pressures in those countries more heavily hit by the crisis. It should be stressed that, in a number of countries (e.g. cohesion countries), EU funds contributed in part to the resilience of public investment since the crisis.

<sup>(3)</sup> In Germany, however, recent agreements on reforming the federal fiscal relations should increase the scope for public investment, alleviating barriers to investment in infrastructure at municipality level.

<sup>(4)</sup> For example, current available data from AMECO show that the average investment rate in the EU28 in 2017 is forecasted to be 1.2 p.p. below the average of the period 1995-2004.

Graph I.1.3: Investment rates by type of asset, EU-27



% of GDP. HR excluded due to lack of data on investment by category. 2017 and 2018 forecasts not available.  
Source: AMECO

**All categories of investment in the EU, except "other investment", have decreased since the crisis** (graph I.1.3). Investments in equipment have recently picked up, while residential construction (dwellings) seems to have bottomed out and non-residential construction remains weak. The notable exception is "other investment", which is in large part intangible investment and has been increasing in terms of GDP. <sup>(5)</sup>

### 1.3. INVESTMENT ACROSS SECTORS: A SHIFT-SHARE ANALYSIS

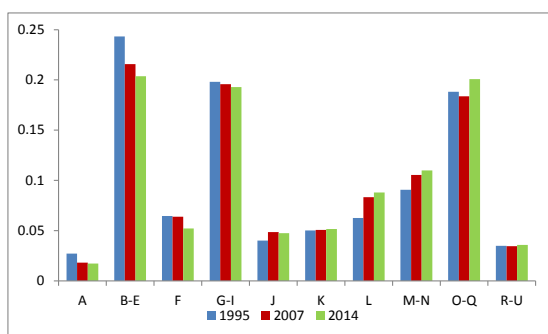
**The decline in investment rates in advanced economies began well before the crisis.** It is often put in relationship with the shift towards less investment-intensive sectors (i.e. services). In some EU countries, it has been associated with specialisation in sectors sheltered from international competition, notably with regard to emerging and developing countries <sup>(6)</sup>. Thus, an increase in the share of total output represented by sectors that have lower investment rates over time would be observed and sectoral reallocation of resources would play a role in explaining the developments of investment across EU countries.

<sup>(5)</sup> "Other investment" in AMECO includes fixed assets that consist of mineral exploration; computer software; entertainment, literary or artistic originals and other intangible fixed assets (new information, specialised knowledge, etc., not elsewhere classified), intended to be used for more than one year. See part III for a broader discussion on intangible investment and how it is measured in National Accounts.

<sup>(6)</sup> For example, Rachel, L. and Smith, T.D. (2015)

**Over the last two decades, the share of services in total gross value added (GVA) in the EU has increased from 47% to 53%** (see Graph I.1.4). Not only business services and real estate services such as Public Administration have also increased their share. The contraction of the Industrial sector (as well as Agriculture), which is also more investment-intensive as shown in Graph I.1.4, would seem to support the idea that the *servicification* of the EU economy can explain part of the overall decline in investment rates.

Graph I.1.4: Share of GVA of different sectors in the EU



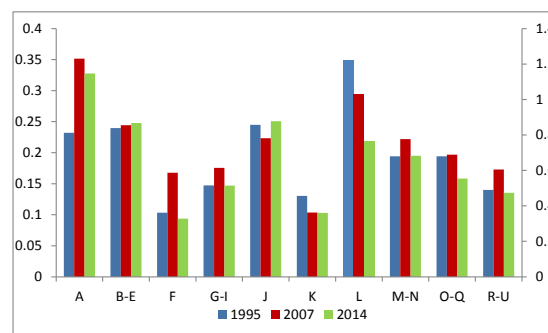
The share is calculated as the sector's GVA divided by total GVA. Sectors are classified according to the NACE-Rev. 2 classification. A = agriculture; B-E= industry; F = construction; G-I= wholesale and retail trade, transport and accommodation; J= information and communication; K= finance and insurance; L= real estate activities; M-N= professional services; O-Q= public administration and defence; R-U = Arts, entertainment. UK, HR, PL, RO, BG excluded due to missing data in some of the sectors.  
**Source:** Eurostat and ECFIN calculations

**A clear trend cannot be seen, instead, in sectoral investment rates** (see Graph I.1.5) <sup>(7)</sup>. Between 2007 and 2014, however, investment rates have dropped in all sectors except Industry and Information and Communication. In construction, finance, real estate services and the Public administration, moreover, they were below the 1995 values.

In order to have a clearer view of the role of sectoral reallocation in explaining investment developments, a shift share decomposition of investment rates changes is performed (Box I.1.1). The shift-share decomposition allows breaking down the change in aggregate investment rates into three components: a *reallocation*, a *within* and a *dynamic* component. The *reallocation* effect shows

the change in investment rates due to the change in the weights of different sectors, keeping sectoral investment rates constant.

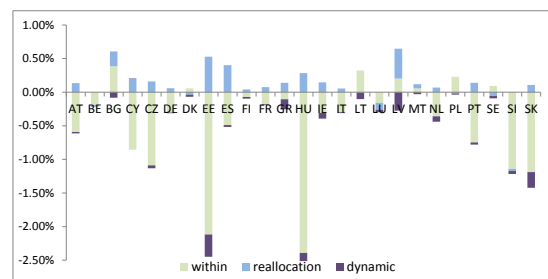
Graph I.1.5: Sectoral investment rates in the EU



Investment rate of sector L (real estate) on the right-hand side scale. Sectors classified according to NACE-Rev. 2. A = Agriculture; B-E= Industry; F = Construction; G-I= Wholesale and retail trade, transport and accommodation; J= Information and communication; K= Finance and insurance; L= real estate activities M-N= professional services; O-Q= public administration and defence; R-U = Arts, entertainment. UK, HR, RO, BG excluded due to missing data.  
**Source:** Eurostat and ECFIN calculations

Therefore, the reallocation effect shows the change in investment rates that is due to structural changes in the economy, like the *servicification* of the economy. The *within* effect is the portion of investment rates changes due to within-sector fall in investment, keeping the sectors' shares constant. This one shows the intrinsic investment performance of the sector. The *dynamic* effect is the change in investment rates due to the fact that sectors with higher (lower) investment rates growth have been expanding (contracting).

Graph I.1.6: Shift share decomposition of investment rates changes, 1995-2007



Annual average. HR, RO and UK excluded due to missing data. The sample for BG starts in 2000.  
**Source:** Eurostat and ECFIN calculations

<sup>(7)</sup> Data used in this section come from Eurostat.

**Box I.1.1: Shift-share decomposition of investment developments**

A relatively simple approach to decompose changes in investment rates in order to disentangle the role of sectoral reallocation is the shift-share analysis.

We define the investment rate as  $i = I/GVA$ , where  $I$  is total investment and  $GVA$  the economy's gross value added. If we call  $j$  the different sectors, then the aggregate investment rate is:

$$i = \sum_j \frac{I_j}{GVA_j} \cdot \frac{GVA_j}{GVA} = \sum_j i_j \cdot s_j$$

Where  $i_j$  is the sectoral investment rate and  $s_j$  is the share of sector  $j$  in total GVA. In a discrete time perspective, the change in total investment rate between years 0 and 1 can therefore be decomposed as:

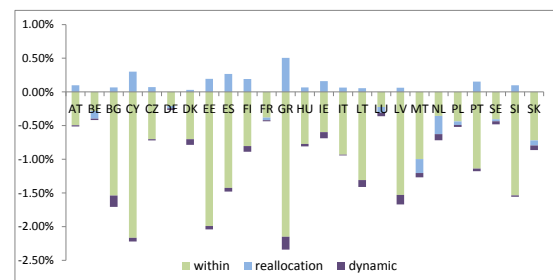
$$i^1 - i^0 = \sum_j i_j^0 (s_j^1 - s_j^0) + \sum_j (i_j^1 - i_j^0) s_j^0 + \sum_j (i_j^1 - i_j^0) (s_j^1 - s_j^0)$$

The first term in the equation is the *static shift effect*: it measures the impact of a change in the sectoral structure of the economy, hence a *reallocation* effect. It is positive if sectors showing relatively high investment rates increase their GVA share. The second term is the *within-sector* effect: the sum of sectoral investment rates growth weighted by the share of each sector in total GVA at the beginning of the period. It reflects growth in total investment under the assumption that sectors keep their shares in GVA constant. Finally, the third term represents the joint effect of changes in sectors' shares and sectoral investment (the *dynamic shift effect*). It is positive if sectors with above (below)-average growth in investment rates increase (decrease) their share in total GVA; it is negative if expanding sectors have below-average investment growth or if the shares in total GVA of sectors with relatively high investment growth are declining.

We define investment as the gross fixed capital formation (GFCF) in NACE-Rev.2 sectors. Due to constraints in sectoral data availability, Croatia, Romania and the United Kingdom are not included. Data cover the period 1995-2015 and the sectors included are: Agriculture (NACE sector A); Industry except construction (B-E); Construction (F); Wholesale & retail trade, transport, accommodation, food service (G-I); Information and communication (J); Financial and insurance activities (K); Real Estate Services (L); Professional, scientific and technical activities; administrative and support service activities (M-N); Public administration, defence, education, health, social work (O-Q); Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies (R-U).

As a robustness check, Construction and Real Estate services were excluded, to abstract from the impact of the real estate bubble and consequent burst in some countries. Nevertheless, results are very similar.

Graph I.1.7: Shift share decomposition of investment rates changes, 2008-2015



Annual average. HR, RO, UK excluded due to missing data.  
Source: Eurostat and ECFIN calculations

**The *within* effect is the main driver of investment rate changes, and more so since the crisis** (graphs I.1.6 and I.1.7). The fact that the *within* effect was already negative in the pre-crisis period for 18 EU countries out of 25 included in the sample shows the well-known stylized fact that investment in many EU countries was already weak before the crisis. The crisis, however, has had a significant impact and, on average, the *within* effect in 2008-2014 has been negative for all EU countries.

**The other two components, the *reallocation* and the *dynamic* effects, are smaller but still contribute to explain, jointly, up to 50% of investment rate changes.** <sup>(8)</sup>

The *reallocation* effect is negative only for few countries in both periods, which tends to show that the reallocation of resources in the economy, in particular the shift of economic activity towards less capital-intensive sectors, has not been the main driver of investment evolution in the EU <sup>(9)</sup>.

Finally, the *dynamic* effect is always negative, in both periods. Since the dynamic effect is negative when expanding sectors have lower-than-average investment rates growth, it might suggest that the structural shock of the crisis did not have a significant "efficiency-enhancing" effect, redistributing resources towards more dynamic sectors. At the same time, other factors might be at play, including resources being reallocated *within* each sector, which cannot be captured at this level of aggregation. <sup>(10)</sup>

#### 1.4. GROUPING EU COUNTRIES ACCORDING TO INVESTMENT TRENDS

Macroeconomic features, in particular investment levels and trends, indebtedness and the potential for catching-up, point to a distinction of three groups of countries in the EU since the crisis. However, there is still a great diversity across countries, even within these three groups.

<sup>(8)</sup> Since the shift-share analysis is performed at a relatively wide sectoral level, it does not take into account *within-sector* reallocation and might thus underestimate actual reallocation.

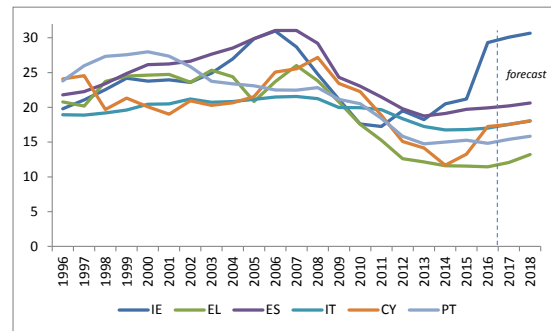
<sup>(9)</sup> However, one should bear in mind that the time period may be too short to identify a secular trend.

<sup>(10)</sup> Ollivaud P. and Turner D. (2015).

##### 1.4.1. Countries heavily hit by the crisis

**Both private and public investments have fallen significantly in the wake of the crisis for the euro area countries heavily hit by the crisis** <sup>(11)</sup> (see Graph I.1.8). This was particularly striking for private investment, where the drop reflected a rapid adjustment of the capital stock following an investment boom before the crisis, notably in construction (Italy is an exception), and some decrease in investment in equipment, in particular in the wake of the competitiveness losses before the crisis associated with rising unit labour costs, except for Ireland. Public investment further declined with the crisis and the ensuing fiscal consolidation process.

Graph I.1.8: Investment Rates - Countries heavily hit by the crisis



Total investment as a share of GDP.

Source: AMECO

**More recently, equipment investment has rebounded in Spain, as well as in Portugal and Cyprus** (although from a very low level following the crisis), **and to a more limited extent in Italy.** In Ireland, investment in intangible assets (such as intellectual property rights) has rebounded markedly. However, the impressive figures are heavily distorted by the activities of multinational enterprises in the country, which can create some uncertainty. Investment in dwellings is expected to benefit from rising real disposable incomes (except in Greece) and low mortgage rates but is unlikely to get any close to pre-crisis levels, also due to pre-crisis over-investment in housing in some countries.

**Despite a recovery in investment, limited fiscal space, debt overhang in the non-financial**

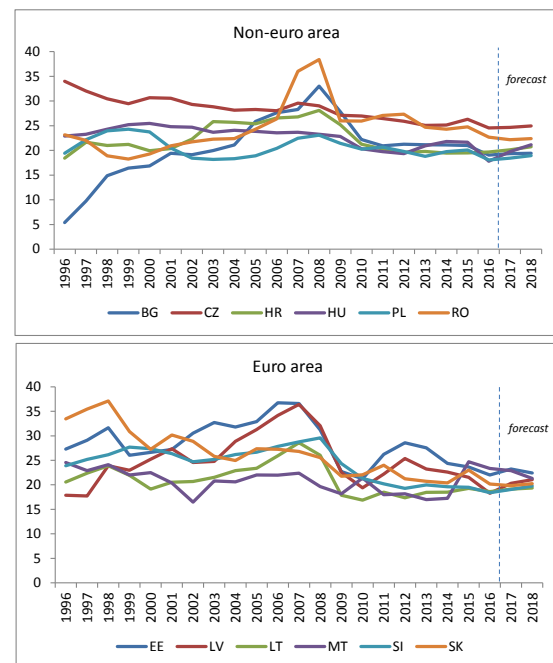
<sup>(11)</sup> Cyprus, Greece, Spain, Ireland, Italy, Portugal.

**corporate sector and problems of access to credit** (e.g. bank lending is expected to remain subdued in some countries due to a high share of non-performing loans on bank balance sheets) will continue to weigh on their investment capacity for some time, and a modest recovery in investment trends is therefore expected over the next years. Deleveraging is ongoing but the legacy of high indebtedness is proving difficult to reverse in a low-growth, low-inflation environment, and in countries whose public sectors are also highly indebted. <sup>(12)</sup> Furthermore, investment rates could remain low due to the weakness of expected demand, which, as in most other EU countries, will be hampered by the effect of demographic ageing and weak TFP growth.

#### 1.4.2. Catching-up countries

**Investment in catching-up countries <sup>(13)</sup> has also declined during the crisis, in some cases sharply.** For instance, some countries have been severely hit by the crisis, with housing booms and busts in countries such as Estonia and Latvia, and competitiveness losses in a number of countries due to rising ULCs. Private investment has also slowed down since the crisis, and is expected to remain significantly lower compared to the pre-crisis period, except for Malta (see Graph I.1.9).

Graph I.1.9: Investment Rates – Catching-up countries



Total investment as a share of GDP.  
Source: AMECO

**For most of the catching-up countries, the decrease in private investment, although significant, was milder than in euro area countries heavily hit by the crisis. Public investment has also been more resilient,** owing to the supportive role of EU funds, but it has nevertheless declined substantially in particular in Croatia, Slovenia and, to some extent, the Baltics. In addition, although some countries saw large increases in their debt ratios before the crisis, <sup>(14)</sup> both private and public indebtedness remain significantly lower than in the former group, which means that deleveraging pressures are likely to weigh less on investment. <sup>(15)</sup>

**At the same time, the recovery of investment may be slower in a number of countries** of this group (see section 1.3.5). These countries are large recipient of EU funds. Therefore, the significant drop of total investment and in investment in construction in 2016 is expected to be temporary, mainly due to a slow uptake of new projects

<sup>(12)</sup> Cuerdo C., Drumond I., Lendvai J., Pontuch P., and Raciborski R. (2013).

<sup>(13)</sup> Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Malta, Poland, Romania, Slovenia and Slovakia.

<sup>(14)</sup> This includes notably Latvia, Estonia (for both corporate and households debt), Slovenia (notably for corporate debt) and Slovakia (notably for households debt).

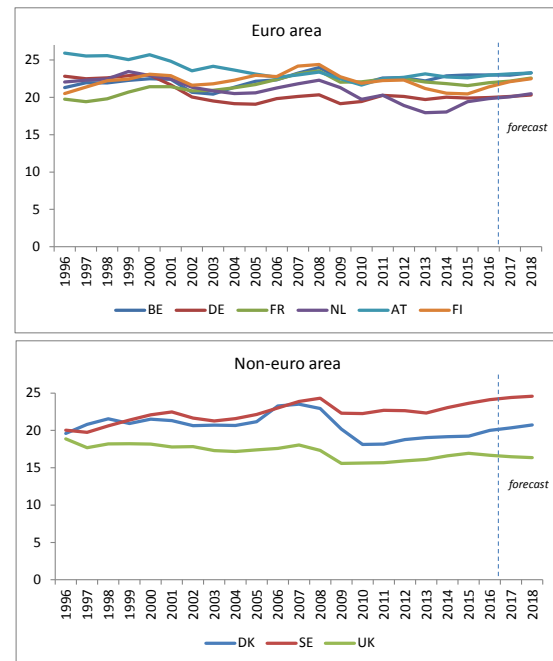
<sup>(15)</sup> Cuerdo C., Drumond I., Lendvai J., Pontuch P., and Raciborski R. (2013), op.cit.

financed by EU funds under the new 2014-2020 programming period. Overall, total private investment-to-GDP ratios for most countries of this group are expected to recover gradually. The recovery in investment is necessary to foster the catching-up process, notably by addressing large infrastructure needs and by developing higher value added activities through increased investment in R&D and innovation. In particular, the implementation of investment projects financed from EU funds and foreign direct investments will play a crucial role in this sense.

#### 1.4.3. The other EU countries in the euro and non-euro area

**Both private and public investments have been relatively more resilient to the crisis in the core euro area countries and non-euro area countries** <sup>(16)</sup> (see Graph I.1.10). There are, however, different patterns across countries in this group in terms of the level and composition of investment. For instance, public investment was relatively low even before the crisis in a number of these countries, notably in Germany and Belgium. Within this group, euro area countries with persistent current account surpluses (Germany, the Netherlands, Austria and Luxembourg) tend to have lower investment rates than the euro area average, notably in construction. In some of them, high corporate savings are not reflected in high investment.

Graph I.1.10: Investment rates - the other EU countries



Total investment as a share of GDP.  
Source: AMECO

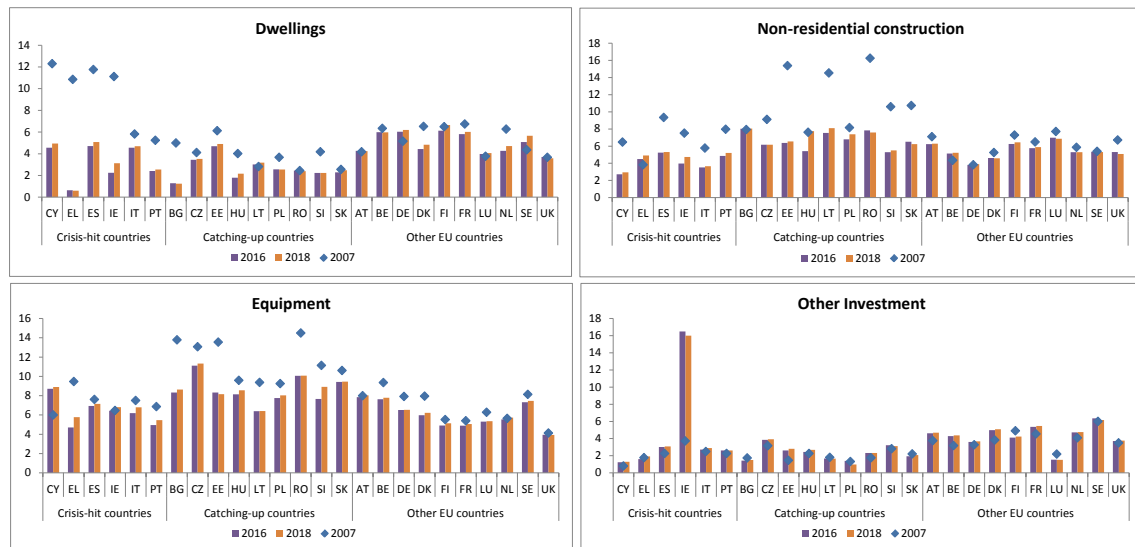
**In some countries (Belgium, France and Finland), investment has been increasingly oriented towards the services sectors and has decreased in manufacturing since the 2000s, reflecting both a trend shift towards services and a deterioration in competitiveness or the effect of specialisation in some categories of products that have faced shocks (as in the case of the electronics sector in Finland).**

**In addition, since the beginning of the 2000s, in many countries of the group, the decreasing trend in equipment investment has been partly compensated by an increasing trend in 'other' investment.** This reflects in part the increasing importance of intangibles in more advanced economies. Financing R&D, including through efficient public funding and the development of alternative sources of finance, can therefore be important factors affecting to investment in some of these countries (Germany, the Netherlands, France and Sweden).

<sup>(16)</sup> Austria, Belgium, Denmark, Germany, Finland, France, Luxembourg, the Netherlands, Sweden and the United Kingdom.



Graph I.1.11: Forecasted investment rates



Rates calculated as gross fixed capital formation by type of goods over GDP. HR, LV and MT omitted due to lack of data.  
Source: AMECO (Spring forecast 2017)

## 1.5. LOOKING FORWARD

**The economic recovery in the EU is progressing and the GDP is expected to grow 1.9% both in 2017 and 2018.**<sup>(17)</sup> The determinants of investment are, moreover, supportive for a pick-up of investment: global demand is rising, capacity utilisation rates are above average, corporate profitability is increasing and financing conditions are particularly favourable. Furthermore, the Investment Plan for Europe is starting to have a concrete impact on the economy.

**In spite of the good framework conditions, however, investment is not expected to increase markedly over the next couple of years.** Policy uncertainty persists, and the modest medium to long-term demand outlook and remaining deleveraging needs will continue to weigh on investment decisions. As a result, even though investment rates are forecasted to keep slowly increasing at least until 2018, they will generally remain far below the pre-crisis levels, except in the case of "other investment" (see Graph I.1.11).

**Investment in residential construction will remain at levels far below the pre-crisis ones** in crisis-hit countries and most EU catching-up

countries, plus Denmark and the Netherlands. Given the persisting overcapacity in the sector following the construction boom of the past decade, this is not surprising.

**The picture is very similar for non-residential construction and equipment, although in the latter case most countries are forecasted to reach pre-crisis levels.** It is less the case, however, for a number of countries in the catching-up group (Bulgaria, Romania, Estonia, Lithuania). Given the importance of this type of investments for increasing the productive capacity of the economy and also for the process of catching up, this is quite worrisome.

## 1.6. CONCLUSION

Summing up, investment still shows signs of weakness in the EU and is not projected to increase markedly in the medium term. The macroeconomic factors behind this, namely the weakness of demand and investment opportunities and the legacy of the crisis, clearly play a role.

The evolution of investment has been quite diverse across EU countries and across sectors and types of investment, pointing to common patterns of investment and common weaknesses across groups of EU countries.

<sup>(17)</sup> European Economic Forecast- Spring 2017, op. cit.

Since the crisis, whilst investment rates have gone down *within* sectors throughout the EU, at the same time bottlenecks and rigidities may be hampering the reallocation of resources, so that the most dynamic sectors (and, probably, firms) are not expanding.



## 2. WHY IS INVESTMENT WEAK IN THE EU?

### 2.1. INTRODUCTION

In spite of improved financing conditions, investment in the EU has been persistently weak, especially in some Member States.

The objective of this chapter is to discuss investment drivers and barriers in relation to business investment developments in the EU. Against this background, section 2.2 reports an overview of the determinants of investment and also discusses how the economic literature has related them to investment developments. Section 2.3 presents an empirical analysis relating business investment in EU countries to these determinants. Section 2.4 focuses on the state of play at the EU level while section 2.5 concludes.

### 2.2. OVERVIEW OF INVESTMENT DETERMINANTS

#### 2.2.1. Macro-economic factors

There is a vast literature<sup>(18)</sup> highlighting the main determinants of investment, and empirical works use different types of models and approaches to identify the impact of each factor on investment. Traditional models have represented investment growth as a function of desired changes in capital stock and depreciation. In turn, the desired level of capital stock is a function of a number of variables, in particular output and the cost of capital.<sup>(19)</sup> Furthermore, the evidence suggests that uncertainty about future economic conditions and expected profits plays a key role in driving investment, while financing conditions remain an important determinant of investment for SMEs in particular.<sup>(20)</sup>

On the one hand, the *accelerator model*, which models investment as a function of output growth, has been found to be relevant in explaining investment. An alternative model is the *neoclassical model*, where the desired stock of

capital is a positive function of output but also depends negatively on the user cost of capital.

On the other hand, as mentioned above, other variables capturing the financial environment (e.g. uncertainty, financial constraints, as well as the cost of capital) tend to play a role, as well as barriers to investment linked to institutional, labour and business environment factors, which operate on the supply side<sup>(21)</sup>. These aspects are taken into account in the *extended accelerator model*, which introduces other factors that can contribute to hold investment back, such as uncertainty, leverage and cash flow. Recent work from ECB (2016) on ten euro area countries has shown how these country-specific macroeconomic and structural characteristics affect business investment, and that the interaction between structural and certain cyclical factors may exacerbate business investment dynamics in crisis times.

#### 2.2.2. The role of microeconomic factors

While barriers to investment per se cannot explain the decline in investment, they might be especially hindering in the current post-crisis context. In fact, as a consequence of a recession, the least productive and efficient firms would be expected to leave the market, thus making space for more productive firms to expand. However, this "efficiency-enhancing" effect may be diluted when capital markets are imperfect.

Barriers to resource reallocation (both capital and labour) are more likely to linger when firms face credit constraints.<sup>(22)</sup> Therefore, a stronger recovery of investment would likely result from better expectations of future economic growth but also from framework conditions more conducive to investment.

##### 2.2.2.1. Financial sector/ Taxation

A recent IMF paper (2016) analyses the microeconomic drivers of firms' investment choices in the euro area using a large, cross-country panel dataset of firms' balance sheets and

<sup>(18)</sup> For an overview of main models, see Barkbu B., Berkmen S.P., Lukyantsau P., Saksonovs S., and Schoelermann H. (2015).

<sup>(19)</sup> Barkbu et al. (2015).

<sup>(20)</sup> ECB (2016).

<sup>(21)</sup> Alesina, A., Ardagna, S., Nicoletti, G. and Schiantarelli, F. (2005), ECB (2016).

<sup>(22)</sup> Riley, R., Rosazza Bondibene, C., and Young, G. (2015)

income statements from 2001–2013. <sup>(23)</sup> Its main findings show a negative relationship between a firm's debt and investment, and this negative effect appears to be greater for SMEs than large firms, while highly indebted firms are also found to be less responsive to demand. These results suggest that the sluggish investment recovery in the euro area may be partly due to corporate debt burdens, particularly at SMEs, which account for a large share of value-added in the euro area.

A BIS paper (2015) estimates a simple model of investment for the G7 economies (Canada, France, Germany, Italy, Japan, the United Kingdom and the United States) over the period 1990 to 2014 to assess the role of access to finance (as well as uncertainty) in the explanation of persistent low investment. The paper suggests that uncertainty about future economic conditions and expected profits play a key role in driving investment, while favourable financing conditions have provided only a small direct stimulus to investment.

**Access to finance remains an obstacle to investment in a number of countries.** In particular, in Member States with high private sector debt and leverage, access to bank credit is relatively more difficult and expensive than in the rest of the EU, holding back private investment (Graph I.2.1). High public debt and the need to pursue fiscal consolidation also restrain public investment in some countries.

**By changing the return on investment projects, taxation alters investment behaviour.** In particular, productive investment is affected by effective tax rates <sup>(24)</sup>. Effective rates depend not only on the statutory corporate income tax (CIT) rate, but also on elements that jointly determine the size of the tax base, such as asset-specific depreciation allowances, investment tax credits, interest deductibility.

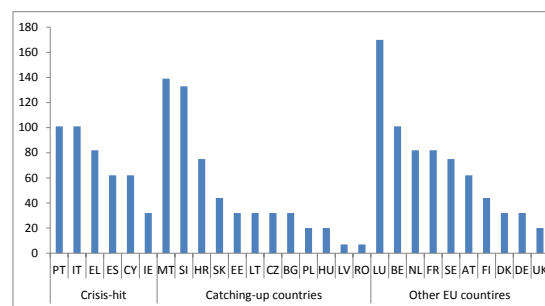
Finally, the issue of access to finance is especially relevant for young innovative firms, which could depend on alternative sources of financing that are less used in the EU in comparison to other advanced economies. <sup>(25)</sup>

<sup>(23)</sup> IMF (2016).

<sup>(24)</sup> Djankov S. et al. (2010).

<sup>(25)</sup> Masiak et al. (2017).

Graph I.2.1: Ease of getting credit



Source: World Bank - Doing Business 2017

**Well-designed corporate income tax systems** are of paramount importance in order to minimise investment distortions and increase competitiveness. Complexity in the tax system is to be considered an additional barrier to investment for businesses, including foreign investors.

#### 2.2.2.2. Public Administration / Business Environment

**A supportive business environment** is characterized by supportive conditions for firms' entry and exit, enhanced competition, low administrative and regulatory burden, efficient access to finance, well-functioning insolvency frameworks, efficient public administration and judicial system, as well as low corruption.

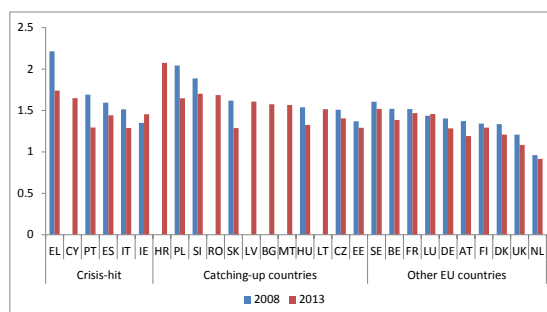
**The literature has investigated the positive role of business environment/competition on investment.** In general, results show a positive relationship on improved business environment and investment. An empirical analysis of private fixed investment in the US over the past 30 years using industry-level and firm-level data investigates the following factors that could explain low investment: (i) financial frictions, (ii) measurement error (due to the rise of intangibles, globalization, etc.), (iii) decreased competition (due to technology, regulation or common ownership), and (iv) tightened governance and/or increased short-termism. <sup>(26)</sup> It shows that both industry-level and firm-level evidence provide fairly strong support for the decreased competition and short-termism/governance hypotheses. In the US, it seems that industries with more

<sup>(26)</sup> Gutierrez G., Philippon Th. (2016).

concentration and more common ownership invest less, even after controlling for current market conditions.

A recent OECD paper (Égert, 2017) analyses the relationship between investment (the capital stock) and its long-term drivers using co-integration techniques.<sup>(27)</sup> Based on a panel of 32 OECD countries for 1985 to 2013, it shows that more stringent product and labour market regulations tend to be associated with less investment. The paper provides evidence for non-linear policy effects and that the negative relationship between structural policies and investment is more pronounced if policies are being tightened rather than relaxed. The paper also highlights policy interactions between product and labour market policies. For instance, higher levels of product market regulations (covering state control, barriers to entrepreneurship and barriers to trade and investment) tend to amplify the negative relationships between product and labour market regulations and the capital stock.

Graph I.2.2: Product market regulation, 2008 vs. 2013



The latest available year is 2013. BG, CY, HR, LT, MT, RO are only available for 2013.

Source: OECD.org

**Significant differences across EU countries still exist in terms of rigidity of product market regulation**, although between 2008 and 2013 it has decreased in all EU Member States except Ireland and Luxembourg (Graph I.2.2).<sup>(28)</sup> More generally and beyond regulation, a high-quality business environment and public administration has a positive impact on investment (see part II).

**A higher efficiency and transparency of the public administration** can be achieved through simplification and better coordination across different layers of government, the use of public procurement, the quality of regulation (e.g. impact assessment), and the further development of digitalisation. The low efficiency and transparency of public administration remains a major barrier to investment and growth in several countries. In addition, corruption is still a concern in several countries. Corruption undermines investors' confidence in the institutions and the rule of law. It also hurts the economy and deprives states from much-needed tax revenue.

**The efficiency of the judicial system**<sup>(29)</sup> is also crucial for the effective enforcement of laws, including economic laws, and remains an essential building block of an environment conducive to investment and growth. Timely judicial decisions, including properly enforced contracts and effective resolution of corporate cases, are essential for businesses and investors. For example, investors take into account in their economic decisions the risk of being involved in commercial disputes or insolvencies. Labour-contract disputes can also entail a significant cost for firms whenever judicial decisions take a long time and create uncertainty about a final resolution.

**Reducing the complexity and low predictability of regulations** under which firms operate as well as cutting administrative burden can have a positive effect on investment. Heavy, expensive and time-consuming administrative procedures act as a disincentive, to create or to expand a firm. The interaction and lack of coordination between different government levels often add to costs and uncertainty. By decreasing costs, time and uncertainty of doing business, measures in these areas could increase the efficiency of operating firms, while creating favourable conditions to attract investment and promote the entry of new firms.

**Improved insolvency frameworks**, striking the right balance between the protection of creditors and the reduction of exit costs for firms would contribute to the smooth exit of less efficient firms.

<sup>(27)</sup> Egert B. (2017).

<sup>(28)</sup> For details on the construction of the PMR indicator, Koske, I., I.Wanner, R. Bitetti and O. Barbiero (2015)

<sup>(29)</sup> European Commission (2017a) The 2017 EU Justice Scoreboard, 10 April 2017.

An efficient competition framework is a key ingredient of well-functioning markets in goods and services. This requires an effective competition legislation and a competition authority having the power and the adequate tools and resources to work in an efficient and independent manner.

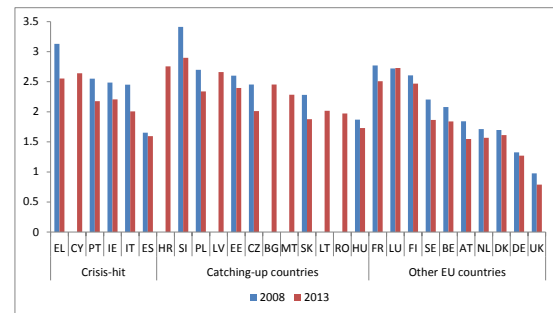
### 2.2.2.3. Sector Specific Regulation

**Well-functioning markets in services play an essential role for economic growth**, both directly and indirectly, as they represent an increasingly important input for other sectors. Remaining barriers to competition in services (e.g. in retail, professional services and construction), can create obstacles to investment in the manufacturing sector, through high costs and low profitability, and hamper productivity gains in the whole economy. Alesina et al. (2005)<sup>(30)</sup> analyse the effect of regulation in several network services in OECD countries, showing that less restrictive regulation leads to greater investment in the long run, and this is especially the case for entry liberalisation.

**Infrastructure needs are high in the EU**, which requires investment to both maintain and expand the current quality and capacity of the networks. The ambitious targets for decarbonisation and digitalisation and the need to complete the internal market require the network sectors to make big investments in the period 2020-2030<sup>(31)</sup>. A main challenge is to ensure that the regulatory frameworks for the transport, energy and telecommunications sectors are conducive to investment of the needed scale.

**Addressing project market risk** and public acceptance is key for investments in energy interconnectors, which are critical, in particular, for the completion of the internal energy market and for the integration of renewable energy sources.

Graph I.2.3: Sectoral regulation indicator, 2008 vs. 2013



OECD aggregate Sectoral PMR. Covers airline, electricity, telecom, gas, post, rail and road. Data for BG, CY, HR, HU, LT, LV, MT, RO only available for 2013.

Source: OECD

**Market opening plays also a crucial role in fostering investments** with the entry of new players. Improving competition in electricity and gas markets are an issue in several countries. Furthermore, there is today evidence that the current market design is not adequate to trigger the energy transition. Current market price signals do not incentivise investments in low carbon technologies and security of supply, while market support schemes are in need of reform to be more open to competition and fiscally sustainable. Tariff-setting below cost is a major issue in several Member States. It creates tariff deficits and stifles the entry of new players and services<sup>(32)</sup>. Furthermore, support schemes for renewables have been or are being reviewed in several Member States to factor in the improving cost competitiveness of renewable technologies and to integrate renewable energy further into the electricity market.

**Regarding the transport sector, various bottlenecks are preventing investment** in transport infrastructure from infrastructure planning and allocation issues to delays in the implementation of national strategies. Limited competition, notably in railways, is another major bottleneck to investments. An efficient assessment and monitoring framework of Public-Private Partnerships (PPPs) and support capacity-building in public authorities can ensure their adequate, efficient and wider use for transport infrastructures<sup>(33)</sup>.

<sup>(30)</sup> Alesina, A.; Ardagna, S.; Nicoletti, G. and Schiantarelli, F. (2005)

<sup>(31)</sup> European Commission (2016a), section 1.2.2, table I. For the period 2011-2030, annual investment needs would amount to EUR 698000 mn in land transport, EUR 207000 mn in energy distribution and transmission. As regards telecommunication, investment needs over the period 2011-2020 would amount to EUR 62000 mn.

<sup>(32)</sup> European Commission (2014).

<sup>(33)</sup> European Commission (2016a).

**Well-designed PPPs and innovative financing structures** can be substantial contributors to developing infrastructure while ensuring fiscal consolidation. Innovative financial instruments can leverage limited public resources by catalysing private financing. In this context, PPPs can be a useful option for public authorities if i) the Value for Money (VfM) analysis demonstrates that the PPP option is the most economically advantageous one and ii) if the public sector has the technical skills to prepare and negotiate a robust PPP agreement <sup>(34)</sup>.

**Finally, the performance of state-owned enterprises** is important in sectors where they are key players, such as in the energy and railway sectors, where they represent significant shares of total turnover. <sup>(35)</sup>.

#### 2.2.2.4. Labour market/ Education

**Labour market responsiveness can facilitate resource reallocation between or within sectors** and can hence support investment. Therefore, a more restrictive employment protection legislation (EPL) that affects both workers' hiring and firing, can hamper the reallocation of resources, which might influence firms' investment decisions. However, more stringent EPL means that labour is more costly and, in the absence of financial and labour market frictions, firms will substitute labour for capital, hence invest more. But in the case of market frictions and wage bargaining, higher EPL decreases the capital-to-labour ratio (Cingano et al. 2016) <sup>(36)</sup>. The impact of EPL on labour productivity is also ambiguous. On the one hand, EPL hampers the reallocation of workers across industries and firms, which can bear negatively on productivity. On the other hand, a more stringent EPL may also promote investment and result in more learning-by-doing, which may increase productivity.

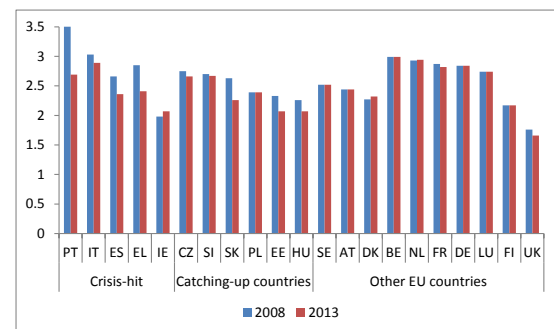
Cingano et al.(2010) analyse the effect of EPL and financial market imperfections on investment on the basis of a firm-level panel of EU countries, showing that a higher EPL is associated with less turnover, less investment, less added value per

worker and lower capital labour ratios. <sup>(37)</sup> In addition, it points to the complementarity between credit market imperfections and EPL, as poor access to credit markets seems to exacerbate the negative effects of EPL on capital deepening and productivity.

**Over the last years, labour markets have been reformed substantially** and EPL has decreased in particular in the countries heavily hit by the crisis, except in Ireland (Graph I.2.4). Differences across EU countries have, therefore, been reduced.

**Wage-setting mechanisms** that take into account productivity can also boost competitiveness – hence investment – by allowing adjustment to competitive pressures while providing incentives for workers to move to more productive firms.

Graph I.2.4: Employment Protection Legislation, 2008 vs. 2013



The indicator measures employment protection for regular contracts. BG, CY, HR, LT, LV, MT, RO not included due to lack of data.

Source: OECD

**The quality of education, vocational education and training, and apprenticeship systems** is an important factor to ensure the quality of human capital and address skills shortages and skills mismatches in the labour market.

<sup>(34)</sup> European Commission (2016a)

<sup>(35)</sup> European Commission (2016b).

<sup>(36)</sup> Cingano, F., M. Leonardi, J. Messina and G. Pica (2016).

<sup>(37)</sup> Cingano F., Leonardi M., Messina J., Pica G. (2010).

**Box 1.2.1: Determinants of investment: regression analysis**

The regression analysis is based on a model of investment determinants that includes the accelerator effect, financial constraints and labour and product market regulation and covers the period 1995-2015.

The base regression is the following:

$$I_{it} = \alpha_i + \beta_1 accel_{i,t-1} + \beta_2 interest_{it} + \beta_3 profits_{it} + \beta_4 uncertainty_{it} + \varepsilon_{it}$$

Where  $I$  is business investment (scaled by the capital stock at  $t-1$ ),  $accel$  is the accelerator term (measured as gross value added scaled by the lagged capital stock), lagged one year to avoid potential endogeneity,  $interest$  is the long-term lending rate, measuring the cost of capital,  $profits$  are corporate profits (scaled by the capital stock at  $t-1$ ), proxying financial constraints (i.e. the higher the profits, the lower the financial constraints and therefore the higher the investment rates, other things equal) and  $uncertainty$  is the standard deviation in Consensus Forecasts' GDP growth forecast. Finally,  $\varepsilon_{it}$  is an autocorrelation and heteroskedasticity-robust error term. The data source is AMECO.

The regressions also include country fixed effects ( $\alpha_i$ ), to control for time-invariant factors affecting business investment across countries. This is especially relevant, for example, since catching-up countries tend to have higher investment rates, other things equal. <sup>(1)</sup> Economic theory and previous empirical work on the topic gives clear priors regarding the expected sign of the coefficients:  $\beta_1, \beta_3 > 0$  and  $\beta_2, \beta_4 < 0$ .

This equation is then augmented including regulatory indicators which proxy the restrictiveness of labour and product market regulation, respectively:

$$I_{it} = \alpha_i + \beta_1 accel_{i,t-1} + \beta_2 interest_{it} + \beta_3 profits_{it} + \beta_4 uncertainty_{it} + \beta_5 reg_{it} + \beta_6 d * reg_{it} + \varepsilon_{it}$$

In particular, we use the OECD indicator for employment protection legislation (EPL) as a proxy of barriers to investment in the labour market and, as proxies of barriers to investment in product markets, we use alternatively the PMR index for State Control (PMR\_SC), the economy-wide PMR index (PMR\_TOT) and entry barriers (Entry). <sup>(2)</sup> EPL ranges from 0 to 5, 5 being the highest possible degree of regulation, while the PMR indicators and Entry barriers range from 0 to 6, with 6 being the most restrictive regulation. Finding  $\beta_{EPL} < 0$  and / or  $\beta_{PMR} < 0$ , therefore, implies that restrictive regulation hinders investment.

Finally, since the crisis might have involved a structural break, we interact the regulatory variable with a crisis dummy (i.e. equal to 1 from 2009 onwards and 0 otherwise). <sup>(3)</sup>

<sup>(1)</sup> The choice of a fixed effect model is preferred to a pooled OLS and confirmed by the Hausman test.

<sup>(2)</sup> In doing so, one variable at a time is included, in order to avoid multicollinearity problems.

<sup>(3)</sup> For example, barriers which may have been less relevant in the pre-crisis environment might have become more restrictive afterwards, because the disruptive effect of the financial and economic crisis would have requested significant resource reallocation.

### 2.3. ASSESSING THE DRIVERS TO BUSINESS INVESTMENT IN THE EU: AN EMPIRICAL ANALYSIS

In order to investigate the determinants of business investment in EU countries, an econometric analysis is performed, following the related empirical literature (see section 2.2).

Against this background, an approach that combines the accelerator model with financial and

institutional variables is proposed here. In order to identify the role of structural factors, the regression is then augmented to include variables proxying the investment barriers.

#### 2.3.1. Baseline model

The baseline model of the determinants of investment includes the accelerator term (i.e. gross value added) and variables summarizing the macroeconomic and financial conditions and includes macroeconomic variables (accelerator,



Table I.2.1: Baseline model: results

	(1)	(2)	(3)	(4)
	BASE	EU14 & CEEC-11	PRE-CRISIS, Full Sample	POST-CRISIS, Full Sample
Accelerator(-1)	0.093*** (0.019)	0.058*** (0.014)	0.107*** (0.016)	0.064*** (0.020)
Interest	-0.031*** (0.008)	-0.009*** (0.003)	-0.046*** (-0.009)	-0.026*** (-0.009)
Profits	0.219 (0.139)	0.095 (0.090)	0.09 (0.101)	0.430*** (0.098)
Uncertainty	-0.007 (0.093)	-0.033 (0.043)	-0.197 (0.118)	0.162 (0.098)
Constant	0.851*** (0.222)	0.959*** (0.193)	1.158*** (0.134)	0.450* (0.217)
CEEC*Accelerator(-1)		0.030** (0.012)		
CEEC*Interest		-0.053*** (0.014)		
CEEC*Profits		-0.01 (0.210)		
CEEC*Uncertainty		0.154 (0.189)		
Country FE	YES	YES	YES	YES
Observations	409	409	231	178
R-Squared	0.586	0.652	0.509	0.523

Dependent variable: business investment ratio. Driskoll-Kraay standard errors in parenthesis. See Box for a detailed description of the model and variables. \*\*\*=significant at 1%; \*\*= significant at 5%; \* = significant at 10%.  
Source: European Commission services calculations

cost of capital, corporate profits, macro-economic uncertainty). Moreover, it accounts for country specificities, distinguishing between the EU-15 and Member States that joined since 2004. The dependent variable is business investment, in order to avoid results being watered down by the presence of public investment.

**Investment has been mainly driven by macro-economic factors.** The accelerator and the cost of capital are always found to be significant and with the right sign (see Table I.2.1, column (1)). Only macroeconomic uncertainty is not significant in the specifications used <sup>(38)</sup>.

**The impact of macro-economic factors varies across Member States and time period.** Member States that joined the EU since 2004 show

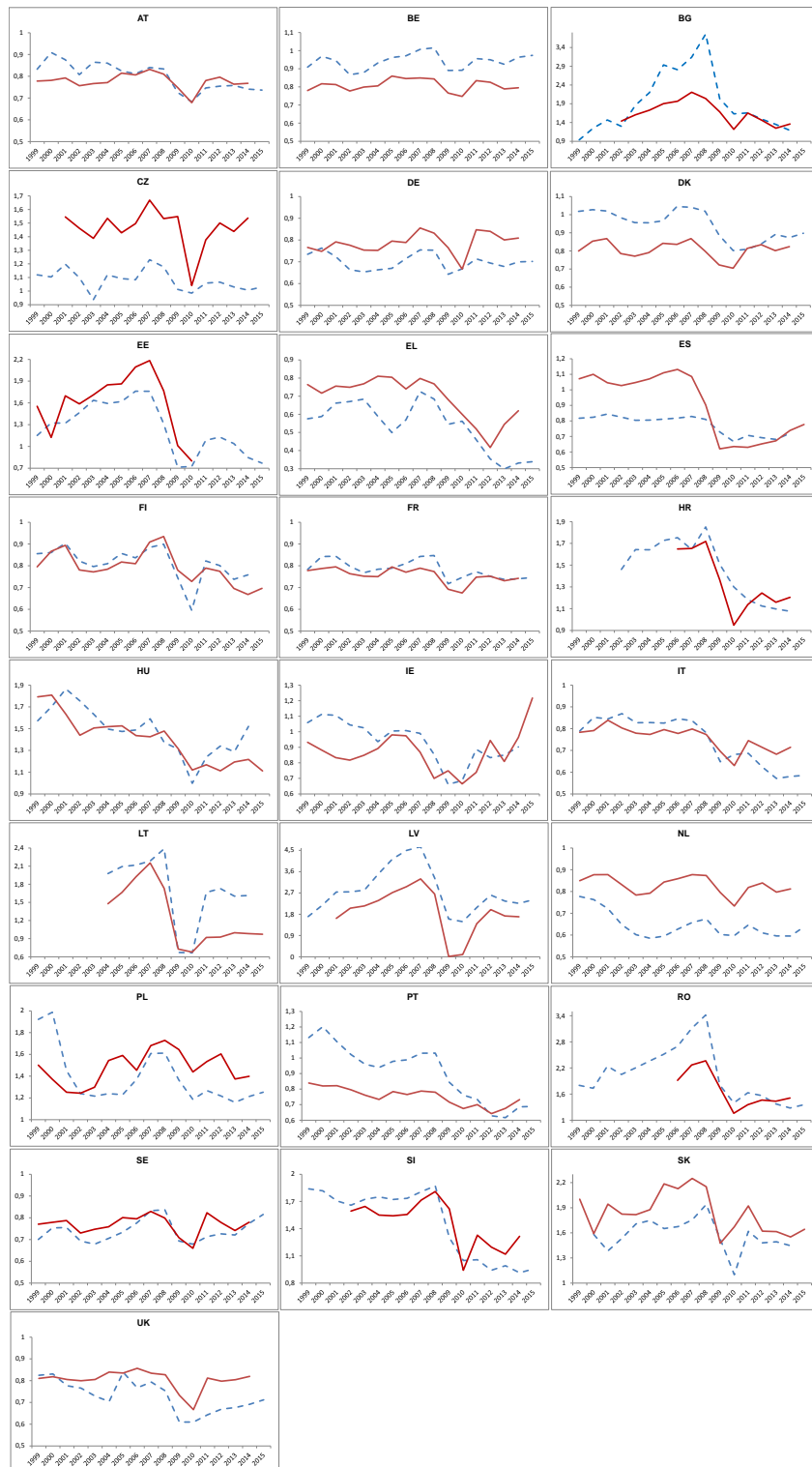
significantly higher elasticity of investment to demand and to the cost of capital (in absolute terms) (Table I.2.1, column (2)). Moreover, results suggest that weakness of investment in the period since 2008 was primarily due to weak demand, and less so to cost of capital. Both the coefficient of the accelerator term and the cost of capital are smaller for the post-crisis period (Table I.2.1, columns (3) and (4)).

**The crisis has also contributed to highlighting the importance of financial factors,** in particular financial constraints: corporate profits, which are a proxy for self-financing, have a positive and significant coefficient in particular after the crisis.

**Comparing the predicted variable with observed business investment ratios provides evidence of the impact of the crisis** and the resulting investment "gap" (Graph I.2.5). After 2008, actual investment in a number of countries fell below the level predicted by the model: this shows how the drop in demand, as well as the

<sup>(38)</sup> Note that this is not in line with some related literature (for example Banerjee et al. 2015). Due to data limitations for the overall EU28, the G7 standard deviation of GDP forecasts was used.

Graph I.2.5: Actual (dotted line) and estimated (continuous line) business investment ratios



LU, CY, MT excluded due to missing data. See Box I.2.1 for details.  
 Source: AMECO and European Commission services calculations.



tightening of credit markets at least in the aftermath of the crisis have caused underinvestment.

**However, several Member States already showed "underinvestment" before the crisis, and this seems to have been exacerbated since then.** These results point to the fact that there are additional factors that explain the weakness of investment in EU countries that need to be investigated.

### 2.3.2. Assessing the role of structural factors

The results of the baseline model point to the fact that weakness of demand and financial frictions are good predictors of investment, but additional factors must have played a role. It is not straightforward to relate statistically investment data with institutional variables, also because institutional indicators, for their nature, may not be capturing all the features of interest.

**Results point clearly, however, to the fact that more restrictive product and labour markets hinder business investment,** and this is especially the case since the crisis (table I.2.2). These results are in line with the related literature, although the analysis is constrained by the fact that the labour and product market indicators provided by OECD and used in the analysis are only available until 2013. Since a number of EU countries has adopted significant reforms since then both in labour and product markets, with our approach we cannot estimate yet the impact of these reforms on investment.<sup>(39)</sup>

**More specifically, higher employment protection is associated with lower business investment ratios,** other things equal, and this negative impact is significantly stronger since the crisis. The same stylized fact is found when focusing on product market regulation, since highly regulated product markets are found to hinder business investment.

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<sup>(39)</sup> Results were confirmed also using the PMR indicator for trade and investment and for barriers to entrepreneurship.

## 2.4. INVESTMENT BARRIERS: EU STATE OF PLAY

At the current juncture, collective and coordinated actions at EU level actions as well as actions at the level of the Member States are required to implement the necessary policies and structural reforms to reverse the downward trend in investment and to put Europe firmly on a sustainable economic growth path in the future.

**The Investment Plan for Europe, adopted by the European Commission in November 2014, is one of the EU's major initiatives.** The Investment Plan is a comprehensive strategy to unlock the full potential of investment in Europe. It is composed of three mutually reinforcing pillars: (i) the European Fund for Strategic Investments (EFSI) aimed at mobilising up to EUR 315 billion over three years (2015-2018) in new investments in areas of strategic importance to the EU economy; (ii) the European Investment Advisory Hub (EIAH) and the European Investment Project Portal (EIPP) aimed, respectively, at providing technical assistance for project promoters and diffusing investment opportunities; (iii) an ambitious approach aimed at improving the investment environment, removing bottlenecks, and enhancing the functioning of the Single Market.

**Progress on the first and second pillars of the Investment Plan is assessed regularly.** The European Fund for Strategic Investments (EFSI, First Pillar) is helping to finance infrastructure and innovation projects in the EU across key sectors such as energy and resource efficiency, transport, broadband, research, and health, as well as SMEs and mid-caps. To ensure additionality, projects are selected only if they would, in principle, not have been financed without the EFSI support. This means that these projects have to provide added value and bear more risk than projects normally financed by the European Investment Bank (EIB) and the European Investment Fund (EIF).

From its launch in 2015 until September 2017, 607 projects approved by the EFSI for a total investment value of EUR 236 billion in all 28 Member States have been approved by the EIB Group. In the SME window, operations across all Member States for a total of EUR 79.5bn have been approved by the European Investment Fund.

Table I.2.2: Product market regulation, labour market regulation and investment

	(1)	(2)	(3)	(4)
	Business investment and employment protection	Business investment and State Control	Business Investment and Prod. Markets Regulation	Business investment and sectoral entry barriers
Accelerator(-1)	0.045** (0.018)	0.048*** (0.0087)	0.046*** (0.0072)	0.046*** (0.0082)
Interest	-0.012*** (0.003)	-0.011*** (0.002)	-0.009*** (0.002)	-0.012*** (0.002)
Profits	-0.0258 (0.152)	0.116 (0.150)	0.219 (0.133)	0.129 (0.138)
Uncertainty	0.000726 (0.0309)	-0.0206 (0.0269)	-0.0236 (0.035)	-0.02 (0.0286)
Crisis	-0.0676* (0.0348)	0.00425 (0.0499)	0.112** (0.0427)	-0.0564** (0.0257)
EPL	-0.0354* (0.0188)			
Crisis*EPL	-0.0265** (0.012)			
PMR_SC		0.00706 (0.013)		
Crisis*PMR_SC		-0.0526** (0.0246)		
PMR_TOT			0.115** (0.0412)	
Crisis* PMR_TOT			-0.126*** (0.0293)	
Entry				0.0173 (0.0108)
Crisis*Entry				-0.0363* (0.0227)
Constant	1.056*** (0.163)	0.896*** (0.179)	0.608*** (0.150)	0.861*** (0.144)
Country FE	YES	YES	YES	YES
Observations	302	310	310	322
R-Squared	0.486	0.525	0.546	0.526

Dependent variable: business investment ratio. Driskoll-Kraay standard errors in parenthesis. See Box for a detailed description of the model and variables. \*\*\*=significant at 1%; \*\*= significant at 5%; \* = significant at 10%.

Source: European Commission services calculations

In the infrastructure and innovation window, the EIB has approved projects for a total investment value of EUR 156.6 billion.

**The European Investment Advisory Hub** (second pillar), which is a joint initiative between the Commission and the EIB, is providing advisory and technical assistance to project promoters, public authorities and private companies, to help them prepare their projects, to advise them about possible funding sources, and to give them access to a range of technical and financial expertise. As of April 2017, the Hub has already dealt with more than 450 requests since September 2016. The European Investment Project Portal (second pillar), which is collecting information on investment projects in Europe in order to diffuse them to potential international investors, is operational since June 2016.

The Commission has proposed the extension of the Fund until 2020, which should trigger a total of at least half a trillion euro investments by that year. Other objectives of the proposal are to reinforce additionality and enhance the geographical coverage of EFSI. Negotiations between the European Parliament and the Council of the EU are in the final phase.

**But progress on the financing and technical assistance tools can only have a limited impact when weaknesses in the investment environment and bottlenecks continue to hinder investment.** In this perspective, the so-called "third pillar" of the Investment Plan proposes an agenda to remove these bottlenecks, to improve the business environment, increase the quality and efficiency of public administration, strengthen competition and improve the responsiveness of the labour market. It also aims at reinforcing the Single Market through combined actions at EU and at Member State level.

**Advancing the Single Market** contributes to making Europe a more competitive and attractive place for investment and innovation. This is achieved by allowing firms to operate on a bigger scale, thereby enhancing their capacity to innovate, invest, become more productive and create jobs. Strengthening competition, improving price responsiveness and lowering entry barriers can also have a positive impact on investment. A greater transparency and predictability of the

regulatory framework in the Single Market is also important, particularly for long term and large-scale investments such as in infrastructure and cross-border projects. At EU level, the Commission has launched a number of initiatives regarding the Single Market <sup>(40)</sup>, in particular, measures to develop the Capital Markets Union (CMU), to further deepen the Single Market for goods and services, to complete the Digital Single Market and to develop an Energy Union. All these initiatives contain specific measures to remove obstacles to investment in the context of the third pillar of the Investment Plan.

In particular, notable progress has been made with the implementation of the Capital Markets Union Action Plan <sup>(41)</sup> as 20 of the 33 announced actions have been delivered after 18 months. For example, the European Commission has proposed a reduction of bank capital charges for certain infrastructure investments <sup>(42)</sup>.

In the European Commission's "Start-up and Scale-up Initiative" <sup>(43)</sup> further measures aim to help firms take full advantage of the opportunities of the Single Market. These measures aim to create a more coherent framework to allow start-ups to grow and do business across Europe. In particular, some actions focus on access to finance for start-ups, including venture capital, on insolvency and on taxation. It also helps companies overcome the many obstacles they still face to go cross-border.

A Services package to tackle barriers in the services market has been adopted by the European Commission in January 2017. It includes notably a legislative proposal introducing the European Services card, which aims at facilitating the cross-border exercise of a number of activities in the area of services. The proposals will facilitate the mobility of professionals and streamline the administrative procedure that EU business service providers have to follow to expand their activities to other EU countries. <sup>(44)</sup>

Other actions with direct impact on investment have also been undertaken or are ongoing, such as

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<sup>(40)</sup> European Commission (2016c), European Commission (2016d).

<sup>(41)</sup> European Commission (2015a).

<sup>(42)</sup> European Commission (2016e).

<sup>(43)</sup> European Commission (2016f).

<sup>(44)</sup> European Commission (2017e).

the simplification of rules to facilitate the combination of the European Fund for Strategic Investments with other sources of EU funding, including European Structural and Investment Funds, a clearer statistical treatment of public private partnerships (PPPs) and the creation of a "one-stop-shop" for large infrastructure projects with a cross-border dimension, bringing together the responsible Commission services in a single investment policy team in order to have a common approval date.

The Digital Single Market strategy, which was adopted in May 2015, will also contribute to removing barriers, promoting innovation and further improving the environment for investment. The mid-term review<sup>(45)</sup> gives an overview of the state of play of the Digital Single Market strategy, emphasising the role of the co-legislators to finalise key legislation and complete the strategy by 2018. The review also outlines three main areas where the EU needs to act further, namely data economy, cybersecurity and online platforms.

The Energy Union, with a forward-looking climate and energy policy will enable the transition to a low carbon economy. It aims to support the integration of renewable energy, to enhance energy efficiency and to improve the price signal for investment.

**In parallel, the Better Regulation agenda** seeks to contribute to the quality and predictability of the regulatory environment. Its aim is to ensure that policy objectives are achieved in the most effective and least burdensome way. The body of existing EU regulation is kept under review and before proposing new initiatives, the need for EU action and the potential impacts of alternative policy options have to be properly assessed.

**Initiatives at EU level and structural reforms in the Member States are complementary.** Structural reforms can address weaknesses in the business environment and bottlenecks that have their origin in national provisions and that can affect business efficiency and hamper investment. Ensuring well-functioning markets and a favourable business environment, in particular by reducing administrative and regulatory burden and removing structural rigidities, can contribute to

support investment and growth. And importantly, such reforms are – to a large extent – accomplished through measures that imply no, or a limited, budgetary cost while they may provide significant benefits.

This is why, as part of the European Semester, particular emphasis has been placed on the identification of investment barriers<sup>(46)</sup> and the priority reforms to remove them. These are well reflected in the 2016 and 2017 country-specific recommendations for 27 Member States. Based on the country-specific profiles<sup>(47)</sup> on investment challenges at national level (2015 barriers to investment), complemented by further information provided in the country reports published in 2016 and 2017, Graph I.2.6 provides an overview of the main barriers to investment in 27 Member States.

**The highest number of barriers to investment in Member States is related to weaknesses in the business environment** such as high regulatory and administrative burden, the lack of a predictable regulatory framework, the complexity of the tax system (see Graph I.2.6).<sup>(48)</sup> In some countries, these barriers include the low degree of efficiency and transparency of public administration, and the lengthy procedures of the judicial system. Entry barriers for innovative companies or skills shortages can also be an issue in other countries. Moreover, there are a number of bottlenecks linked to sector specific regulations and the cumbersome and lengthy approval procedures in particular for large infrastructure projects in energy, transport, and broadband.

This assessment is in line with evidence provided by firm survey on constraints affecting investment. A recent EIB Investment Survey<sup>(49)</sup> covering 2500 firms across the EU28, identifies uncertainty,

<sup>(45)</sup> European Commission (2017b).

<sup>(46)</sup> European Commission (2015b). Investment barriers are defined there as supply-side factors that hinder private investment (in particular, from non-financial corporations). This means that weak demand is not an "investment barrier" in this sense. However, it cannot be denied that weak demand and the decrease in public investment in the context of the crisis correspond to major causes of low or declining investment in the EU, as also discussed in Chapter 1 and in Sections 2.2-2.3.

<sup>(47)</sup> European Commission (2015b).

<sup>(48)</sup>

[http://www.consilium.europa.eu/en/meetings/eurogroup/2016/07/EG-Note-on-Investment-08-07-16-Ares\\_pdf/](http://www.consilium.europa.eu/en/meetings/eurogroup/2016/07/EG-Note-on-Investment-08-07-16-Ares_pdf/)

<sup>(49)</sup> Tracking investment needs and constraints across Europe. April 2017.

the lack of skilled labour and the business and the regulatory environment among the main perceived barriers to investment; while access to finance remains a concern for Europe's younger, smaller, innovative firms and firms active in those countries more affected by the economic downturn.<sup>(50)</sup>

and, in particular, sector specific regulation, which may hamper infrastructure projects.

The barriers to investment identified in this exercise vary across the three groups of countries distinguished in Section 1.

**For the countries heavily hit by the crisis, the main barriers identified in this exercise are in the areas of business environment and public administration as well as in sector specific regulation.** In addition, some Member States in this group with past large competitiveness losses still witness relatively low labour market responsiveness as reflected by investment challenges related to restrictive employment protection legislation (EPL) and framework for labour contracts as well as challenges related to wages and wage setting. A number of investment challenges are also identified in the areas of education and skills, and research and innovation, while access to finance and taxation can also hamper investment in some countries.

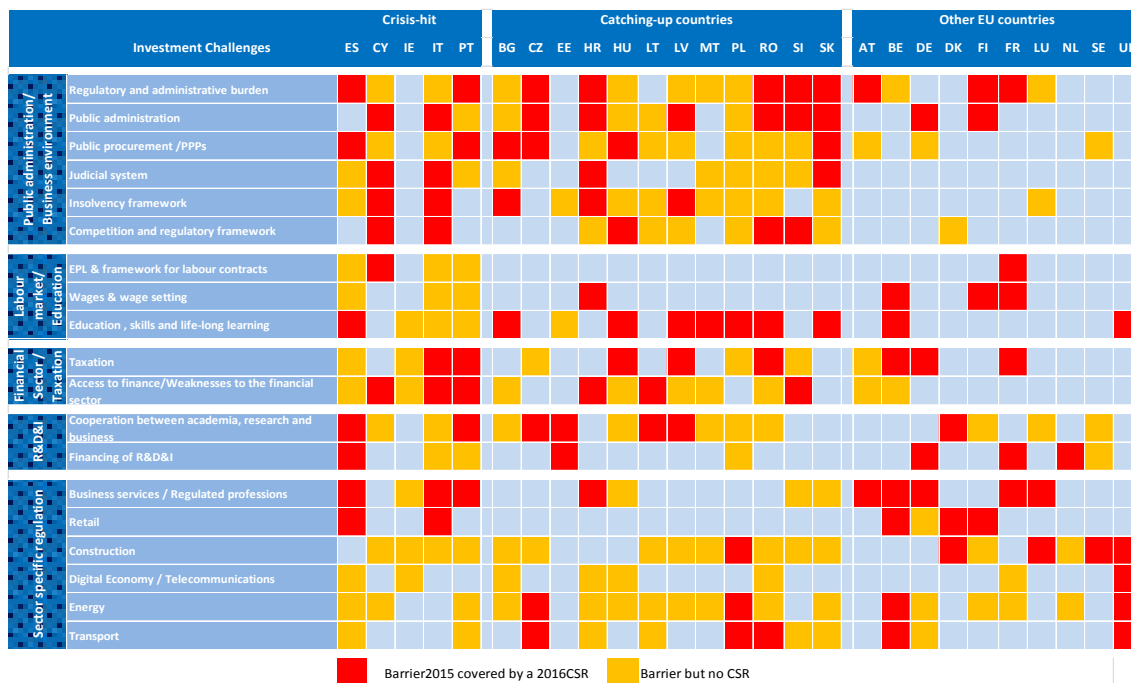
**For the catching-up countries, the main barriers are also in the areas of business environment and public administration,** including the competition and regulatory framework, as well as in sector specific regulation, notably linked to infrastructure projects. In addition, investment challenges are quite frequent in the area of education and skills. The weak cooperation between academia, research and business is also identified as a possible barrier to investment, as well as access to finance and taxation.

**For the other EU countries, Graph I.2.6 clearly shows that the number of investment challenges is lower, notably in the areas of business environment and public administration.** However, barriers remain in the areas of regulatory and administrative burden, research and innovation

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<sup>(50)</sup> A survey from ECB (2015) also shows that structural rigidities and regulatory constraints are limiting investment in the euro area at the present time.

Graph I.2.6: Investment challenges



Source: European Commission

## 2.5. CONCLUSIONS

There is a multiplicity of barriers to investment and they also vary across countries and per category of investments. Empirical analysis presented in this chapter shows that macro-economic factors such as demand, cost of capital and financial constraints, are key determinants of investment. However, structural factors such as high regulation in product and labour markets seem to hinder business investment, and especially so since the crisis. In this respect, weakly-functioning labour and product markets appear to hinder investment also because they do not help European economies to take advantage of the "efficiency-enhancing" effect of the crisis. This identification of main barriers to investment at national level confirms the importance of high quality of business environment.

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# APPENDIX 1

## Investment challenges

Table I.A1.1: Categories of investment challenges and description

PUBLIC ADMINISTRATION/ BUSINESS ENVIRONMENT		
	Regulatory barriers and administrative burden	Administrative burden (especially for SMEs) to start a business, cost and time of administrative procedures crucial for businesses (e.g. enforcing contracts, registering property), late payments Low quality of regulation Lack of predictability of the regulatory framework
	Public administration	Lack of effectiveness of public administration, low quality of the civil service (high staff turnover, low remuneration levels for qualified staff), low degree of digitalisation  Insufficient administrative capacity at regional or local level (including lack of resources and expertise, and for instance weighing on the absorption of ESI funds)  Complexity / fragmentation between multiple layers of government leading to inconsistencies in the decision-making process  Lack of transparency in legislative processes
	Public procurement /PPPs	Excessive length of procedures, legal framework fragmentation and uncertainty (frequent revision of public procurement law/ complexity / lack of transparency/ lack of expertise for PPPs, public procurement and project finance/ inefficiency of the system of supervision and control)  Insufficient degree of competition in tendering procedures: (lack of competition in contract awards where there was a single bid/ high use of negotiated procedures without publication of a notice)
	Judicial system	Inefficiency, low quality and independence of the judicial system Lengthy proceedings in civil and commercial litigation and a high number of unresolved cases, under use of alternative dispute resolution methods  Problems of legal certainty: unpredictability of judicial decisions
	Insolvency Frameworks	Lengthy procedures to resolve insolvency cases Uncertainty of the outcomes Lack (or sub-optimal use) of early restructuring procedures
	Competition and regulatory framework	Weaknesses of the competition authority and regulatory bodies Issues related to state aid (including limited knowledge of EU state aid rules) and sheltered State-owned enterprises (SOEs)
LABOUR MARKET/ EDUCATION		
	Employment protection legislation and framework for labour contracts	Complexity of labour law leading to uncertainty, e.g. length and cost of dismissal procedures Restrictiveness of labour regulation Effects of size contingent regulations in labour
	Wages and wage setting	Misalignments between wages, productivity and skills (e.g. wage formation rigidities)
	Education, skills, lifelong learning	Skills and labour shortages and quality of education system, vocational education and training, and apprenticeship system
FINANCIAL SECTOR / TAXATION		
	Taxation	High level of corporate tax /tax wedge on labour Design of taxes non conducive to investment (e.g. complexity) Instability of taxation
	Access to finance	High indebtedness of the corporate sector Weakness of the banking sector (e.g. high level of non-performing loans, weak legal rights for borrowers and lenders) Underdevelopment of capital markets
RESEARCH, DEVELOPMENT AND INNOVATION		
	Cooperation between academia, research and business	Lack of expertise in legal (intellectual property) and financial matters to create spin-offs in universities
	Financing of R&D&I	Lack of alternative forms of financing (business angels, venture capital, crowd-funding)
SECTOR SPECIFIC REGULATION		
	Business services / Regulated professions	Challenges to competition in services (e.g. legal form, shareholding and tariff requirements)
	Retail	Potential restrictions to the establishment of large retail outlets coming from land use and land classifications under applicable urban planning rules
	Construction	Restrictive planning regulation, prices of land and buildings Length and costs of permits
	Digital Economy / Telecommunications	Administrative, technical and regulatory obstacles (e.g. investment in broadband).
	Energy	Lack of cost effective support to energy aimed at ensuring fiscally sustainable, predictable and stable regulation for investors Administrative, technical and regulatory obstacles (grids, energy efficiency, generation)
	Transport	Administrative, technical and regulatory obstacles Limited public funds and lack of PPP projects

Source: Check list of Investment Challenges, extracted from European Commission (2015), Commission Staff Working Document, "Member States Investment Challenges", SWD(2015)400 final/2, 18.12.2015.

## APPENDIX 2

### Detailed sources and definitions of the data

Table I.A2.1: Detailed sources and definitions of the data

<b>Variable</b>	<b>Source</b>
Sectoral investment	Eurostat, Gross capital formation by industry (up to NACE A*64) (nama_10_a64_p5)
Sectoral Gross Value Added	Eurostat, National accounts aggregates by industry (up to NACE A*64) (nama_10_a64)
Product Market Regulation	OECD.org, economy-wide indicator
Employment Protection Legislation	OECD.org, employment protection for indicator for regular contract, version 3.
Ease of Getting Credit	Getting credit distance-to-frontier indicator, World Bank Doing Business.
R&D intensity	Business Enterprises' R&D expenditure / GVA. Eurostat, National Accounts, Science, technology, digital society.
Sectoral Regulation Indicator	OECD.org, Network Sector indicators for Product Market Regulation, overall.
Interest Rate	AMECO, long-term real interest rate (ILRV)
Uncertainty	Standard deviation of forecast of one-year-ahead GDP growth for G7 countries, Consensus Forecasts
Profits	AMECO, Net operating profits of non-financial corporations
Capital Stock	AMECO, Net capital stock at constant prices, total economy (OKND)

Source:



# Part II

Business environment and investment

# 1. BUSINESS REGULATION AND QUALITY OF PUBLIC ADMINISTRATION: MEMBER STATES PERFORMANCES

## 1.1. INTRODUCTION

Excessive and uncertain business regulation and a low-quality of public administration can have a negative impact on economic performance by discouraging private sector activities and hampering investment. <sup>(51)</sup>

The ease of doing business is one of the main areas of structural reforms through which countries can improve their economic outcomes. This is a priority of the Commission's work notably through the better regulation agenda, the third pillar of the Investment Plan, and it is a prominent area in the multilateral surveillance in the context of the European Semester.

This chapter aims at assessing the business environment in Member States using international data, which allow for a transparent and objective comparison of relevant indicators across countries (Section 1.2). The assessment is complemented by an analysis of firms' perceptions of the business environment as collected in a recent Eurobarometer Survey (Section 1.3). Section 1.4 explores the structural drivers of firms' perceptions using the results of the Eurobarometer survey.

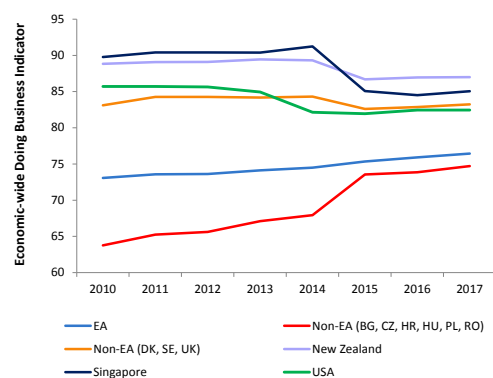
## 1.2. INTERNATIONAL COMPARISON OF BUSINESS REGULATION AND QUALITY OF PUBLIC ADMINISTRATION

There are several indicators and studies that compare and rank economies with regard to their business environment. Two widely known international data sources are: i) the Doing Business (DB) database from the World Bank; and ii) the Product Market Regulation (PMR) project from the OECD. Both databases present aggregated indicators as well as sub-indicators covering a wide range of aspects related to the ease

of doing business and the restrictiveness of regulation (further details in Box II.1.1).

**Over the past years, many EU Member States have improved their business environment** (Graphs II.1.1 and II.1.2).<sup>(52)</sup> The indicators exhibit a positive trend, with many countries improving their score over the considered period. Denmark, Sweden and the United Kingdom, the so-called "non-EA (EU15)" group, on average perform better than the other EU Member States. Member States that joined the EU since 2004 and are not yet part of the Euro Area (EA) – the so called "non-EA (after 2004)" group – are rapidly catching up and their gap with the average EA score is now almost closed.<sup>(53)</sup> EA Member States tend, on average, to score worse than non-EA (EU15) countries and they display a smaller improvement over the period compared to non-EA (after 2004) countries.

Graph II.1.1: Performance of the EU vis-à-vis worldwide best performers, Doing Business Indicators



Note: A higher value of the distance to frontier indicator means a better performance. Country group scores are simple, non-weighted averages.

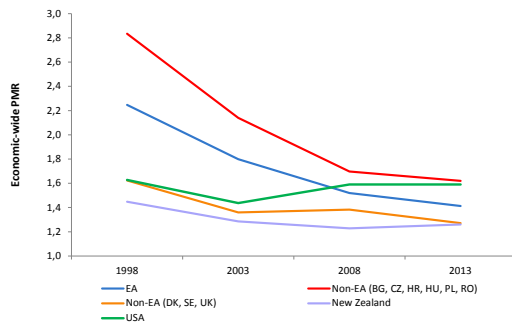
Source: World Bank, Doing Business database (2017)

<sup>(51)</sup> Business regulation and quality of public administration should be seen in their broad definition. Business regulation embeds specific regulations that are central to the functioning of the private sector. Similarly, the quality of public administration includes not only the compliance costs for firms when dealing with public authorities (i.e. administrative burdens), but also for example the role of predictability and stability of legislation.

<sup>(52)</sup> In the graphs, EU Member States are divided into three different groups: the euro area (EA) countries; the non-EA countries of EU15 (Denmark, Sweden and UK); and the non-EA countries that joined the EU since 2004 (Bulgaria, Czech Republic, Croatia, Hungary, Poland and Romania). Group scores are simple, non-weighted averages.

<sup>(53)</sup> Note that the new Member States who already joined the euro area, Slovenia (2007), Cyprus and Malta (2008), Slovakia (2009), Estonia (2011), Latvia (2014), and Lithuania (2015) are included in the EA group.

Graph II.1.2: Performance of the EU vis-à-vis worldwide best performers, Product Market Regulation

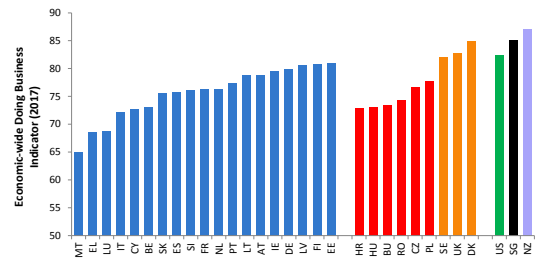


Note: The PMR indicator is in the range between 0 and 6, where lower values mean a better performance. Group scores are simple, non-weighted averages.  
Source: OECD, Product Market Regulation database (2013)

Nevertheless, the EU business environment remains, on average, less supportive than the best performing countries in the world: only Denmark, Sweden and the United Kingdom are close to the best performers such as Singapore, New Zealand (and United States, according to the DB indicator). Despite the improvement shown over the period analysed, EA and non-EA (after 2004) countries still lag behind the best performers.

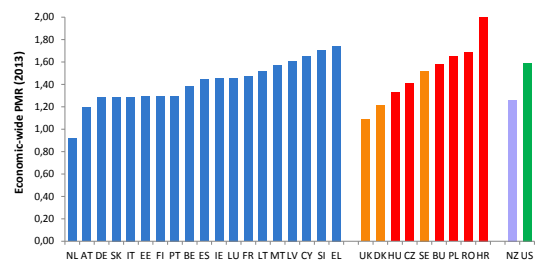
There are also significant differences between Member States. The heterogeneity is high between the groups of EU Member States (EA and non-EA) and with respect to the best performers (Graphs II.1.3 and II.1.4). These differences suggest that there is still room for improvement within the EU. The large heterogeneity between EU Member States in terms of business regulation may have negative effects on the individual Member State economies, but it also hampers the well-functioning of the Single Market, undermining the overall growth prospects.

Graph II.1.3: Cross-country comparison for EA, non-EA and non-EU, Doing Business Indicators



Note: A higher value of the distance to frontier indicator means a better performance. Latest available year is 2017.  
Source: World Bank, Doing Business database (2017)

Graph II.1.4: Cross-country comparison for EA, non-EA and non-EU, Product Market Regulation



Note: The OECD economy-wide PMR indicator takes values between 0 and 6, with 6 being the most restrictive regulation (y-axis), thus a lower PMR score means better performance. The latest available year is 2013.  
Source: OECD, Product Market Regulation database (2013)

*Box II.1.1:*      **Measuring business regulation and the quality of public administration**

The OECD economy-wide PMR indicator is a composite indicator measuring the restrictiveness of regulation in various domains and other public interventions. The main sources of information used to construct the indicator are the responses of national governments to the OECD Regulatory Indicator Questionnaires 2013, 2008, 2003, and 1998. The responses received go through extensive review by OECD and government experts. The indicators take values between 0 and 6, with 6 being most restrictive.

The OECD PMR indicators have several advantages: they are factual, focused on market functioning, easy to use for policy makers, publicly available and transparent (Pelkmans, 2010). However, the PMR project does not cover the whole spectrum of regulations relevant for firms (for example regulations in the area of safety, health, environment, consumer protection and financial markets are not included), and EU regulation is not included. Moreover, the OECD indicator is published only every five years and the latest data available now is from 2013. This is an important limitation as available information can soon become outdated in light of recent reforms.

The Doing Business indicators (developed by the World Bank – WB) measure the ease of doing business. To achieve comparability across countries and over time, data is collected in a standardised way, using a questionnaire which presents the same business case to respondents in terms of legal form of the business, its size, its location <sup>(1)</sup> and the nature of its operations. The questionnaires are distributed to local experts, foreseeing several interactions with the Doing Business team, to ensure a high quality of responses and eventually clarify potential misinterpretations among the actors involved. It is important to underline that the questionnaires are not sent to firms but to professionals in the specific areas of analysis.

The Doing Business data are based on a detailed reading of domestic laws, regulations, and administrative requirements. The methodology used is transparent and based on factual information. It does not require collecting data from a representative sample, since it is not a statistical survey. Nevertheless, the use of a standardised scenario implies a reduction in the scope of the analysis. In particular, the data may not be representative of other regions within a country, or other forms of businesses. Also, the project covers many but not all relevant transactions a business can encounter. For selected Doing Business indicators, the measure of the time (and partly the cost) relies on the judgement by expert respondents, with the risk of introducing some subjectivity. Finally, the methodology assumes that enterprises have the full information of all procedural steps required, while this is not always true in reality, leading to a delay in the process.

There are two aggregate Doing Business indicators: the distance to frontier (DTF) score and the ease of doing business ranking. The former looks at the regulatory best practice and reports the absolute distance of a given economy to the frontier (the economy showing the best performance). The latter measure, calculated on the basis of the distance to frontier, compares and ranks the national economies. <sup>(2)</sup> The 10 topics covered by the Doing Business data are: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. Each of these indicators covers a range of sub-indicators. As such, the Doing Business database is an extensive source of information.

In order to investigate the underlying structure in the data, we have conducted a Principal Components Analysis (PCA). With this methodology, the original variables can be replaced by a reduced set of variables which can give an adequate synthesis while limiting, at the most, the loss of information.

The results of the PCA on the Doing Business indicators show that there are two key dimensions where Member States have conveyed their efforts in the past years. The first dimension relates to the ease of doing business across borders and, in particular, with sub-indicators such as "Trading across Borders" variables

<sup>(1)</sup> Data pertain to a typical SME operating in the largest business city of each country analysed. Starting from 2015, for countries whose population in 2013 was over 100 million, data are collected also for the second largest city.

<sup>(2)</sup> For further cross-country comparisons on the full set of Doing Business indicators please refer to the Annex 2 of European Commission, DG ECFIN (2017).

*(Continued on the next page)*



Box (continued)

and, more specifically, with the "Time to Import" and the "Time to Export" indicators. The second dimension highlights the relevance of the starting a business variables, with a particular emphasis on the "Cost to Start a Business" and on the "Number of Procedures to Start a Business" indicators.

More information on the criteria and results of the PCA are provided in Appendix AII.1.

**Specific indicators can provide more granular information on the business environment for a given economy.** The notion of business environment covers a wide number of areas and more detailed information can be derived by the specific indicators and sub-indicators. The evolution over the period 2015-2017 of the 10 Doing Business indicators can be indicative of the business environment in the EU Member States (see Table II.1.1).

**Despite the positive evolution over time in many EU Member States, there are still areas that can be improved.** Most room for improvement appears to remain in categories like obtaining credit, protecting minority investors and enforcing contracts. These dimensions have an impact on possibilities to start and expand a business, provide security for investors and reduce the cost of market transactions.

**In general, countries doing well in one**

**dimension also tend to do well in other aspects of the institutional and business environment.** EU Member States with a less supportive business environment perform, in general, poorly in many related areas (according to the cross-subcomponents links shown in the heat map). In general, countries showing improved achievements in their business environment have undertaken reforms in a number of areas. From this evidence it can be derived that, in order to be effective, business environment reforms need to be comprehensive and ambitious. Appendix AII.2 provides a series of examples of reforms in the business environment from Member States.

**Reforms in the business environment also benefit from actions in other related areas, such as access to finance and labour market regulation.** These refer to both national and EU-level actions. Examples of EU action include the work on the completion of the Single Market (including the Digital Single Market), and the

Table II.1.1: Doing Business heat map EU28, 2015-2017

	Starting a business	Dealing with construction permits	Getting electricity	Registering property (2016 methodology)	Getting credit	Protecting minority investors	Paying taxes (old methodology)	Trading across borders	Enforcing contracts	Resolving insolvency
<b>EA Countries</b>										
Austria	↗	↗	↗	↗	→	→	↗	→	→	↗
Belgium	↗	↘	↘	↘	→	→	↘	→	→	↘
Cyprus	↗	↗	↗	↗	↗	→	↗	→	↗	↗
Estonia	↗	↘	↘	↘	→	→	↗	→	→	↗
Finland	↗	↘	↗	↗	→	→	↗	→	→	↗
France	↗	↗	↗	↘	→	→	↘	→	→	↗
Germany	↗	↗	↗	↘	→	→	↘	→	→	↗
Greece	↘	↘	↘	↘	→	→	↘	→	→	↘
Ireland	↗	↗	↗	↗	→	→	↘	→	→	↘
Italy	↗	↗	↗	↗	→	→	↘	→	→	↘
Latvia	↗	↘	↘	↘	→	→	↗	→	→	↗
Lithuania	↗	↗	↗	↗	→	→	↗	→	→	↗
Luxembourg	↗	↗	↗	↘	→	→	↘	→	→	↘
Malta	↗	↗	↗	↘	→	→	↘	→	→	↘
Netherlands	↗	↗	↗	↗	→	→	↘	→	→	↗
Portugal	↗	↗	↗	↗	→	→	↘	→	→	↗
Slovak Republic	↗	↗	↗	↗	→	→	↘	→	→	↗
Slovenia	↗	↗	↗	↗	→	→	↘	→	→	↗
Spain	↗	↗	↗	↗	→	→	↘	→	→	↗
<b>Non EA Countries</b>										
Bulgaria	↗	↗	↗	↗	→	→	↘	↘	→	↗
Croatia	↗	↗	↗	↗	→	→	↘	→	→	↗
Czech Republic	↗	↗	↗	↗	→	→	↘	→	→	↗
Denmark	↗	↗	↗	↗	→	→	↘	→	→	↗
Hungary	↗	↗	↗	↘	→	→	↘	→	→	↗
Poland	↗	↗	↗	↘	→	→	↘	→	→	↗
Romania	↘	↘	↘	↘	→	→	↘	→	→	↘
Sweden	↗	↗	↗	↗	→	→	↘	→	→	↗
United Kingdom	↗	↗	↗	↘	→	→	↘	→	→	↗

Note: The frontier is attributed a score of 100 to which other countries' performance is compared. A higher value hence indicates a better performance. The colours refer to the values on 1 June 2016: orange refers to a value below 71, yellow to a value between 71 and 79 and green to a value above 79. The arrows show the evolution between 1 June 2014 and 1 June 2016.

Source: DG ECFIN calculations based on the Doing Business indicators (WB)

latest EU Start-up and Scale-up initiative. <sup>(54)</sup> The European Semester and Country-Specific Recommendations (CSRs) can help Member States in their reform activities to further strengthen the business environment. The European Survey on the Access to Finance of Enterprises (SAFE survey) <sup>(55)</sup> confirms the importance and the need of comprehensive reform packages, covering both the business environment and other dimensions of the economy (such as the financial and labour markets). According to the SAFE survey, SMEs mention regulation among the most pressing problems, together with issues related to finding customers, access to finance and availability of trained and experienced staff. <sup>(56)</sup> In addition, the ECB Investment Survey finds that reforms on national labour and product markets, as well as greater fiscal harmonisation, are among the most needed actions to encourage further investment in the euro area. <sup>(57)</sup>

### 1.3. FIRMS' PERCEPTIONS ON BUSINESS REGULATION AND QUALITY OF PUBLIC ADMINISTRATION

The analysis so far has focussed on lessons emerging from well-known data sources such as the World Bank and the OECD. Further insights into the business regulation and the quality of public administration can be derived by directly asking firms about their experiences. In 2015, the European Commission published the results from a large-scale Flash Eurobarometer survey that asked firms a wide variety of questions (see Box II.1.2 for further details).

**Cross-country differences are substantial** for the four themes identified among the questions of the survey (Graph II.1.5):

- **EU firms' perception on the quality of public administration.** Overall, firms in Estonia, Malta and UK have a positive view of the quality of public administration. On the other side of the spectrum are Greece, Slovakia and Italy where respondents most frequently report obstacles. For example, regarding the reliability of information from public authorities, about 20% of respondents from Estonia and Luxembourg were dissatisfied as against about 60% of respondents from Greece.
- **EU firms' perception on the easiness of starting a business.** Estonia, Sweden and Finland appear to be the best performers in this area, whereas obstacles are perceived mostly in Italy, Spain and Greece.
- **EU firms' perception on the main obstacles to the activity of the company.** The best performers in the EU are Sweden, Denmark and UK. Countries where firms report the biggest obstacles are Greece, Spain and Italy. Heterogeneity is also found in the lack of predictability and stability of legislation: Luxembourg, Denmark and Malta appear to be the best performers whereas the biggest obstacles are perceived in Croatia, Poland and Greece. <sup>(58)</sup>
- **EU firms' perception on the quality of tax administration.** Sweden, Finland and Estonia are among the best performing countries, whereas Croatia, Hungary, and Belgium close the rankings.

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<sup>(54)</sup> European Commission (2016d).

<sup>(55)</sup> The SAFE survey is the result of the collaboration between the European Commission and the European Central Bank. It covers micro, small, medium-sized and large firms and it provides evidence on the financing conditions faced by SMEs and large firms during the past six months.

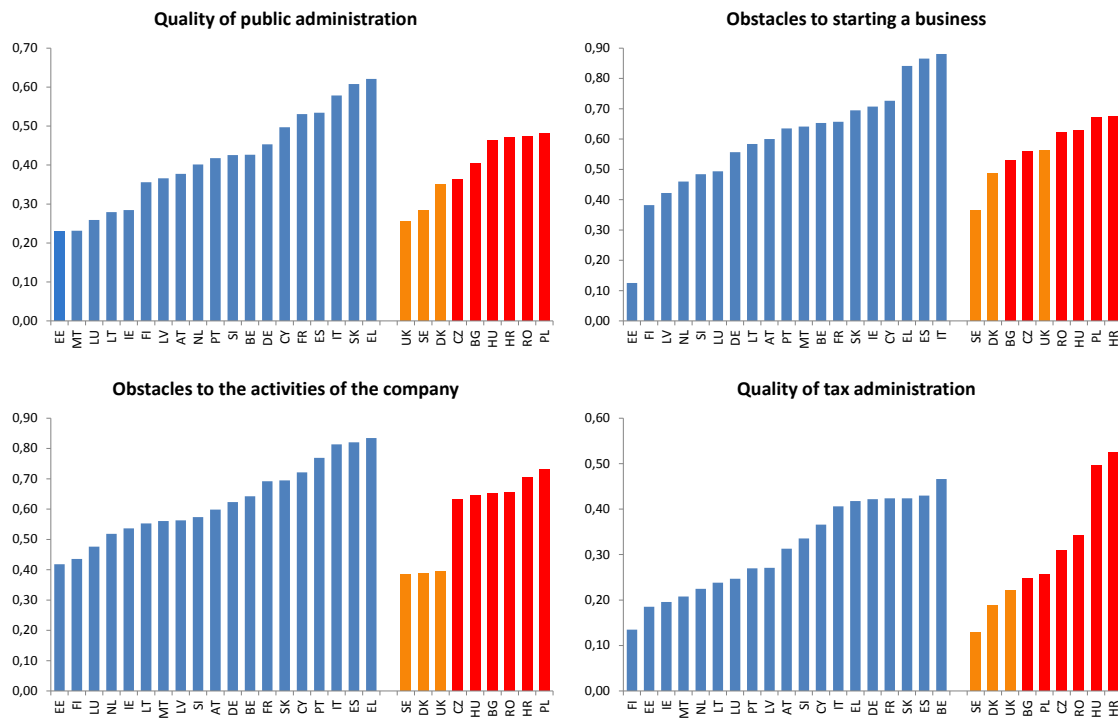
<sup>(56)</sup> Regulation shares a 4<sup>th</sup> place among the most pressing problems, together with production and labour costs.

<sup>(57)</sup> ECB (2015). The Investment Survey includes questions on investment plans and strategy; current and future investment plans; and insights into existing constraints and policy measures which could help support/encourage further euro area investment in the longer term. The 74 responses received represented a sample of large euro area companies, accounting for around 2.5% of total employment and 3% of total private sector non-housing investment expenditure in 2014.

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<sup>(58)</sup> For a cross-country comparison from the Eurobarometer survey on the predictability of legislation, please see Annex 5 of European Commission, DG ECFIN (2017). The empirical literature has so far given little attention to the effects of this specific aspect of business environment.

Graph II.1.5: Firms' perceptions on business environment



Note: A lower value indicates a better performance. The indicator is the fraction of respondents reporting an obstacle (for example, a value of 0.2 means that 20% of respondents are reporting an obstacle).

Source: European Commission calculations based on the Flash Eurobarometer 417

**On quality of public administration**, firms were asked their views on the efficiency of public administration in dealing with requests, the reliability of information from public authorities, and the availability of online public administration services, among other things.

**On obstacles to starting a business**, firms were asked their views on number of procedures, time, cost and capital required to start a business, and also on the need for permits and licenses.

**On obstacles to the activities of the company**, firms were asked their views on customs controls and import-export formalities, inspections by competent authorities, existence of an informal economy, health and safety at work requirements, and predictability and stability of legislation.

**Finally, on quality of tax administration**, firms were asked their views on dealing with the tax authorities, and how easy it is to file and pay various forms of taxes.

**Heterogeneity among responses suggests that there is still room for improvement across all EU Member States.** As seen for the indicators based on international data sources, countries doing well on one indicator also tend to do well on other dimensions. There are however exceptions, and also the well-performing countries have scope for further improvement on specific items.

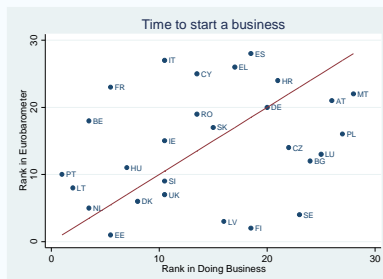
### Box II.1.2: Eurobarometer Survey

The European Commission published in 2015 the results from a large-scale Flash Eurobarometer survey on the quality of business regulation and public administration among 10,603 firms in the 28 EU Member States, including companies from different size classes (SMEs as well as large firms) and age categories, and operating in various sectors. <sup>(1)</sup> The field work was carried out in spring 2015.

Firms' views were asked on many different aspects of the business environment. Regarding the quality of public administration, questions covered the efficiency of public administration in dealing with requests, the reliability of information from public authorities, and the availability of online public administration services, among other things. <sup>(2)</sup> On the easiness of starting a business, firms were asked their views on number of procedures, time, cost and capital required to start a business, and also on the need for permits and licenses. In relation to the main obstacles to the activity of the company, the questions cover, for example, customs controls and import-export formalities, inspections by competent authorities, existence of an informal economy, health and safety at work requirements, and predictability and stability of legislation. Finally, on the quality of tax administration, firms were asked to report their views on dealing with the tax authorities, and how easy it is to file and pay various forms of taxes. <sup>(3)</sup>

#### Measurement issues

Regarding time to start a business, the results from the survey are quite different from the Doing Business project. According to the World Bank data, it takes 6.5 days to start a business in Italy, and in Spain and Greece the estimate is 13 days. These numbers are not particularly bad. In Austria it takes 21 days, in Bulgaria 23 days, and in Finland 14 days. Yet firms in Italy, Spain and Greece appear to require much more time to launch a business according to the Eurobarometer survey data. The graph below illustrates the limited correlation between the World Bank and Eurobarometer data. The 45 degree line plots the situation of perfect correlation between the two sources.



There are several potential explanations for the diverging results. A first reason could be cross-country variations in people's propensity to respond positively or negatively. A second reason can be related with the sample: The World Bank Doing Business indicators pertain to a particular type of firm (an SME operating in the largest city) in order to make cross-country comparisons easier, whereas the Eurobarometer survey includes a wide variety of firms (in terms of age, size, sector, location etc.). Moreover, the respondents in the Doing Business project are practitioners working in the field while the respondents in the survey are firms.

Another reason could be that reform implementation lags behind the official registration of the reform in indicators as reported in Doing Business. Finally, the scope of the survey does not include access to finance while this is covered by the World Bank Doing Business. These different sampling strategies could have an influence on the indicators. For example, if it is now much easier than in the past to start a business, it is likely that old firms would respond more critically to the survey than young firms who recently went through the process. This potential explanation is tested by restricting the sample to young firms only, but this does not change the finding that respondents in Spain and Italy frequently report obstacles.

These measurement issues underline, all the more, the need to interpret the indicators with caution and the need for in-depth country-specific analysis (such as for example in the Small Business Act factsheets) before drawing policy conclusions.

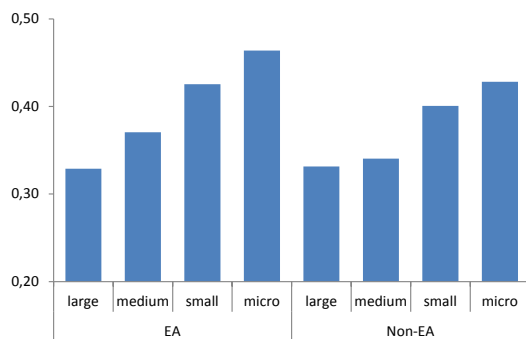
<sup>(1)</sup> European Commission, 2015, survey conducted by TNS Political & Social.  
<sup>(2)</sup> This issue is covered in more detail in the Eurobarometer survey than in the World Bank Doing Business and the PMR databases.  
<sup>(3)</sup> For more information on the survey, see the Annex 5 of European Commission, DG ECFIN (2017).

#### 1.4. EXPLORING THE STRUCTURAL DRIVERS OF FIRMS' PERCEPTIONS

A logical next step is to investigate to what extent firm characteristics (age, sector and size) matter for their views on the quality of business regulation and public administration. The results of the Eurobarometer help to identify the perception by firms' characteristics.

**SMEs have a higher perception of facing barriers, in particular in the euro area** (Graphs II.1.6 - II.1.9).<sup>(59)</sup> For example, 46% of the micro firms in the EA perceive obstacles related to quality of public administration, against 33% of the large firms. This is not surprising as larger companies will often have more capacity to deal with "red tape". Moreover, the cost (in terms of time and finances) of regulatory compliance is – to a certain extent – fixed and thus represents a relatively heavier burden on smaller companies.

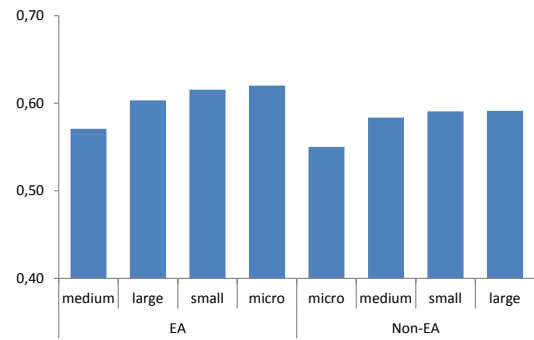
Graph II.1.6: Firms' perceptions on the quality of public administration, by firm size



Note: A lower value indicates a better performance.  
Source: European Commission calculations based on Flash Eurobarometer 417

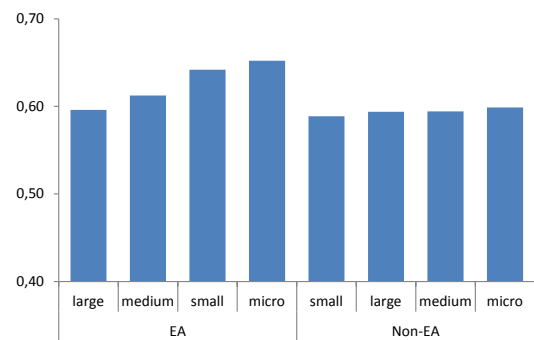
<sup>(59)</sup> Micro-enterprises have up to 10 employees; small enterprises have up to 50 employees; medium-sized enterprises have up to 250 employees; and large firms have more than 250 employees. The indicator is the fraction of respondents reporting an obstacle (for example, a value of 0.2 means that 20% of respondents are reporting an obstacle).

Graph II.1.7: Firms' perceptions on the obstacles related to starting a business, by firm size



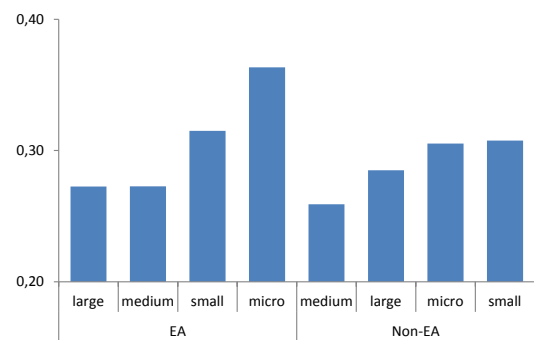
Note: A lower value indicates a better performance.  
Source: European Commission calculations based on Flash Eurobarometer 417

Graph II.1.8: Firms' perceptions on the obstacles related to the activities of the company, by firm size



Note: A lower value indicates a better performance.  
Source: European Commission calculations based on Flash Eurobarometer 417

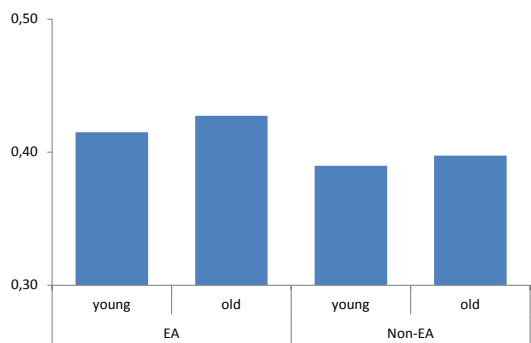
Graph II.1.9: Firms' perceptions on the obstacles related to quality of tax administration, by firm size



Note: A lower value indicates a better performance.  
Source: European Commission calculations based on Flash Eurobarometer 417

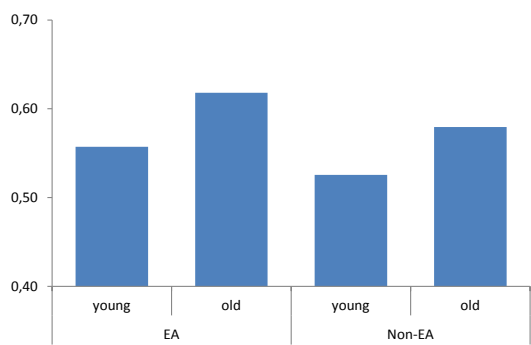
**Young firms are somewhat more positive on the business environment than older firms, except for tax administration** (Graphs II.1.10 - II.1.13). For example, 56% of the young firms in the EA perceive obstacles to starting a business, against 62% of the old firms.<sup>(60)</sup> This might reflect the fruits from recent reforms in several Member States.

Graph II.1.10: Firms' perceptions on the quality of public administration, by firm age



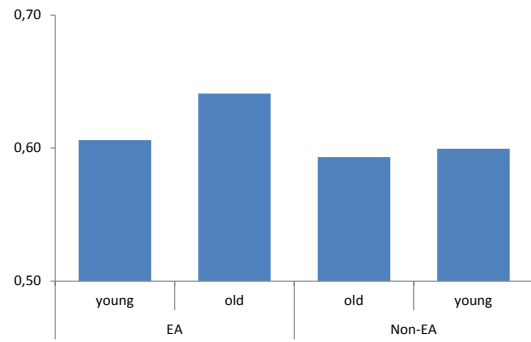
Note: A lower value indicates a better performance.  
Source: European Commission calculations based on Flash Eurobarometer 417

Graph II.1.11: Firms' perceptions on the obstacles related to starting a business, by firm age



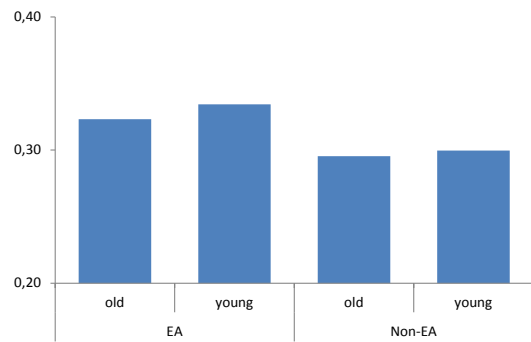
Note: A lower value indicates a better performance.  
Source: European Commission calculations based on Flash Eurobarometer 417

Graph II.1.12: Firms' perceptions on the obstacles related to the activities of the company, by firm age



Note: A lower value indicates a better performance.  
Source: European Commission calculations based on Flash Eurobarometer 417

Graph II.1.13: Firms' perceptions on the obstacles related to quality of tax administration, by firm age



Note: A lower value indicates a better performance.  
Source: European Commission calculations based on Flash Eurobarometer 417

**The importance of firms' characteristics on the perception of business environment is confirmed by further empirical analysis** (see Table II.1.2).<sup>(61)</sup> For example, smaller firms tend to have a higher probability of reporting a negative opinion of the business environment than larger firms. This is notably the case for the quality of public administration and the quality of tax administration. For example, for both EA and non-EA countries, micro firms have a 6.8%-point larger probability of reporting an obstacle with respect to the quality of public administration

<sup>(61)</sup> Regressions are run with the dummy transformation of the relevant policy indicators as dependent variables, and firm size, firm age, sector- and country-dummies as explanatory variables. The policy indicators refer to the four themes introduced in section 1.3: quality of public administration, starting a business, obstacles to the activity of the company, and quality of the tax administration.

<sup>(60)</sup> Old firms are firms established before 1 January 2009; young firms are firms established 1 January 2009 or after. The indicator is the fraction of respondents reporting an obstacle (so for example a value of 0.2 means with 20%).

Table II.1.2: Drivers of perceptions

	(1) Obstacles related to quality of public administration	(2) Obstacles to starting a business	(3) Obstacles to the activities of the company	(4) Obstacles related to quality of tax administration
micro	<b>0.0681***</b> (0.0181)	-0,00401 (0.0164)	-0,0104 (0.0132)	<b>0.0456*</b> (0.0251)
small	<b>0.0580***</b> (0.0175)	-0,00120 (0.0165)	-0,00713 (0.0129)	0,0183 (0.0251)
medium	-0,00262 (0.0196)	-0,0117 (0.0181)	-0,00917 (0.0148)	-0,0136 (0.0267)
young	-0,0106 (0.0134)	<b>-0.0187*</b> (0.0106)	0,00426 (0.00735)	0,0188 (0.0175)
retail (G)	0,00357 (0.0122)	0,00348 (0.0100)	<b>-0.0150*</b> (0.00888)	0,00398 (0.0156)
services (H,I,J,K)	-0,00495 (0.0131)	-0,00717 (0.0109)	-0,00905 (0.00971)	-0,000328 (0.0170)
industry (B,D,E,F)	0,0108 (0.0136)	-0,0159 (0.0117)	-0,00613 (0.0105)	0,0129 (0.0176)
Observations	8.493	8.385	3.138	7.521

Note: Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: European Commission calculations based on the Flash Eurobarometer 417

(relative to large firms). Larger firms usually have a higher capacity to deal with "red tape". Moreover, many costs related to the business environment are fixed costs which therefore matter more for smaller companies.<sup>(62)</sup> The econometric results reported in the table also confirm that young firms tend to be more positive with respect to obstacles to starting a business.

## 1.5. CONCLUSIONS

Despite continuous improvement in Member States to improve the quality of business regulation and public administration over the past years, there remains substantial scope for further progress.

According to the Doing Business indicators, in euro area economies there is room for improvement in categories like obtaining credit, protecting minority investors and enforcing contracts. These dimensions are relevant as they have an impact on possibilities to start and expand a business, provide security for investors and reduce the cost of market transactions. Improving

these policy areas would contribute to a well-functioning financial system and a predictable and accessible judicial system.

The recent EU firm survey on the perception of business environment confirms that the EU could make progress, in particular when it comes to SMEs. Reforms by the government giving special emphasis to specific groups of firms (e.g. young firms, fast growing firms, SMEs,) can be more effective, as long as negative side-effects (such as growth traps) are avoided. Section 1.4 has shown that the reporting of obstacles at least partly correlates with firm characteristics (age, size).

The strong cross-country variation in reported obstacles indicates that the exchange of good practices could support the reform process. Member States can in particular learn from the good practices (as an example, see Appendix AII.2 on recent experiences in Estonia, Finland and in the Czech Republic), while taking into account the importance of country-specific conditions.

<sup>(62)</sup> European Commission (2014) shows how the efficiency of public administration has an impact on the growth of firms, both in terms of employment and on the share of high-growth firms.



## 2. IMPACT OF BUSINESS REGULATION ON INVESTMENT

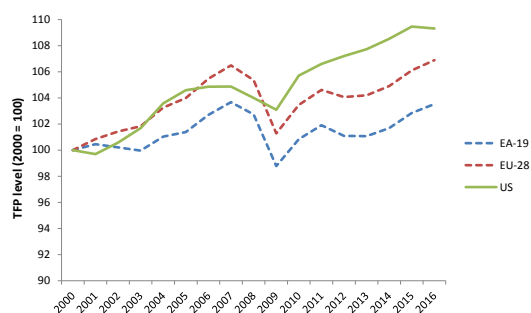
### 2.1. INTRODUCTION

The previous chapter has shown how, despite the positive evolution over time of many EU Member States, there is still space for improvement in terms of business environment (see chapter II.1). Chapter II.2 discusses the economic argument for the ease of doing business, reviewing the available empirical evidence on the economic impacts of business regulation, and the various channels through which they materialise (Section 2.2). This relationship is further explored on the basis of firms' views of the business environment, using the results of the Eurobarometer survey (Section 2.3). The chapter ends with a short policy discussion (section 2.4).

### 2.2. THE ECONOMIC ARGUMENT FOR EASE OF DOING BUSINESS

**Improving the business regulation and the quality of public administration is an important part of policy strategies aimed at boosting growth and employment.** The crisis lowered capital growth, through a steep fall in investment, as well as labour supply, through higher structural unemployment. But the recession also casted a long shadow in the euro area in terms of weak productivity performance, with unfortunate consequences in terms of living standards, competitiveness, and sustainability of public and private debt. In the period 2000 - 2016, total factor productivity (TFP) in the US increased by 9.3% while it has increased by 6.9% in the EU as a whole and only by 3.5% in the euro area (Graph II.2.1). Policy measures to improve the business regulation and quality of public administration are part of the structural reform strategy necessary to revitalise the convergence process and close the gap in TFP performance vis-à-vis the US.

Graph II.2.1: Low productivity growth in the Euro area



Source: European Commission

**The administrative and regulatory burden is one of the main barriers to investment.** Available quantitative studies, including by the Commission, show that a supportive business environment is essential to boost investment. A review of case studies by the European Investment Bank finds that regulation can affect investment both in terms of higher costs and higher risks. <sup>(63)</sup>

**The business environment can impact investment through different mechanisms.** For example, by making it easier and faster to start a new business, by providing framework conditions conducive to further expansion of firms (also across borders), by minimizing risks associated with legislative uncertainty, and by ensuring efficient interactions with public administration and tax authorities. Many empirical studies have looked into the impact of business regulation on economic activity, particularly productivity and growth. However, somewhat surprisingly, only few of them have looked into the direct impact of business regulation on investment. Clearly, direct evidence that business regulation matters for growth and productivity can also be interpreted as indirect evidence that it matters for capital formation.

#### 2.2.1. DIRECT IMPACT OF REGULATION ON INVESTMENT

**Unjustified business regulation has a negative direct impact on investment.** Removing unnecessary regulation and lowering barriers to entry are potential drivers for investment and

<sup>(63)</sup> EIB (2016).



capital formation in the long-run. <sup>(64)</sup> In particular, the effects of regulation on investments is more pronounced in the case of investments in intangible assets, which are affected by human capital, public investments in R&D, science-business linkages, regulatory frameworks (product and labour) and financial conditions. In the case of intangible investment, a positive and significant relation is found for the "ease of starting a business" indicator. The "ease of trading across borders" indicator exhibits a positive and significant relationship with tangible investment. <sup>(65)</sup> Administrative burden or other regulatory costs (e.g. adapting business processes to meet requirements, payments for licensing fees, etc.) can raise investment costs. Similarly, the cost of investing is higher when regulation is fragmented across geographical or product markets. Changes over time in regulation, or in its enforcement, can generate uncertainty, increasing the risks of investing in a given economy. <sup>(66)</sup>

This negative impact of regulations on investment is confirmed in a recent study for the OECD. <sup>(67)</sup> Less stringent product market regulation is associated with higher investment. The author also finds that better institutions, measured by the rule of law and quality of legal institutions, reduce the negative effect of unjustified regulation on investments (see chapter II, part I).

**Unjustified business regulation also decreases the attractiveness of countries for foreign investors.** Protection of incumbents and other barriers to trade and investment (both indicators are from the OECD's PMR database) generate negative effects on greenfield foreign direct investment (FDI). Similarly, the costs of enforcing contracts and of the easiness of paying taxes (both from the World Bank's Doing Business) also

matter. Empirical results from an European Commission study point at sizeable negative impacts of business regulation and quality of public administration on FDI flows. <sup>(68)</sup> For example, a 1 point increase in the PMR sub-indicator measuring the protection of incumbents would be associated with a 13% reduction in greenfield FDI inflows.

### 2.2.2. OTHER TRANSMISSION CHANNELS

**There are other channels through which business regulation can negatively impact investment.** The available empirical literature has explored a number of transmission channels through which business regulation and quality of public administration can affect the economy and also potentially impact investment. These include (1) firm entry and exit, and firm growth (upscaling), (2) allocative efficiency <sup>(69)</sup> and productivity, and (3) profitability and mark-ups. Obviously these channels can be interrelated. For example, a higher birth rate of firms can spur allocative efficiency and lower mark-ups.

**Business friendly regulation has a positive impact on firm dynamics and ultimately on productivity developments.** The rate of economic growth increases with the birth rate of new firms. <sup>(70)</sup> This is because innovation leads to market entry and to replacement of existing firms (Schumpeterian creative destruction). The empirical literature shows that institutional and policy settings can play a major role in firms' decision to enter, expand in or even exit from, a given market. It has been found, for example, that "red tape" barriers have relevant effects on firm's entry. <sup>(71)</sup> Entry costs have substantial effect on

<sup>(64)</sup> Alesina et al. (2003) provide compelling empirical evidence on this issue. Their analysis is based on time-varying indicators of overall regulation, barriers to entry and public ownership, used to examine the effect of deregulation in 21 OECD countries over the period 1975-96 on investment in three broad non-manufacturing sectors: utilities (gas and electricity), transport (airlines, road freight and railways) and communication (telecommunications and postal services).

<sup>(65)</sup> European Commission, DG ECFIN/RTD (2016). The note investigates barriers to investment in tangible and intangible assets, using new data on intangibles from INTAN-INVEST.

<sup>(66)</sup> EIB (2016).

<sup>(67)</sup> Égert, B. (2017).

<sup>(68)</sup> Canton and Solera (2016).

<sup>(69)</sup> Productive resources such as labour and capital are channelled towards their most efficient use in competitive markets. Barriers to competition can prevent the reallocation of resources, enabling inefficient firms to survive while hampering growth of the efficient companies. These facets can be summarised by the indicator on allocative efficiency (AE), defined in the Product Market Review 2013 (European Commission, DG ECFIN, 2013). This indicator measures the extent to which the most productive firms have the largest market share. Low numbers of the AE index point at forces in the economy preventing competition to work properly, such as excessive regulation, rent-seeking, ineffective procurement, clientelism.

<sup>(70)</sup> Aghion et al. (2013).

<sup>(71)</sup> Ciriaci (2014). The author includes the cost and number of procedures to start a business, the time to export (both

TFP levels across countries. <sup>(72)</sup> Regulations that create barriers to entry tend to raise mark-ups and reduce innovation, investment and productivity growth, <sup>(73)</sup> and de-regulation has been associated with faster TFP growth. <sup>(74)</sup> More generally, Doing Business indicators have been found very relevant in understanding growth performance. <sup>(75)</sup>

**The expected gains of an improved business environment are significant.** Commission calculations <sup>(76)</sup> have shown that improving the ease of doing business contributes to GDP. The authors investigate the potential growth impact of a wide variety of structural reforms. In particular, they investigate the impact of entry costs using Doing Business data and apply a distance-to-frontier approach by assuming that half of the gap vis-à-vis the average of the three best EU performers is closed. For example, if Member States were to reduce the costs of entry and close half of the gap with the three best EU performers, this could lead to sizeable GDP gains. Moreover, the combined impact of product market reforms (higher competition in services sector and lower entry costs) for the euro area countries would be about 1.5% of euro area GDP within a 10 year horizon.

Deregulation and improvement in the quality of public administration will bring changes to mark-up and allocative efficiency, thereby improving economic outcomes. <sup>(77)</sup> Market reforms and labour market reforms can be effective in raising output, even in the short term, and especially if supported by other policies that directly boost supply and demand (such as growth-friendly fiscal policies, tax reform, investment in infrastructures,

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using World Bank Doing Business data) and an indicator for public authorities' late payments (from *Intrum Justitia*), and reports significant negative impacts on firm entry from "red tape" (i.e. compliance costs for firms when dealing with public authorities).

<sup>(72)</sup> Barseghyan (2008).

<sup>(73)</sup> Griffith and Harrison (2004); and Griffith et al. (2006).

<sup>(74)</sup> Nicoletti and Scarpetta (2003).

<sup>(75)</sup> Djankov et al. (2006).

<sup>(76)</sup> Varga and In 't Veld (2014). Also see the Single market integration and competitiveness report 2016 from the European Commission

<sup>(77)</sup> European Commission, DG ECFIN (2016a) concentrates on the effect of specific reforms in selected EU Member States. The increase in GDP is assessed through the use of QUEST (the dynamic stochastic general equilibrium model used by DG ECFIN), looking at the mark-up and allocative efficiency changes derived by product market reforms.

as well as accommodative monetary policy). <sup>(78)</sup> Generally, reducing the administrative burdens and the regulatory entry barriers in specific sectors can boost job creation and competitiveness. Similarly, regulatory reforms can boost competition and entrepreneurship in those EU countries still experiencing a large labour productivity gap vis-à-vis the OECD average. <sup>(79)</sup>

**An enabling business climate can foster resilience in the euro area.** Resilient economic structures imply that Member States have a low vulnerability to shocks and/or a high degree of flexibility to adjust to economic shocks. This is of particular importance in a monetary union, given the absence of the nominal exchange rate as an adjustment tool. While a performant business environment can foster the reallocation of capital and labour in response to shocks, structural rigidities can significantly slow down the speed of adjustment as measured, for instance, by the change in the output gap. Differences in business environment may result in different responses to symmetric shocks, which could make monetary policy less effective, in particular if monetary policy is constrained by the zero lower bound.

**A performant business environment can boost resilience through different channels.** Some tend to be more important for specific stages of the firms' life-cycle while others are more generic (for instance, the quality of public administration and tax authorities). Euro area countries with a more enabling business environment experienced a stronger post-crisis recovery (Graph II.2.2). A range of empirical studies confirm the positive effect of the business environment on resilience. <sup>(80)</sup> Furthermore, large heterogeneity in terms of business regulation between euro area Member States hampers not only individual Member State economies, but also the functioning of the Single Market and the overall growth prospects of the euro area.

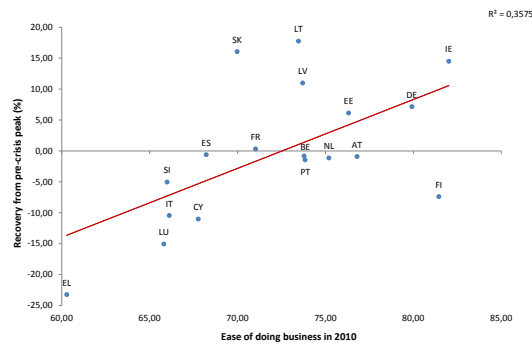
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<sup>(78)</sup> International Monetary Fund (2016). The IMF analyses the effects of lowering anticompetitive barriers to entry in non-tradable sectors and reducing administrative costs of firing procedures.

<sup>(79)</sup> OECD (2016).

<sup>(80)</sup> Ziemann, V. (2013).

Graph II.2.2: Business environment and resilience in the euro area



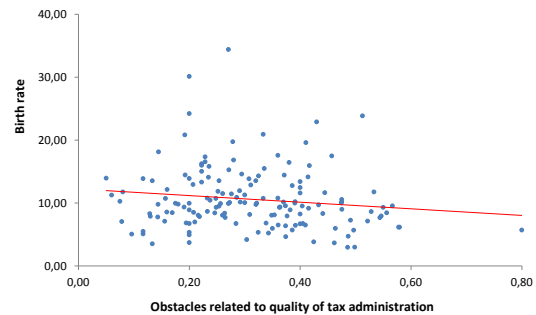
(1) Recovery from pre-crisis peak stands for the % difference from the maximum value in 2007-2008 to 2016 in real Gross National Income per capita. MT is missing as the data on ease of doing business are not available for 2010. **Source:** European Commission, World Bank

### 2.3. EVIDENCE FROM THE EUROBAROMETER SURVEY

The business environment directly and indirectly affects investment and economic performance (see section II.2.1). The effects of business environment on investment and economic performance are further explored on the basis of firms' views of the business environment, using the results of the Eurobarometer survey. The exploration is based on simple correlation diagrams.

**The business environment can impact economic performance through business dynamics.** A more business-friendly environment is expected to be associated with higher birth rates of firms, ultimately affecting investment and economic performance. For example, an increase in the obstacles related to the quality of tax administration is associated with a lower birth rate. However the correlation between the two is not very strong (Graph II.2.3).

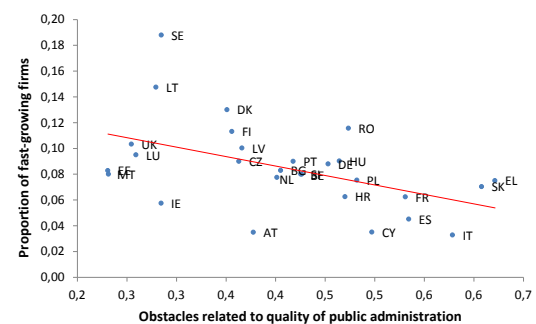
Graph II.2.3: Business environment and firms' birth rate



**Source:** EC calculations based on the Flash Eurobarometer 417 and Eurostat for the Birth rate indicator.

**Similarly, firms' capability to grow, once they entered the market, affects economic performance.** There is a negative correlation between the proportion of fast-growing firms and the four policy areas identified in section II.1.2. <sup>(81)</sup> This correlation suggests that (i) the quality of public administration, (ii) the obstacles to start a business, (iii) the obstacles to the activity of the company and (iv) the quality of the tax administration do affect firms' capability to scale-up (Graphs II.2.4 to II.2.7). <sup>(82)</sup>

Graph II.2.4: Quality of public administration and firms' scaling-up

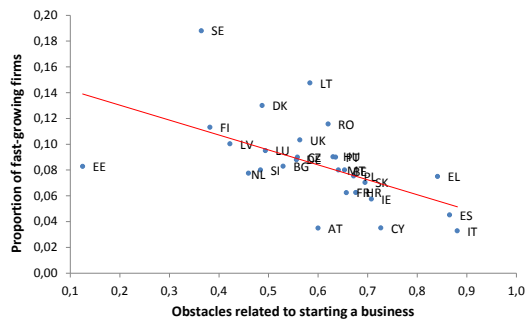


**Source:** EC calculations based on the Flash Eurobarometer 417 and Eurostat

<sup>(81)</sup> Fast growing firms are defined as firms reporting more than 25% turnover growth since January 2012 (the field work was carried out March - April 2015).

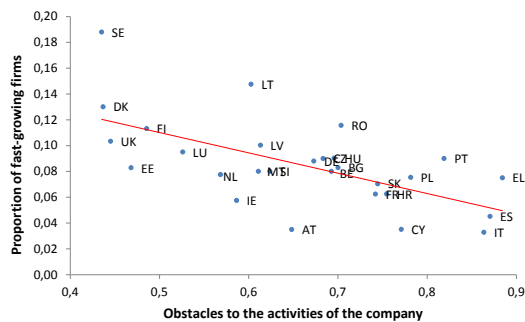
<sup>(82)</sup> Regression analysis shows that the correlation is significant for the quality of public administration, the obstacles to start a business, and the quality of the tax administration, but not for obstacles to the activities of the company.

Graph II.2.5: Obstacles to starting a business and firms' scaling-up



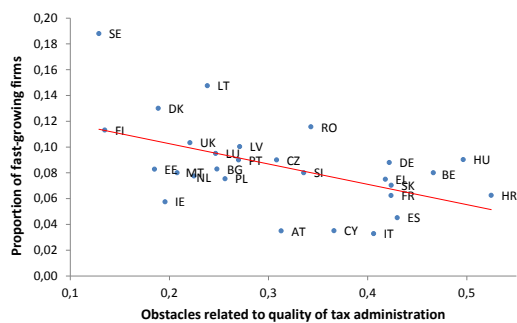
Source: EC calculations based on the Flash Eurobarometer 417 and Eurostat

Graph II.2.6: Obstacles to the activities of the company and firms' scaling-up



Source: EC calculations based on the Flash Eurobarometer 417 and Eurostat

Graph II.2.7: Quality of tax administration and firms' scaling-up

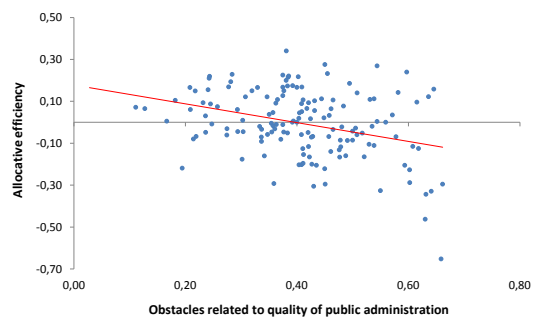


Source: EC calculations based on the Flash Eurobarometer 417 and Eurostat

**Allocative efficiency (AE) is another relevant channel that affects investment and economic**

**performance.** <sup>(83)</sup> Intuitively it is very likely that allocative efficiency is closely related to the business environment. This productivity indicator will be affected by market entry and exit of firms, and also by the easiness to run a business. A simple pairwise correlation analysis reveals indeed that AE is associated with all the four themes covered in the survey (Graphs II.2.8 to II.2.11), and the observed relationship is quite compelling. The quantitative effects are rather strong: the AE-indicator moves, broadly speaking, between +0.1 and -0.1, which corresponds with a difference in labour productivity of 14.6%. Naturally, correlation does not mean causality, and the observed quantitative relationship can be distorted by the influence of other factors. Further empirical work would therefore be needed to investigate this relationship in more detail.

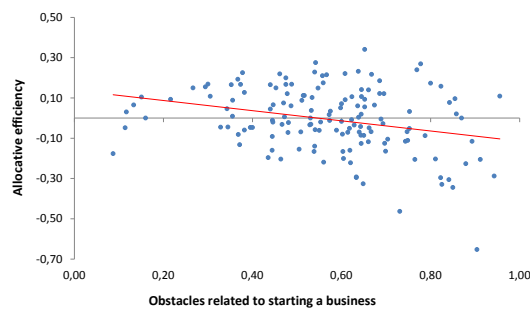
Graph II.2.8: Quality of public administration and Allocative Efficiency



Source: EC calculations based on the Flash Eurobarometer 417 and Eurostat

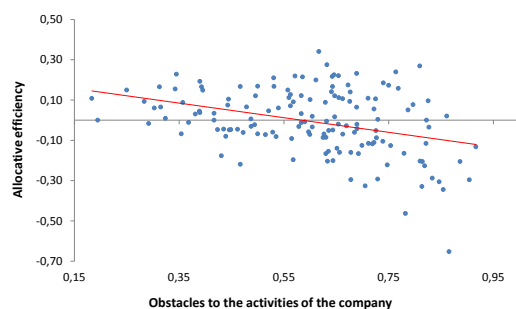
<sup>(83)</sup> A description of the AE indicator is provided in the Product Market Review 2013 (page 14) and is based on industry productivity, decomposed into the (unweighted) average of productivity per firm size class plus a cross-term measuring the extent to which firms in size classes with higher average productivity have larger market shares. This last term is referred to as allocative efficiency (AE). The indicator is calculated using Eurostat data.

Graph II.2.9: Obstacles to starting a business and Allocative Efficiency



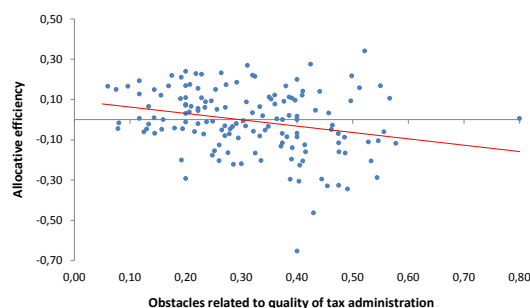
Source: EC calculations based on the Flash Eurobarometer 417 and Eurostat

Graph II.2.10: Obstacles to the activities of the company and Allocative Efficiency



Source: EC calculations based on the Flash Eurobarometer 417 and Eurostat

Graph II.2.11: Quality of tax administration and Allocative Efficiency



Source: EC calculations based on the Flash Eurobarometer 417 and Eurostat

**To summarise, the reported obstacles bear real economic costs**, in the sense that a more frequent reporting of obstacles is associated with lower firm entry, a smaller fraction of fast-growing firms, and greater misallocation of productive resources.

## 2.4. CONCLUSIONS

Better business regulation and a higher quality of public administration lead to improved economic performance. Business regulation covers a range of dimensions, some of which tend to be more important for specific stages of the firms' life-cycle while others are more generic. For instance, firm entry will partly depend on the cost and time needed to start a business. Regarding scaling up, business or employment regulations that depend on the firm's size (e.g. tax advantages for small firms) tend to trap firms in specific size categories. In addition, regulations that hamper cross-border trade can be detrimental for firm growth. Effective insolvency frameworks are critical to minimise the cost of exit and create the breathing space necessary for entry and scaling up.

Differences in business environment may have a substantial impact on growth as well as on resilience to shocks for euro area countries. As such, they undermine cohesion in the common currency area and generate differences and imbalances which can make the common monetary policy less effective and its transmission potentially asymmetric.

A survey carried out among firms, summarised in Chapter II.1, has shown that the reporting of obstacles at least partly correlates with firm characteristics (age, size). When firms' perceptions are more positive, the country can reap economic benefits in terms of higher birth rates, improved allocative efficiency and productivity, and a larger fraction of fast-growing firms.

Policy measures to improve the business regulation and quality of public administration are part of the structural reform strategy necessary to revitalise the convergence process and close the gap in TFP performance vis-à-vis the best performers. An avenue for fostering progress is through mutual learning and an exchange of good practices, while taking into account the importance of country-specific conditions.

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## APPENDIX 1

### Principal Components Analysis: Criteria and Main Results

With a large amount of variables, it may be difficult to detect the underlying structure in the data. As a consequence, the original variables can be replaced by a reduced set of artificial ones that can guarantee an adequate synthesis of the observed data, while limiting, at the most, the loss of their overall information. To that end, multivariate statistics provides a useful data reduction methodology, known as Principal Components Analysis (PCA). Intuitively, PCA aims to reduce the dimension of the initial database and transform it through the identification of a new, but smaller, set of uncorrelated variables, referred to as Principal Components (PCs) which summarize and convey the most relevant information in the original data. Each component is extracted in decreasing order of importance: the first explains the greatest share of variance of the observed data; while a gradually lower share is described by the subsequent ones.

The present analysis draws upon the Doing Business 2017 Report, while offering a specific focus on the examination of the EU28 countries. To this purpose, specific adjustments in the database have been necessary before the implementation of the PCA, so as to strengthen the reliability of the final outcomes. More specifically: i) the Doing Business Indicators are reported according to different unit of measurements as well as different scales. Therefore, the original variables had to be standardized; ii) information concerning the years 2004 and 2005 has been excluded from the analysis, because of copious missing values across indicators; iii) only indicators and countries not exhibiting missing values have been retained. To this end, Malta and Cyprus could not be included, as full and complete information of the indicators is not available; iv) the indicator Trading across Borders has been subject to a change in identification methodology after 2014. Therefore, the analysis could not be directly considered up until the year 2017.

In view of this, the PCA has been implemented on the EU28 countries (excluding Malta and Cyprus) and exclusively for the time span 2006-2014. On this basis, two components have been retained: (i) the first factor relates to the ease of doing business across borders and, in particular, with sub-indicators such as "Trading across Borders" variables and, more specifically, with the "Time to Import" and the "Time to Export" indicators; (ii) the second factor highlights the relevance of the starting a business variables; with a particular emphasis on the "Cost to Start a Business" and on the "Number of Procedures to Start a Business" indicators. The eigenvalue decomposition for the retained components can be represented in the following table:

Table II.A1.1: PC's eigenvalue decomposition

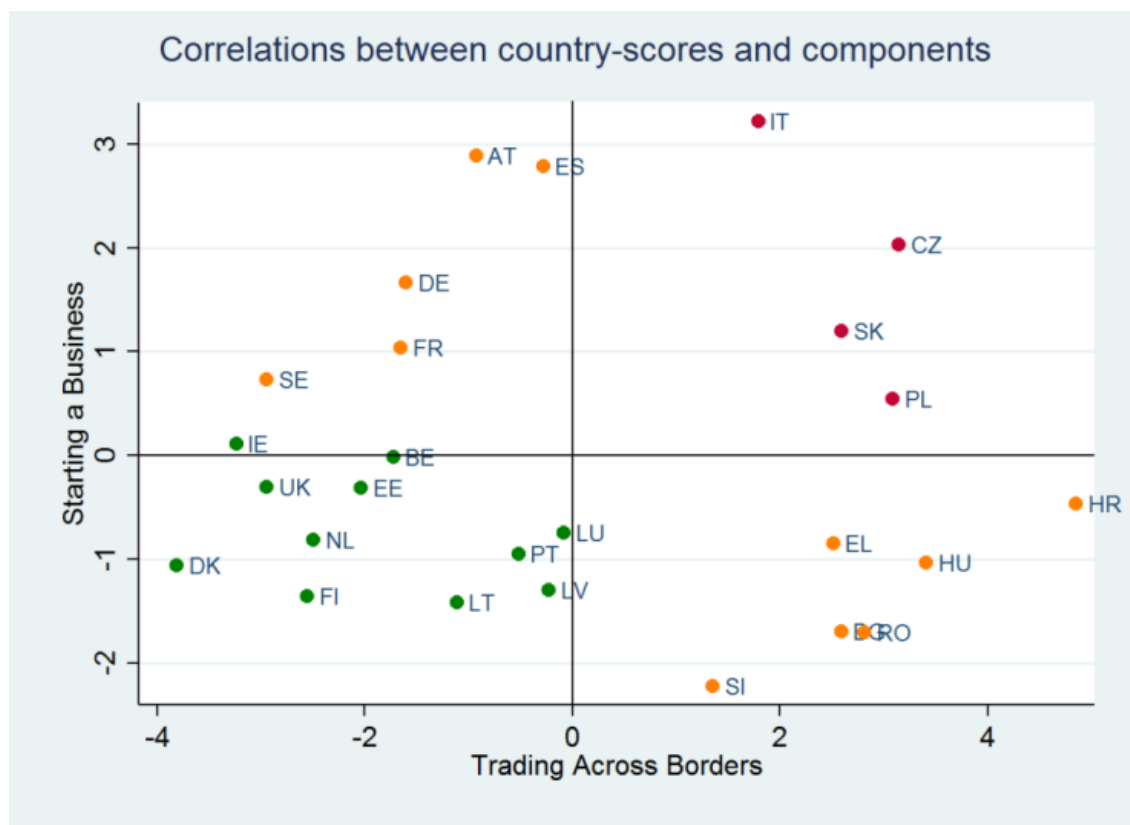
	Eigenvalue	Difference	Proportion	Cumulative
Component 1	<b>6,59813</b>	4,31035	0,31420	<b>0,31420</b>
Component 2	<b>2,28778</b>	0,17437	0,10890	<b>0,42310</b>
Component 3	<b>2,11341</b>	0,68609	0,10060	<b>0,52380</b>
Component 4	<b>1,42732</b>	0,01896	0,06800	<b>0,59170</b>
Component 5	<b>1,40836</b>	0,35738	0,06710	<b>0,65880</b>
# of Observations	233	233	233	233
# of Components	21	21	21	21
Trace	21	21	21	21
Rho	1,000	1,000	1,000	1,000
KMO test	0,7	0,7	0,7	0,7

(1) The optimal number of components has been chosen following three main criteria: i) Share of total explained variance; ii) Scree-plot; and iii) Eigenvalue one or Kaiser's Rule. In the table, the first column depicts the eigenvalues (>1) for the Principal Components.

Source: Commission's calculations based on Doing Business Database – World Bank, 2017

The following figure shows the so-called score-plot, which is a projection of the components scores that can be used to detect and interpret possible relationships between our observations. <sup>(84)</sup>

Graph II.A1.1: Score-plot of EU countries in 2014



(1) Missing values are not included. Malta and Cyprus could not be included, as full and complete information of the indicators is not available.

Source: Commission's calculations based on Doing Business Database – World Bank, 2017

The graph contains four quadrants, with differently-coloured dots. Namely, red and green dots illustrate, respectively, those observations revealing exclusively high and positive, as well as low and negative values, for the aspects associated with the two principal components. Orange dots, on the contrary, are representative of the observations positively correlated with only one of the two components; while exhibiting negative values for the variable associated with the other PC. Finally, all dots located around the origin imply that those observations show, for the aspects represented by the two components, values particularly close to the average of the whole sample.

In our specific case, while no country seems to be positioned around average values for both components, the highest positive score for the First Components is associated with Croatia, immediately followed by Hungary, Czech Republic, Poland, Slovak Republic, Greece, Bulgaria, Romania, Italy and Slovenia. On the contrary, Italy is the country exhibiting the highest positive score for the Second Component, and then followed by Austria, Spain, Czech Republic, Germany, Slovak Republic, France, Sweden and Poland.

<sup>(84)</sup> To facilitate the reading, the graph shows exclusively the scores corresponding to the two components extracted for the year 2014, rather than for the full time-span.

## APPENDIX 2

### Examples from Member States

Recently, Estonia, Finland and Czech Republic have put in place several comprehensive reforms in different policy areas.

#### Estonia

Estonia has increased its Doing Business DTF scoring in the latest years, reaching the 12th position worldwide, and becoming the first among EA countries. An active reform agenda by the Estonian government has contributed to the creation of a business friendly environment, which is also confirmed by the positive opinion of firms reported in the Eurobarometer survey. According to the Doing Business Reports, Estonia made starting a business simpler by allowing minimum capital to be deposited at the time of company registration (2016). Getting credit was improved by amending the Code of Enforcement Procedure and allowing out-of-court enforcement of collateral by secured creditors (2011). Amendments to Estonia's insolvency law increased the chances that viable businesses would survive insolvency by improving procedures and changing the qualification requirements for insolvency administrators (2011). The new government is proceeding with major changes which are currently discussed and are expected to be soon adopted. Many of these changes are to favour enterprises, such as: the zero bureaucracy programme (although already ongoing); the bureaucracy-free form of entrepreneurship for small businesses; simplified taxation and reporting procedures for self-employed; a labour tax refund or tax credit system for start-ups and fast-growing businesses to temporarily reduce the labour tax burden; a reduction of tax rates on regularly paid out dividends by legal persons. Finally, Estonia has recently eased constraints on economic immigration, especially for start-ups, the ICT sector and large foreign investors, a measure that had been advocated by businesses for rather a long time.

#### Finland

The results of WB Doing Business and the Eurobarometer survey reflect the already relatively good business environment which the government has further improved. The Finnish government has implemented several measures to increase entrepreneurship and support start-ups. To promote the growth of innovative firms, the government has considerably increased the availability of loan and export guarantee resources for the SMEs. In order to ensure that regulatory burdens on business will not grow, a one-in, one-out rule for the new and revised legislation was introduced in the beginning of 2017. The government has set up an impact assessment board to review legislative proposals and the impact assessments which accompany them. Also, in order to improve competition and reduce regulation in retail, the shop opening hours were liberalised as of 2016.

#### Czech Republic

Czech Republic has moved from one of the lowest EU Doing Business DTF scores in 2010 to a higher than EU-average DB score in 2017, representing the biggest improvement over the period among the EU countries.<sup>(85)</sup> Following implementation of the Business Corporations Act, which entered into force in 2014, the Czech Republic has made it easier to start a business by substantially reducing the minimum capital requirements for limited partnership companies. The Ministry of Industry and Trade concluded in the recent action plan<sup>(86)</sup> – prepared in consultation with stakeholders - that a large number of simplification measures (60) had been implemented. However, there is currently no methodology to quantify the effective impact of these measures on enterprises. Nevertheless, progress can be observed in a number of areas. For example, the time required to register a company in commercial courts was reduced, in particular by allowing notaries to directly register companies through an online system. The insolvency law was amended in 2013 in order to make it possible for smaller businesses to use the legal possibility of corporate reorganisation. An additional amendment to the Insolvency Act, which is

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<sup>(85)</sup> Despite this improvement, the level of the DTF score in the Czech Republic suggests that there remain needs for improvement in some areas.

<sup>(86)</sup> Czech Republic Ministry of Industry and Trade, 2016.

currently being debated in the Chamber of Deputies, aims at limiting the powers of creditors and strengthening the protection of debtors against unjustified requests to open insolvency proceedings. As regards costs of paying taxes, shortened tax returns have been introduced for self-employed entrepreneurs, while the introduction of lump-sum taxes for certain employees is planned for 2017. In 2016, the electronic evidence of sales was launched to tackle tax evasion and the Government approved an amendment to the Building Act and related legislation to simplify and streamline the procedures, reducing the waiting time for investors.

# Part III

Investment in intangibles

# 1. WHAT DO WE KNOW ABOUT INTANGIBLE ASSETS?

## 1.1. INTRODUCTION

While economic analyses have traditionally focused on physical capital in the production process, there is an increasing recognition of the importance of intangible investment<sup>(87)</sup> as a vital factor for productivity, growth and living standards. Such spending, collectively called investments in 'intangible assets' (or shortly 'intangibles'), are strategic investments in the long-run growth of individual companies and of the economy as a whole. They include investing in human capital (education and training), as well as public and private research and development expenditures (R&D), market development, and organisational and management efficiency.

The view that firms' competitive advantage is based on corporate and especially rather intangible resources, such as competences and capabilities, and on the assimilation of knowledge (instead of size and power) is at the heart of the evolutionary theory of the firm, which looks at a firm as a 'social community' whose productive knowledge defines a comparative advantage (Nelson and Winter, 1982). This theory of production is based on differential capabilities, embedded in the personal and organisational structure of firms; i.e. personal skills and routines at the organisational level form the repository of knowledge (embodied knowledge in equipment/machinery and tacit knowledge, capabilities and skills) which, in turn, defines the production possibilities.

A fundamental characteristic of this knowledge is that it is not easily transferable between firms. In fact, it is its distribution within the economy that determines the heterogeneity of economic (and firm) behaviour (Hayek, 1945) and substantiates competitiveness (thus conceptually going beyond considerations of mere unit labour costs).

This chapter aims at discussing what constitutes this 'intangible' type of assets (Section 1.2). Moreover, it provides stylised facts on the evolution of investment in intangibles (Section

1.3), discusses main economic characteristics of intangibles (Section 1.4) and draws some conclusions (Section 1.5).<sup>(88)</sup>

## 1.2. WHAT ARE INTANGIBLE ASSETS?

**The literature considers intangibles as resources that share the durable impact of 'assets'** (in contrast to intermediate inputs), irrespective of a company's capacity and/or willingness of 'capitalising' them. Moreover, intangibles are typically hard to codify and to accumulate; and they are not easily transferrable.<sup>(89)</sup> Besides, they are regarded as non-rival assets as they can commonly be deployed at the same time in multiple uses.<sup>(90)</sup>

**There are three major forms of intangibles:** (i) those created primarily through innovation and discovery, (ii) those that underlie organisation practices (including also investments in customer satisfaction, product quality and brand reputation), and (iii) those related to human capital (see Hand and Lev, 2003). Accordingly, intangible assets comprise investment in R&D, innovation and technology development, training/education of workers, internal organisation structures, customer and institutional networks, market exploration and development (marketing), and software and information technology.

**The conceptual approach towards capturing and accounting for investments in intangible assets has been continuously broadened.** However, amending the accounting standards (i.e. shifting the asset boundary) towards including more and more intangible assets has triggered a controversial debate concerning where to draw the cut-off line; i.e. what is still to be considered as investments in intangible assets (and can be reliably accounted for, i.e. captured in statistics) and what not?

<sup>(87)</sup> In the literature, intangible assets are (synonymously) termed 'intellectual assets', 'knowledge assets', 'knowledge based capital' or 'intellectual capital'. See Table A1 (Annex AIII.1) for a list of intangibles as currently proposed in the literature.

<sup>(88)</sup> This section is based on Thum-Thyssen *et al.* 2017, chapter I - III. *European Economy Discussion Papers* 047 | May 2017.

<sup>(89)</sup> See e.g. Winter, 1987; Kogut and Zander, 1992; Conner and Prahalad, 1996.

<sup>(90)</sup> See e.g. Itami and Roehl, 1987; Chatterjee and Wernerfelt, 1991; Collis and Montgomery, 1998; Teece, 2000; Hitt *et al.*, 2006; Carmeli and Tisher, 2004; Villalonga, 2004.

**Both business and national income accounting have traditionally treated outlays on intangibles as intermediate expenditure and not as investment.** <sup>(91)</sup> According to the SNA2008 / ESA2010 standards, the Systems of National Accounts currently capture under the asset category "intellectual property products" a range of specific intangible assets, namely R&D, mineral exploration, computer software and databases, entertainment, literary and artistic originals. Similar to investments in tangible assets, such as machinery and equipment or dwelling and other structures, expenditures by businesses or government on these intangible assets are treated as gross fixed capital formation (GFCF) and make for a sizable and rising share of overall investment.

**An essential modification brought by the ESA 2010 <sup>(92)</sup> reform was changing the way R&D is treated** (from intermediate consumption to business sector investment in intangible assets), which reflects the nature of R&D as knowledge to be used in the productive process over multiple periods. Based on the same logic, spending on software and databases was already treated as investment in the national accounts before implementing ESA 2010. <sup>(93)</sup>

**Nevertheless, some argue to consider also the spending on 'economic competencies' as investment in knowledge based capital.** In fact, considering the spending on further types of intangibles as investment (i.e. going beyond SNA2008/ESA2010 standards) would be in line with the views of many in the business community who attribute fundamental aspects of corporate

success to spending on acquired goods or services, such as e.g. marketing, data, design and business process re-organisation, because this contributes to the production for longer than the taxable year. <sup>(94)</sup>

Arguably one may go even further than the categories outlined below in Table 1 and broaden the corresponding definitions to also include e.g. public sector intangible assets not currently recorded as investments. <sup>(95)</sup>

Table III.1.1: **Forms of intangible assets**

COMPUTERISED INFORMATION	• Software	✓
	• Databases	✓
INNOVATIVE PROPERTY	• R&D	✓
	• Mineral explorations	✓
	• Copyright & creative assets	✓
	• New product development in financial services	-
ECONOMIC COMPETENCIES	• New architectural & engineering designs	-
	• Brand-building advertisement	-
	• Market research	-
	• Training of staff	-
	• Management consulting	-
	• Own organisational investment	-

For more details on types of intangible assets see Table A1 in Annex AIII.1

Source: Corrado, Hulten and Sichel (2005)

**And some even argue to go beyond that and suggest including also human capital/skills** in a wider sense as well as trust, health, wellbeing, happiness, etc. as further intangible asset types. To do so, however, a range of unresolved conceptual and statistical issues need to be addressed, which so far have kept additional intangible categories from being included in the SNA.

Due to operational reasons, here the cut-off line is assumed along the asset types outlined above in Table III.1.1; i.e. what goes beyond that (i.e. which is not falling in any of the mentioned assets classes) is not considered as intangible assets. Below, those intangibles which are captured already in the SNA will be called 'NA-intangibles' and those mentioned in Table 1 but not captured in the SNA are 'non-NA-intangibles'.

<sup>(91)</sup> For instance, when firms invest to integrate databases and organisational processes, spending on hardware commonly only represents some 20% of total costs. The remaining costs are for organisational changes such as new skills and incentive systems. Most of these costs are not counted as investment, even if they are as essential as the hardware.

<sup>(92)</sup> The European System of National and Regional Accounts (ESA 2010) is the newest internationally compatible EU accounting framework for a systematic and detailed description of an economy. ESA 2010 has been implemented in September 2014. The impact of the implementation of ESA 2010 on key indicators of the national accounts in Europe differs from country to country. An overview is provided in [EURONA 2/2014](#).

<sup>(93)</sup> Note that the US national accounts do not differ from the EU national accounts according to ESA on the issue on non-NA intangibles. Both follow the SNA 2008 standard (of which ESA 2010 is the codified European version) i.e. neither in the national accounts of the US nor in the EU the non-NA intangibles are currently recorded as investments.

<sup>(94)</sup> See Corrado et al. (2009): Based on the notion that any use of resources that reduces current consumption in order to increase it in future should qualify as an investment, the authors suggest treating the spending on a number of additional types of intangibles as GFCF.

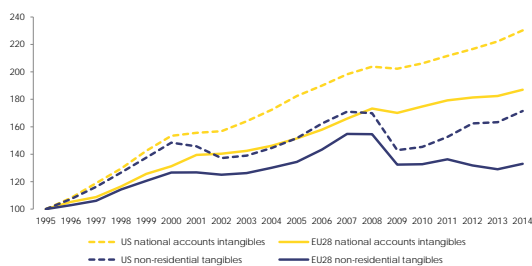
<sup>(95)</sup> There is a comprehensive FP7 project ongoing which addresses the issue of intangibles in the public sector: SPINTAN – Smart Public Intangibles; see Policy Brief dated 08/02/2016: *The public sector and economic growth in the SNA*; <http://www.spintan.net/>.

### 1.3. INVESTMENTS IN INTANGIBLE ASSETS: SOME STYLIZED FACTS

**Intangible assets currently captured in national accounts stand for close to 4% of GDP and 19% of total annual investments in the EU-28.** Note that over half of the investments in such NA intangibles consist of R&D. When excluding residential investments (i.e. dwellings), the share of intangibles is even higher and currently stands at 25% of total (non-residential) investments. By comparison, the GDP share of such NA intangibles in the US currently is at somewhat over 5% and their share in overall non-residential investment at 31%.

**Investments in intangible assets are growing more dynamically than investments in (non-residential) tangible assets.** In fact, over the past two decades, the volume of annual gross fixed capital formation (GFCF) in NA intangibles increased by 130% in the US and 87% in the EU-28 (Graph III.1.1). By comparison, the volume of tangible non-residential investments in the US stands at 70% above the level of 1995 and increased by only 30% in the EU. It is remarkable that investments in intangible assets were, in general, significantly less affected by the economic crisis that started in 2008 (in line with the evidence presented in Chapter I.1, Graph I.1.3).

Graph III.1.1: Non-residential intangible and tangible investments in the EU-28 and the U.S., total economy: chain linked volumes, index 1995=100

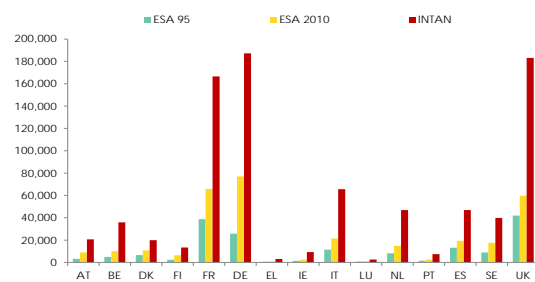


Source: Eurostat national accounts for EU-28, BEA for U.S.

Beyond the intangible assets captured already in national accounts ('NAintangibles'), estimates of a series of previously unmeasured asset types ('non-NA intangibles') have been developed, notably in

the context of the INTAN-Invest project <sup>(96)</sup>. <sup>(97)</sup> The graphs below illustrate the order of magnitude in terms of investments in intangible assets according to three data sources: ESA 95, ESA 2010, and INTAN-Invest <sup>(98)</sup> (graph III.1.2 and graph III.1.3<sup>(99)</sup>).

Graph III.1.2: Investment in business sector intangible assets in EU-15 [2013, million Euros], acc. to different accounting standards



Business sector: NACE Rev. 2 activities A to N (excluding L) plus R and S. Investments according to ESA 95 were obtained from ESA 2010 (NA intangibles), diminished by investment in R&D.

Source: INTAN-invest data (intangible GFCF: 'national account intangibles', 'new intangibles')

<sup>(96)</sup> The INTAN-Invest.net database ([www.intan-invest.net](http://www.intan-invest.net)) is a harmonised (open access) database on macro-economic intangibles across a selection of countries, which complements the work done by the INNODRIVE and COINVEST-projects (both funded by the FP7 SSH programme).

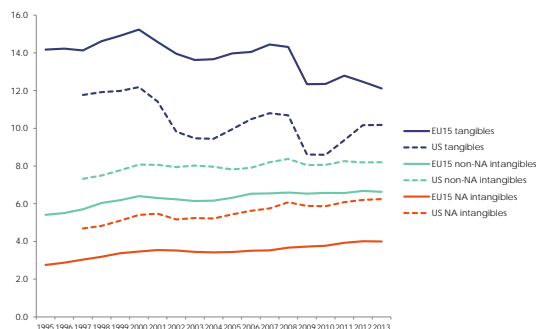
<sup>(97)</sup> The underlying assumptions for calculating this data, together with corresponding challenges, are described in detail in Corrado *et al.* (2012). See also Moulton and Mayerhauser (2015) for a discussion of challenges related with capitalising knowledge assets.

<sup>(98)</sup> Capturing investments in all intangibles (acc. to Table 1).

<sup>(99)</sup> Note that INTAN-Invest data also provide an indication of the impact on the composition of overall investments and the level of gross value added (GVA) if the asset boundary was expanded to include these non-NA intangibles.



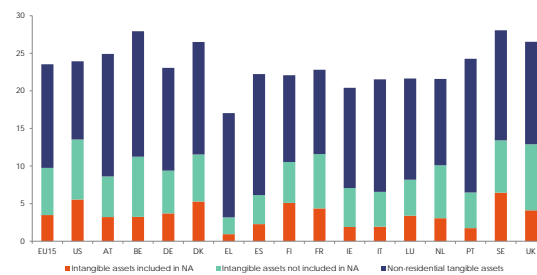
Graph III.1.3: Business sector non-residential GFCF by asset type, EU-15 vs. US (% of business sector GVA)



Source: Own calculations based on INTAN-invest and Eurostat/BEA national accounts data (business sector GVA).

Including non-NA intangibles for the non-residential business sector<sup>(100)</sup> would, on average, increase the level of corresponding GVA by around 6% in EU-15 Member States and 8% in the US.<sup>(101)</sup> Investments in non-NA intangibles would on average also exceed the value of those intangibles which are already treated as GFCF in national accounts. For some countries such a wider definition of intangible assets (i.e. summing up the NA- and non-NA-intangibles) would imply that close to or even more than half of all non-residential business sector investments would consist of intangibles (the Netherlands, Finland, US, France, the United Kingdom, Sweden). (Graph III.1.4).

Graph III.1.4: Business sector non-residential GFCF by asset type, average 1995-2013 (% of business sector GVA)



Business sector defined as NACE Rev. 2 activities A to N (excluding L) plus R and S. US: average 1997-2013.

Source: Own calculations based on INTAN-invest and Eurostat/BEA national accounts data (business sector GVA).

The GVA-share of investment in intangibles tends to be lower in the EU than in the US, in particular with a view at innovative property and economic competencies (Graph III.1.5).<sup>(102)</sup> Although the corresponding investment shares in the EU increased between 1997 and 2013 (except for specific assets such as investment in brand equity), they overall remained below that of the US (except for specific assets such as architectural designs and organisational capital).

Over the observed period 1997-2013, the EU15 made remarkable progress in investment in computerised information. This probably reflects the new economy boom in the 2000s and the efforts to invest in the use of ICT by business sectors.<sup>(103)</sup>

As regards economic competences, EU15 has outperformed the US in the field of organisational capital. By contrast, investment in branding and training is relatively lower and has stagnated between 1997 and 2013.

R&D accounts for a significant share of the investment in knowledge capital in both the EU15 and the US. For the remaining intangible assets types falling in the category of innovative property (new financial products and mineral

<sup>(100)</sup> That means excluding dwellings and public sector GFCF, which are both not covered by the INTAN-Invest data

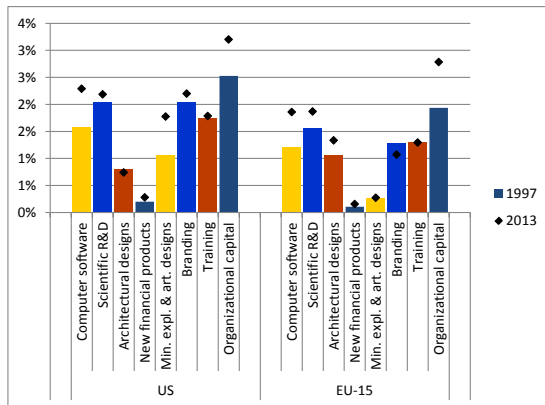
<sup>(101)</sup> The reason why treating additional intangibles as GFCF would increase the level of business sector GVA and consequently overall GDP is essentially the same which led to the increase of GDP due to the capitalisation of R&D in the context of the implementation of SNA2008/ESA2010: Business expenditures on these intangibles are reclassified from intermediate consumption (which are fully used up in the current production process and therefore do not add to GVA in following periods) to gross fixed capital formation.

<sup>(102)</sup> In 1997, the GVA-share of investments per asset type in the EU-15 was below that of the US for all intangibles (except architectural designs).

<sup>(103)</sup> In the early 2000s, the EU was found to lag behind the US in terms of productivity growth and one of the main drivers was the poor performance in terms of ICT-use. See e.g. O'Mahony and van Ark (2003) and Van Ark *et al.* (2008).

exploitations), investment in the EU15 were comparably low in 1997 and have just slightly increased until 2013.

Graph III.1.5: Investment in intangible assets as % of GVA in the US and EU-15, per asset type [1997, 2013]



Source: Own calculations based on INTAN-invest and Eurostat/BEA national accounts data (business sector GVA)

#### 1.4. WHAT MAKES INTANGIBLES SPECIAL? ECONOMIC CHARACTERISTICS OF INTANGIBLE ASSETS

Different types of intangibles commonly share some specific features which distinguish them from tangible assets. <sup>(104)</sup> Such defining characteristics are decisive for identifying barriers to investment and may justify policy intervention, i.e. they deserve particular attention.

The literature suggests a fairly long list of such characteristics. For the sake of simplicity, below these are grouped in three main aspects: (1) specific characteristics of intangibles that may affect competition; (2) risks, uncertainty and high sunk costs characteristically associated with

<sup>(104)</sup> Reflecting this understanding of investments in intangible assets, Corrado, Hulten and Sichel (2005) define them as 'computerised information', 'innovative property' and 'economic competencies'. See Table A1 in Annex AIII.1 for details. Note that some of these investments are already included in the SNA as Gross Fixed Capital Formation (GFCF), especially computerised information and some categories of innovative properties (e.g. mineral exploration, R&D and intellectual property rights). However, according to the System of National Accounts, the spending on other intangible assets is captured as 'expenditures' or 'intermediate consumption' rather than as investment (in particular economic competences, new products and design).

intangibles; and (3) synergies/complementarities among asset types. However, it is important to bear in mind that intangibles are quite heterogeneous. Table A2 (see Annex AIII.2) illustrates this by assessing how these main characteristics apply to various types of intangibles.

##### 1.4.1. Competition-related characteristics

Due to specific features which tend to distort competition, markets for intangible assets and industries mainly driven by the relevance of intangible assets are likely to be affected differently and potentially more severely than those rather relying on tangible assets.

**Many types of intangibles are characterised by limited appropriability and partial excludability.** <sup>(105)</sup> For instance, property rights of intangible assets typically cannot be as clearly defined and well enforced as it is the case with tangibles. Accordingly, firms struggle to deter other businesses from benefiting from their investments in intangibles ('free-riders'). Due to knowledge diffusion and externalities, social returns to intangible investment tend to be higher than the corresponding private returns, which usually leads to under-investment. For the firms buying-in intangibles or producing them for their own use (together perceived here as 'investments in intangibles'), some degree of rent-ensuring <sup>(106)</sup> may be needed to increase the appropriability of the returns to innovation before knowledge diffuses. <sup>(107)</sup>

**Separability** <sup>(108)</sup> and **transferability** <sup>(109)</sup> are two necessary features to facilitate mobility of an asset in terms of ownership. In fact, these are pre-conditions for using assets as collateral and

<sup>(105)</sup> An asset is characterised by limited appropriability or partial excludability if other businesses can benefit from it.

<sup>(106)</sup> That means protecting intellectual property; for instance by means of patents, brands, design, copyright.

<sup>(107)</sup> Note however that some intangible assets can be generated internally by firms and remain inherently non-marketable. Their full value is arguably firm specific because such assets cannot be separated from the original unit of creation without some loss of value (Webster and Jensen, 2006). Brand equity and to a less extent training are examples.

<sup>(108)</sup> An asset is characterised as separable if it can be separated from the place of creation without loss of value.

<sup>(109)</sup> Transferability refers here to the degree that knowledge can be transferred across firms. This depends on whether knowledge is tacit or codified. Tacit knowledge could become transferable if it is embodied e.g. in human capital.

also to salvage value in the event of bankruptcy. While the market for patents and licensing agreements provides a mean to acquire codified and legally protected intangibles, firms cannot obtain tacit, human capital-based, <sup>(110)</sup> or even codified but not legally protected intellectual assets through such channels. In order to obtain intangible capital of this kind, businesses can either do corporate takeovers or selective recruitment (poaching) of specialists. But, both of these strategies entail important risks suggesting that the efficient allocation of intangible capital of a tacit nature is further complicated (Jennewein, 2005).

**Moreover, many intangible assets display specific competition features as they can be deployed simultaneously by multiple users** (non-rivalry <sup>(111)</sup>) without engendering scarcity or diminishing their basic usefulness (e.g. software or designs). With a view to business sector knowledge creation, intangibles tend to be rival across firms and rather non-rival within the firm, which leads to increasing returns to scale (scalability) <sup>(112)</sup> and ultimately to monopolistic competition. Positive network externalities can reinforce this tendency. <sup>(113)</sup>

**The net effect of these competition-related characteristics depends on the situation of each individual business, its competitive environment and the types of intangible assets the company is relying on / investing in.** In fact, on the one hand, any investment in knowledge can have positive external effects, all intangible assets give

rise to spill-over effects which, augmented e.g. by the effects due to limited appropriability, means that the investing firm must be aware *a priori* that competitors may (partly) benefit from their investment in intangibles. This reduces incentives to invest *ex ante*. <sup>(114)</sup> On the other hand, the possibility of benefiting from economies of scale and eventually a situation of monopolistic competition, in turn, provides *ex ante* incentives to invest in intangibles.

#### 1.4.2. Risk, sunk costs, and uncertainty

**Investment in intangibles is associated with systematic risks, costs and uncertainties** as this commonly means entering unexplored fields, i.e. testing and verifying multiple options. This often implies failures and large upfront investment requirements. Thus, investments in intangible assets is prevalent throughout the innovation process, but particularly so in the early stages of fundamental research, invention and experimentation where sunk costs can be large, and failure frequent.

Moreover, the production of intangible assets (which are often embodied in people) is likely to be more uncertain than tangible capital, which is more conducive to replication through standard routines (Hunter *et al.*, 2005).

Finally, lower *ex ante* verifiability <sup>(115)</sup> of intangibles implies financial constraints. This applies to all intangibles.

#### 1.4.3. Synergies and complementarities

**Evidence suggests significant synergies and complementarities across different types of intangibles as well as with regard to tangible assets.** In fact, certain investments can only be

<sup>(110)</sup>In fact, tacit knowledge lacks separability, which in turn undermines its transferability. Note that intangible assets generate firm-specific value whose value depends on the firm's assets being kept together (see Hotchkiss *et al.*, 2008; Gilson *et al.*, 1990), which suggests further limits with regard to separability.

<sup>(111)</sup>An asset is non-rival if it can be used simultaneously by multiple users.

<sup>(112)</sup>The initial cost incurred in creating intangible assets (developing new ideas, designs, etc.) may eventually not be re-incurred once combined with other inputs in the production of goods or services. This may give rise to increasing returns to scale, which can be possibly reinforced by network externalities (particularly prevalent in intangible-intensive industries, such as e.g. ICT).

<sup>(113)</sup>Positive network externalities arise when the value of a good or service increases with the number of users (e.g. subscribers to social or professional networks). This may lead to a winner-takes-all outcome, i.e. network effects can lead to cases of natural monopoly or create high barriers to entry, limiting competition in areas where competitive pressures might raise efficiency.

<sup>(114)</sup>Privately created knowledge tends to be subject to the forces of diffusion, which cannot be constrained in the same manner as physical assets (Brown and Kimbrough 2008); i.e. intangibles tend to diffuse beyond their place of creation, thus providing wider benefits. Rapid diffusion of knowledge may thus deny firms the market power required to price above marginal costs in order to recover the costs of the knowledge creation. Note that markets, however, tend to fail in properly internalising the positive impact from this diffusion, notably on the productivity of investment in knowledge elsewhere.

<sup>(115)</sup>Ex-ante verifiability refers here to the fact that the value of an asset cannot easily be determined before it has generated value.

productive if the appropriate complementary assets exist (e.g. hardware + software + training). Accordingly, factors hindering investment in one type of assets may affect the productivity of (and likely also the investment in) complementary assets.

The economic characteristics illustrated above in the Sections 1.4.1 – 1.4.3 are, to various degrees, relevant for the majority of intangible asset types. However, there are also major differences, primarily between those classified under 'computerised information' and 'innovative property' on the one hand, and those included in 'economic competencies' on the other. Assets in the former two categories are, for the most part, fully non-rival, only partly excludable and they can generally be separated from the original firm without substantial loss of value (i.e. they tend to be tradable by means of market-based transactions). In addition, the corresponding type of knowledge capital can be more easily codified and protected through mechanisms that facilitate its transfer.

In contrast, rivalry and excludability are more prevalent among the types of assets that reflect 'economic competencies'. This is particularly the case with investment in brand equity and human capital, which generate assets that reflect a large degree of corporate or individual embodiment, in addition to being often firm specific and, therefore, not so easily separable. Within 'economic competencies', investments in organisational capital somewhat stand out as being largely non-rival and scalable (within a firm) but less than fully excludable, although attempting to imitate and implement the business model of a successful rival firm is not a simple task. And also the relevance of spill-overs for that asset type is difficult to assess.

Overall, for almost all intangible assets types some characteristics that have specific distorting effects on competition can be confirmed. Also risks, uncertainty and sunk costs appear to be relevant for all types of intangibles (to various degrees). In turn, identifying synergies and complementarities with other intangible and also tangible assets is not trivial and requires further work with a view a divers for and barriers to investment in intangible assets.

## 1.5. EU POLICIES AFFECTING THE INVESTMENT IN INTANGIBLE ASSETS

There is a wide range of measures the EU has implemented to stimulate investments in intangible assets. For instance, stimulating the spending on Research & Innovation has been a main policy target for the EU over many years. Since R&D itself is defined as 'intangible asset', all corresponding policies qualify to be named in an inventory of EU policies set up to stimulate investments in intangible assets. The main policy strands include, for instance, R&D funding of universities and public research centres, public support for private Research & Innovation investment (grants, tax incentives, financial instruments, etc.), supporting science-business collaborations, stimulating demand for innovation (e.g. by means of public procurement), ensuring appropriate skills, and facilitating international linkages, cross-border research co-operations and joint programming with a view at Research & Innovation.

Moreover, the EU has launched measures aiming at improving the functioning of the single market and the foundations for investment and growth (like developing a better skills base<sup>(116)</sup> and ensuring ICT-stimulating framework conditions. Concrete policies thus seek, for instance, to foster Open Data<sup>(117)</sup> and supporting new open standards<sup>(118)</sup> (esp. in ICT), as well as facilitating cross-border operations. Regulatory issues in this field mainly concern ensuring a competitive business environment, applying personal data protection and consumer protection, ensuring security aspects as well as clarifying ownership

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<sup>(116)</sup> Concrete actions comprise the design of a European network of centres of competence to increase the number of skilled data professionals and to promote the recognition of new e-infrastructure professions and skills, in line with the 'Grand Coalition on Digital Skills and Jobs' initiative.

<sup>(117)</sup> This includes e.g. preparing guidelines on recommended standard licences, datasets and charging for the re-use of documents; creating a pan-European open data digital service infrastructure under the Connecting Europe Facility programme as a one-stop shop; setting up measures to promote the open access to research and scientific data sets and sector-specific data (transport, environment).

<sup>(118)</sup> Policy actions aim at supporting the mapping of standards for several big data areas (e.g. smart grid, health, transport, environment, retail, manufacturing, financial services) and at identifying other sectors with sufficient homogeneity to encourage the further development of standards.

and enabling transfer of data.<sup>(119)</sup> Initiatives at EU level generally focus on facilitating operations in the Single Market (see the Single Market Strategy), promoting the digitisation of European industry as well as public services, advancing ICT standardisation priorities, taking forward the European Cloud Initiative and developing a truly Digital Single Market (the DSM Strategy).

And there is an intellectual property rights (IPR) system that offers incentives for companies to invest in the provision of goods and services with high standards of quality, innovation, design and creativity. In this context, the EU works to harmonize laws relating to IPR across EU countries to avoid barriers to trade and to create efficient EU-wide systems for the protection of such rights. It fights against piracy and counterfeiting and aims to help businesses (esp. SMEs) to access and use intellectual property rights more effectively.<sup>(120)</sup> More concretely, support to companies is provided to better manage and take advantage of IPR in the EU and beyond. The EU encourages trading partners to respect IPR; monitors the effects of patent and trade mark-related legislation across the EU; is working to introduce cost-saving, efficient unitary patent protection across Europe and is looking to enhance patent exploitation. Further actions concern the improvement of use of standards by facilitating the licensing process for related IPRs. The EU has, moreover, harmonized trade secret protection laws, and works to generally improve the enforcement of IPRs.

more than half of the total spending on knowledge based capital ('intangible assets') remains uncounted as investments in official statistics. This leads to a distorted picture. Further work is needed to improve corresponding data (thus solving a series of conceptual and also technical / statistical challenges associated with accounting for intangible assets).

## 1.6. CONCLUSION

Common statistics usually fall short in capturing the full picture concerning investments in intangibles (Section 1.2). But, for a comprehensive understanding of knowledge creation and also for sound evidence based policy support, it is important to measure intangibles well. Currently

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<sup>(119)</sup>For instance, analysis of the barriers to the cross-border flow of data; of emerging issues of data ownership and liability of data provision, especially for data collected through Internet of Things (IoT).

<sup>(120)</sup>Note that the Commission adopted in 2011 a comprehensive IPR strategy to ensure that the Single Market for intellectual property functions smoothly. The new rules aim to strike a balance between promoting creation and innovation and promoting the widest possible access to goods and services protected by IPR.

## 2. DRIVERS AND BARRIERS TO INVESTMENT: AN EMPIRICAL ASSESSMENT

### 2.1. INTRODUCTION

The economic characteristics identified in Chapter III.1 suggest a range of drivers of and barriers to investment in intangibles. In this section a non-exhaustive list of altogether five sets of drivers and barriers is presented, drawing on the relevant literature<sup>(121)</sup> and on the mapping of the identified characteristics into drivers and barriers: (1) regulatory framework conditions and a pivotal role for re-allocation, (2) financial conditions, (3) availability of human capital and knowledge stocks, (4) direct and indirect public intervention and (5) macro-economic conditions. Some of the identified drivers and barriers are common to all intangibles. But to the extent possible the analysis is broken down per asset type in section 2.2 and section 2.3.<sup>(122)</sup> Section 2.4 presents an empirical analysis on barriers to investment. Section 2.5 concludes.

### 2.2. DRIVERS AND BARRIERS

#### 2.2.1. Regulatory framework

This driver or barrier follows from generally higher uncertainty for intangibles, but also from their competition-related characteristics which may lead to sub-optimal investment (rent seeking behaviour and positive externalities not captured by investors, see Chapter III.1).

**While efficient resource allocation is important for all types of investment,** the high growth potential and higher uncertainty of intangible assets due to their often exploratory nature increase the importance of an efficient mobilisation of resources. Indeed, compared to tangibles, investment in intangibles is relatively more uncertain, which implies that commercialising an idea for a new product may require swiftly deploying resources (see Andrews and Serres, 2012). To the extent that the

production of intangible goods requires investment in intangible assets, this is at the heart of the Schumpeterian creative destruction, i.e. impediments to entry and exit and to the quick deployment of resources (capital, labour, human) are ever more crucial for unlocking investment in intangibles.

**Beside flexible product- and labour market regulations,** the development of capital markets such as a European Capital Market Union<sup>(123)</sup> and a large internal market such as the European Single Market can also effectively help channel resources towards the most productive investments and facilitate the scale-up of companies.

**Flexible and pro-competitive product market reforms can also foster knowledge diffusion,** as theoretical as well as recent firm-level evidence by the OECD (2016) suggests. For instance, pro-competitive product market reforms can raise the incentives for incumbent firms to adopt new technologies. The OECD (2016) suggests indeed that there is a rising gap between technologically leading firms (frontier setters) and all the others, which could be driven by the difficulty for some firms to transit to the economy of ideas.

**Competition policy should be designed in such a way that incentives for companies to invest in intangible assets are created by addressing potential market failures.** Andrews and de Serres (2012), for instance, argue that the network effects inherent to intangible assets have implications on competition policy design, in particular in terms of the criteria employed to identify anti-competitive behaviour and in terms of technology standards. Competition can also create incentives to improve management and efficiency thus increasing investment in organisational capital (see Hao and Haskel, 2011).

**However, the relation between regulation and intangible investment may not be linear:** some product market regulations may provide incentives to innovators to invest by ensuring high *ex-post*

<sup>(121)</sup> See e.g. Andrews and de Serres (2012), Hao and Haskel (2011), European Commission (2013), Montresor and Vezzani (2014)

<sup>(122)</sup> This section presents our work in Thum-Thysen, Voigt et al. (2017) and Thum-Thysen *et al.* 2017, chapter I - III. *European Economy Discussion Papers* 047 | May 2017.

<sup>(123)</sup> An EU-wide action to promote competition among national capital markets is estimated to free up to €1.8 trillion in cash and deposits to invest cross-border in more profitable and riskier projects (Valiante 2016).



rents (Hao and Haskel 2011 <sup>(124)</sup>). Similarly, some forms of employment protection may increase investment in training as firms have higher incentives to invest in human capital if workers are less likely to leave after the training (*ibidem*). Such non-linearities suggest that low levels of product and labour market regulation should be complemented by appropriate measures, for instance effective intellectual property rights (IPR) systems (i.e. technological patents, industrial designs or brands) ensuring an improved appropriation of returns.

### 2.2.2. Financial conditions

This driver or barrier follows from the higher uncertainty due to the exploratory nature of investment in intangible assets and the generally lower transferability and lower *ex-ante* verifiability <sup>(125)</sup> due to the lack of physical embodiment of intangibles compared to tangibles.

**Higher uncertainty and lower *ex-ante* verifiability imply that even if intangible investments can ultimately be lucrative, they might not be financed or realised,** as the private capital sector sometimes lacks the ability to understand or assess the risks these investments may entail. Indeed, financial conditions such as the interest rate, debt-to-equity ratio and leverage of the banking sector are important drivers of investment (as shown in Section 2.3, below).

**Furthermore, the lack of (tangible) collateral is one of the obstacles frequently identified** by investing firms (see e.g. Montresor and Vezzani, 2014). To facilitate access to finance, improving accounting standards for the valuation of intangibles (both in corporate and national accounts) could allow companies to more easily assess the value they have in terms of intangibles. Other improvements of the mechanisms to disclose information on intangible assets in corporate reporting could be narrative reporting <sup>(126)</sup> as put forward for instance by the OECD (2012). Finally,

<sup>(124)</sup> Aghion *et al.* (2006) also provide evidence for an inverted U-shaped relationship between competition and innovation.

<sup>(125)</sup> *Ex-ante* verifiability refers here to the fact that the value of an asset cannot easily be determined before it has generated value.

<sup>(126)</sup> Narrative reporting is a descriptive section in the annual reports that uses non-financial information to give a picture of a firm's business, market position, strategy, performance, and future prospects.

the development of alternative sources of finance such as venture capital, crowd-funding and public-private co-financing such as provided in the European Fund for Strategic Investments (EFSI) <sup>(127)</sup> could be useful policy tools in that respect.

### 2.2.3. Human capital and knowledge stocks

This driver or barrier follows from the synergies or complementarities of intangible assets with other types of capital such as human capital.

**In fact, an existing high level of generic and for some intangibles in particular tertiary or technical skills is a pre-requisite for successful intangible investment,** as most types of intangible assets are human-capital intensive. For some assets, such as R&D, a critical mass in terms of specific knowledge and skills accumulation is necessary to achieve optimal results. Furthermore, a strong science base is needed to allow new business R&D investments to build on the "shoulders of giants" i.e. the available public R&D/knowledge stock. <sup>(128)</sup> In this regard, public R&D is a major driver of business R&D investments and can play even a more important role in fostering business R&D than (direct and indirect) public funding for business R&D (European Commission, 2016). The efficiency and effectiveness of the public R&D can be improved by the use of performance criteria in distributing institutional funding and international peer review standards in the allocation or competitive peer reviews to allocate project-based funding.

**Public R&D also plays a crucial role in building knowledge stocks** through strong business-science linkages and enhancing knowledge transfer that are crucial to support research and innovation capacity overall. A recent study found that support for R&D co-operations, next to direct and indirect support to business R&D, investments in university research and high-skilled human capital, indeed increase private R&D (Becker, 2015).

<sup>(127)</sup> [https://ec.europa.eu/priorities/jobs-growth-and-investment/investment-plan\\_en](https://ec.europa.eu/priorities/jobs-growth-and-investment/investment-plan_en)

<sup>(128)</sup> See e.g. Caballero and Jaffe (1993) who show that new R&D investments can benefit from an existing stock of R&D investments.

#### 2.2.4. Direct and indirect public intervention

This driver or barrier follows from limited appropriability, spill-overs, and other market failures identified in the context of investment in intangible assets (including also the failure of capital markets to assess risks and cost-benefit relations correctly).

**Government intervention can mitigate market failures** by lowering the risks and associated costs a company faces (directly through grants and public investment or indirectly through tax incentives). In particular, governments can stimulate investment in R&D directly by supporting firms in getting access to finance for R&D activities (e.g. by loan guarantees, state backed venture capital or public procurement). Recent evidence supports this positive impact <sup>(129)</sup>, although in some cases, the results are divergent. The ambiguity of these results is partly attributable to the large array of policy instruments used <sup>(130)</sup> and their effectiveness depends on many factors, in particular their design and implementation. This includes the appropriate targeting of various types and instruments of support, as well as the complementarity of instruments. This type of public support to private investment could be extended to other types of intangible assets (e.g. firm-specific training or potentially computerised information). Direct public support also includes investment in infrastructure, public R&D or the public education system (see also Section 2.1.3).

**Many EU member states use the tax system to stimulate R&D and training.** This indirect set of government instruments includes (R&D) tax incentives <sup>(131)</sup>, which are indeed effective in stimulating business investment in particular in R&D, but their effectiveness depends heavily on the corresponding design, administration, and implementation (Crisuolo *et al.* 2016).

**Finally, public policy can also help strengthen relevant links** with the creation of knowledge hubs through cooperation programmes or intermediary institutions that can act as bridges

between individual actors (e.g. public research centres, universities, private companies).

Note that while intangibles such as R&D are characterised by potentially high social returns, the market failure argument and thus the justification for policy intervention may not be valid for some type of intangibles, particularly in cases where more investment is not socially desirable (e.g. investment in certain types of economic competences, which by being firm-specific can create barriers to entry and exclude competitors from accessing information and technology).

#### 2.2.5. Macro-economic conditions

This driver or barrier only partly follows from the specific characteristics of intangible assets discussed in Chapter III.1. However, macro-economic uncertainty is an obstacle for all kinds of investment but as intangible investment is affected by additional inherent risk, demand uncertainty may affect intangibles relatively more than tangibles. <sup>(132)</sup>

In addition, also the sectoral composition of the economy could affect investment in intangible assets. Evidence on whether a more service-oriented economy tends to be more intangible-intensive is mixed. Corrado *et al.* (2014) find that investment in intangibles has grown more strongly in the services sector, while the OECD (2013b) shows that in some countries investment in intangibles is higher in the manufacturing sector. A reason for the latter fact could be that the manufacturing sector involves an increasing amount of services that could indirectly increase the role of intangibles in that sector. Finally, the degree of digitalisation of an economy can also determine investment in intangible assets.

### 2.3. THE ROLE OF DRIVERS AND BARRIERS BY TYPES OF INTANGIBLE ASSETS

The drivers and barriers discussed above may affect the respective types of intangible assets differently. Therefore, Table A3 (in Annex AIII.3)

<sup>(129)</sup> See Becker (2015).

<sup>(130)</sup> Aristei *et al.* (2015).

<sup>(131)</sup> Note that the tax system as a whole – such as corporate income taxation - can also function as a driver of or barrier to intangible investment, which is part of the regulatory framework.

<sup>(132)</sup> Bontempi (2016) shows on the basis of a theoretical model and Italian firm-level data that uncertainty may delay in particular R&D investment due to a caution effect which incentivises firms to wait and do nothing in cases of demand uncertainty.



provides, per intangible asset type, an *ad hoc* assessment of the role of the barriers and drivers identified above. It is characterised by a very high degree of simplification and should be seen as illustrative, i.e. conveying the general message that the identified drivers and barriers may affect the respective intangible asset types heterogeneously.

**Direct public support and tax incentives are identified to be most useful** in the case of scientific R&D and firm-specific human capital, which are both asset types that are generally characterised by high social returns (relative to private returns). For assets in computerised information, public support may play a role in promoting small and medium enterprises to invest in new technologies. However, these policy tools may also lead to a lock-in situation, in which the subsidised firms do not have the incentive to grow further (European Commission, 2012). Economic competences serving to build monopoly rents such as brand equity should not be targeted by public support.

**Financial conditions matter for all intangibles as they are difficult** to collateralise but may be more important for those assets which are not easily transferable or verifiable such as organisational capital.

**The regulatory framework should on the one hand promote a competitive and flexible environment** but at the same time allow for intellectual property protection to ensure some rents to cover uncertainty in the investments. This holds mainly for the production of computerised information and innovative property, while for most economic competences intellectual property protection should be less of a focus point as these assets are mainly firm-specific.

**Finally, different types of human capital are necessary** for each asset category: while scientific R&D is more intensive in tertiary graduates, computer software rather needs technical skills and design would need creative skills.

#### 2.4. EMPIRICAL ASSESSMENT OF DRIVERS AND BARRIERS TO INVESTMENT

This section aims at verifying the relevance of the determinants identified above. A regression

analysis is performed relating investments in intangible assets to a series of variables under the broad categories of drivers and barriers distinguished above - namely 'regulatory framework' (flexible markets), 'availability of human capital', 'other forms of public intervention' and 'financial conditions'.<sup>(133)</sup> The methodology used for the regression analysis is described in Box III.2.1.

Table 2.1 presents results from the regression model described in equation (4) per asset type (i.e. tangibles and intangibles).<sup>(134)</sup> Estimated coefficients refer to country averages (EU-15), i.e. can hide some country heterogeneity. While the results represent correlations and maybe causal relationships, we do not claim causality.

**Tangible capital tends to be more sensitive than intangible capital to developments in GDP** (see Table 2.1); i.e. the regression results indicate that the accelerator model seems to hold more strongly for tangible capital. Potential reasons could be that the general upswing in intangible investment resulting from a sectoral shift to the knowledge economy is a more important determining factor than the business cycle; or the very long lags between the launch of the investment and the associated returns could imply that short-term cyclical fluctuations matter less (e.g. R&D activity in general); or, finally, that the demand for the goods or services produced with intangible assets are relatively immune to cyclical fluctuations (e.g. pharmaceuticals).

<sup>(133)</sup> Framework conditions were also tested with the share of the service sector in total value added. Findings suggest that investment in intangible assets seems to be more strongly associated with the service economy. However, as previous evidence is mixed, this result would require further investigation.

<sup>(134)</sup> See Thum-Thyssen *et al.* (2017), esp. Tables A3-A6 in the Appendix, for results per asset type when adding each potential investment barrier separately to avoid issues arising from multi-collinearity. Note that more variables were tested such as indicators for alternative financing (venture capital, gross-operating surplus, debt-to-equity ratios and surplus-to-debt ratios of non-financial corporations), taxation indicators (corporate income tax rates, implicit tax rates), quality of IPR, shares of SMEs and allocative efficiency but within the fixed effects framework with robust error terms (robust to heteroscedasticity and intra-group correlation) these variables do not seem to be significantly correlated with investment in intangible assets.

Table III.2.1: Fixed effect regressions, introducing selected determinants per category (public support, availability of human capital, finance and regulation) by asset type

	(1) Total intangibles	(2) NA-intangibles	(3) intangibles	(4) Tangibles
Accelerator term	0.121*** (0.0287)	0.0771*** (0.0195)	0.0444*** (0.0125)	0.336*** (0.0402)
Tertiary education	0.000744*** (0.000200)	0.000363** (0.000152)	0.000381*** (8.74e-05)	0.000238 (0.000415)
Long-term interest rate	-0.000667** (0.000274)	-0.000502** (0.000214)	-0.000165* (8.10e-05)	-0.00200*** (0.000240)
EPL (strictness of selective dismissals)	-0.00643*** (0.00160)	-0.000292 (0.00231)	-0.00613*** (0.00165)	0.00203 (0.00214)
Constant	0.0539*** (0.00587)	0.0242** (0.00796)	0.0297*** (0.00563)	0.0788*** (0.00552)
Country dummies	yes	yes	yes	yes
Time trend	insignificant	insignificant	insignificant	yes
Crisis control	yes	yes	yes	yes
Observations	194	194	194	194
R-squared	0.487	0.362	0.512	0.696
Number of geo	13	13	13	13

Explanatory variables are added in lag-form as described in the main text. All variables are expressed in percentages except EPL, which is expressed on a scale of 0-6. NA-intangibles refer to those intangible asset types that are included in the national accounts' measure of Gross Fixed Capital Formation (GFCF), namely computerised information and some categories of innovative properties (e.g. mineral exploration, R&D and intellectual property rights). Non-NA intangibles refer to those intangible asset types that are captured as expenditure or intermediate consumption in the national accounts. We include country dummies (fixed effects) as well as a control for the economic crisis in 2009 (specified as a crisis dummy and an interaction term between the year dummy and the accelerator term). An additional time trend turns out to be insignificant for most assets except for tangible assets. We include the time trend in the regression when it is significant.

Source: Commission services

**All the dimensions tested are significant, which confirms the importance of the barriers such as regulatory framework, financial conditions, human capital and other forms of public intervention.** In particular public R&D intensity and science-business linkages matter in terms of public support; tertiary education matters in terms of the availability of human capital, flexibility in both product- and labour markets matters in terms of the regulatory framework and the long-term interest rate and the debt-to-equity ratio matter in terms of financial conditions.

Moreover, **drivers significantly differ between investment tangible and intangible assets.** These differences are described below.

**First, financial conditions seem to matter generally more for tangible than for intangible capital.** <sup>(135)</sup> A reason may be that intangible capital tends to be rather financed by internal funds and venture capital than other external funds (and

lacks the types of collateral that would allow easy external funding). Moreover, tangible capital is more cyclical than intangible capital, which would imply a stronger correlation with relatively cyclical variables such as financial indicators.

When comparing the effect of financial variables across intangible asset types, the results suggest that the long-term interest rate matters statistically more for NA-intangibles than for non-NA intangibles. This would imply that R&D and software are the types of intangible assets that could be financed by external funds, even if many times, they tend to be largely financed by internal sources.

**Second, the regulatory framework (both product and labour market) is found to matter more for intangibles than for tangibles,** which confirms findings by Hao and Haskel (2011). <sup>(136)</sup>

<sup>(135)</sup> This observation applies especially to the interest rate but also to the leverage of the banking sector and the debt-to-equity ratio of financial corporations.

<sup>(136)</sup> Note that Alesina *et al.* (2005) model a theoretical and provide evidence for an empirical relationship between regulation and tangible investment for using a sample that does not yet include the economic crisis. Based on an error-correction framework, Egert (2017) suggests a long-run

In fact, most of the measures used as proxies for the regulatory framework have statistically insignificant effects on tangible investment, while the effects on intangible investment are found to be significant with the expected signs. A higher stringency in product market regulations is associated with lower investment in intangible capital while being closer to the country with the lowest stringency in terms of Doing Business is also associated with higher investment in intangibles. Finally, more stringent employment protection legislation is associated with less investment in intangible capital. This observation is even stronger for non-NA-intangibles, which would appear to indicate that flexible resource allocation <sup>(137)</sup> is particularly important for uncertain investments with short maturities, e.g. advertising and market research.

**Third, in terms of public intervention measures tested in the model, evidence suggests that tertiary education is vital for intangible investment** (both NA and non-NA equally), while it does not seem to have a significant effect on tangible investment. This observation can be explained by the fact that intangible capital is potentially more skill-intensive than tangible capital. Furthermore, under- and over-qualification measured on the basis of all three qualification groups (low, medium and high) are found to matter negatively (in the case of under-qualification) and positively (in the case of over-qualification) for intangible investment. Note that other types of skills such as vocational training, generic cognitive and non-cognitive skills could also play a role in particular for non-NA intangibles. This could be subject to further analysis. Furthermore, intangible assets also include firm-specific human capital which is bound to be correlated with tertiary education and qualification but the result captures more than this correlation as it applies to both NA and non-NA intangibles.

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relationship between investment and regulation. See part I and II of this report.

<sup>(137)</sup> See also McGowan and Andrews (2015), who suggest that excessive EPL restricts efficient factor reallocation and can reduce productivity.

*Box III.2.1: Regression analysis of drivers and barriers on investment in intangibles*

To test the potential drivers of intangible investment empirically, we estimate an investment equation based on an accelerator model <sup>(1)</sup> as described in IMF (2015). Investment in time  $t$  and country  $i$   $I_{it}$  (intangible or tangible) is commonly modelled as a function of a desired capital stock  $K_{it}^*$ , potentially some lags thereof (to account for a slow adjustment of the capital stock to its desired level) and depreciation  $\delta_i$  (see Oliner *et al.* 1995) <sup>(2)</sup>:

$$I_{it} = \sum_{j=0}^J \omega_j \Delta K_{it-j}^* + \delta_i K_{it-1}$$

where  $j$  indicates the respective number of time lags. Based on the accelerator model, which postulates that changes in capital are proportionally related to changes in economic output, we can write:

$$\Delta K_{it}^* = c \Delta Y_{it}$$

Inserting equation (3) in equation (2), dividing equation by  $K_{it-1}$ , introducing an error term  $\varepsilon_{it}$  and a fixed effect  $\gamma_i$ , and lagging the output term by one year to somewhat correct endogeneity problems, yields the following econometric model:

$$\frac{I_{it}}{K_{it-1}} = \gamma_i + \sum_{j=1}^N \beta_{1j} \frac{\Delta GVA_{it-j}}{K_{it-1}} + \varepsilon_{it}$$

This model is augmented by other potential explanatory factors of investment such interest rates, debt to equity ratios, product market regulation (PMR), employment protection legislation (EPL), financial regulations, taxation, education, public investment, access to finance etc. denoted by  $DRI_{it-1}$  (drivers):

$$\frac{I_{it}}{K_{it-1}} = \gamma_i + \sum_{j=1}^N \beta_{1j} \frac{\Delta GVA_{it-j}}{K_{it-1}} + \beta_2 DRI_{it-1} + \varepsilon_{it}$$

The model is estimated using a fixed-effect panel estimator with standard errors corrected for autocorrelation, heteroscedasticity and intra-group correlation and is based on annual data for the EU-15 <sup>(3)</sup> Member States over the period 1995-2013 (the final sample size depends on the availability of the data for measuring drivers to intangible investment). The data for intangible investment stems from experimental academic data elaborated by the INTAN-Invest database <sup>(4)</sup>. Data for the accelerator term are taken from ECFIN's AMECO database and drivers of intangible investment are taken from Eurostat, the OECD, the Labour Force Survey and the World Bank. For definitions and more detailed data sources of the respective variables see Thum-Thysen *et al.*, 2017, Table A2.

- <sup>(1)</sup> The accelerator describes the relation between an increase in income and a resulting increase in investment. As described in Knox (1970), the principle of accelerator postulates that with increasing income demand for consumer goods increases. Consequently, investment must increase to raise the productive capacity to meet the increased demand.
- <sup>(2)</sup> IMF (2015) suggests adding a constant in equation (1). This specification was tested, but the constant was found to be insignificant. Similarly, further lags of the capital stock were tested, but, beyond the first lag, no significant results were found.
- <sup>(3)</sup> Note that data for the total capital stocks in the business sector are not available for Luxembourg (in previous year prices) and Portugal and these Member States therefore needed to be dropped from the sample.
- <sup>(4)</sup> The INTAN-Invest.net database ([www.intan-invest.net](http://www.intan-invest.net)) is a harmonised (open access) database on macro-economic intangibles across a selection of countries, which complements the work done by the INNODRIVE and COINVEST-projects (both funded by the FP7 SSH programme). The up-dating of the database is based on voluntary cooperation by academic project partners.

**Finally, the results also indicate that public R&D intensity seems to matter mostly for NA-intangibles.** This finding is intuitive as NA intangibles includes private R&D, which is known to benefit highly from public R&D. In terms of science-business linkages, which are proxied by public-private co-publications, the results suggest that they matter for intangible investment (statistically equally for NA and non-NA intangible investments).

**Evidence also suggests strong complementarities between intangible and tangible assets and also among certain types of intangible assets.** This result holds both in terms of simple correlations and when controlling for the accelerator effect and other controls in the regressions (see Thum-Thysen *et al.*, 2017, Tables

A7 and A8). The regressions (<sup>138</sup>) show a strong relationship between tangible and intangible capital, while complementarity among intangibles seems weaker.

comprehensive perspective is essential. Further work in this regard needs to be done.

The macro-level regression analysis does not allow measuring some more micro-economic features of investment in intangible assets. Micro-level analysis for R&D investment generally confirms the results from the analysis presented in this section but adds some more nuanced insights. Bassanini and Ernst (2002) for instance suggest that the relationship between employment protection legislation and R&D investment depends on wage-bargaining schemes and the type of industry. Complementing the empirical finding above that financial conditions matter, the OECD (2012) for instance stresses the importance of alternative funding schemes such as venture capital. In addition to tertiary education, which is found to matter, Piva and Vivarelli (2007) suggest that corporate skills are a driver for R&D investment. Finally, Becker (2015) confirms the importance of public R&D spending by providing evidence for a positive role of policies to foster science-business linkages as well as R&D tax incentives though their effect depends on the policy design.

## 2.5. CONCLUSION

All sets of investment drivers identified before appear to be relevant. However, some drivers and barriers seem to affect tangible and intangible assets differently: human capital, public investment in R&D and higher education as well as regulation matter more for intangible assets, while financial conditions and GDP developments tend to have a stronger effect on tangible investment. Furthermore, due to synergies between different asset types (tangible and intangible assets, but also among different intangible asset types), a barrier to investment that is relevant for one asset type may indirectly impede investment in other assets. Accordingly, for assessing drivers of and barriers to investment in intangible assets a

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<sup>(138)</sup>Note that these results are meant to figure as a first exploration and should be taken with caution as we suspect strong endogeneity issues, which would preclude any inference on causality.

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# APPENDIX 1

## Types of intangible assets

Table III.A1.1: Types of intangible assets

<b>Computerised information</b>	
Computer software	Covers expenses of software developed for a firm's own use; based on NIPA data that include three components: own use, purchased, and custom software.
Computerised databases	Own use likely is captured in NIPA software measures; data from the Services Annual Survey (SAS) suggest that the purchased component is small.
<b>Innovative property</b>	
Science and engineering R&D (costs of new products and new production processes, usually leading to a patent or license)	Mainly R&D in manufacturing, software publishing, and telecom industries. The census collects data on behalf of the National Science Foundation (NSF). Industrial R&D data are available from the early 1950s and cover work in the physical sciences, the biological sciences, and engineering and computer science (excl. geophysical, geological, artificial intelligence, and expert systems research).
Mineral exploration (spending for the acquisition of new reserves)	Mainly R&D in mining industries.
	a. Mineral exploration, Census of Mineral Industries and NIPAs. b. Other geophysical and geological exploration R&D in mining industries, estimated from census data
Copyright and license costs (spending for the development of entertainment and artistic originals, usually leading to a copyright or license)	Mainly R&D in information-sector industries (excl. software publishing). No broad statistical information, proxied by:
	a. Development costs in the motion picture industry b. Development costs in the radio and television, sound recording, and book publishing industries are crudely estimated to be double the new product development costs for motion pictures. (No estimate for the arts is included.)
Other product development, design, and research expenses (not necessarily leading to a patent or copyright)	Mainly R&D in finance and other services industries. No broad statistical information, proxied by:
	a. New product development costs in the financial services industries, crudely estimated as 20 percent of intermediate purchases.
	b. New architectural and engineering designs, estimated as half of industry purchased services (revenues of the industry as reported in SAS). c. R&D in social sciences and humanities, estimated as twice industry purchased services (revenues as reported in SAS).
<b>Economic competencies</b>	
Brand equity (advertising expenditures and market research for the development of brands and trademarks)	a. Purchases of advertising services: advertising expenditures
	b. Outlays on market research, estimated as twice industry purchased services (revenues of the market and consumer research industry as reported in SAS).
Firm-specific human capital (costs of developing workforce skills, i.e., on-the-job training and tuition payments for job-related education)	Broad surveys of employer-provided training were conducted by the Bureau of Labour Statistics (BLS) in 1994 and 1995. <sup>9</sup>
	a. Direct firm expenses (in-house trainers, outside trainers, tuition reimbursement, and outside training funds) b. Wage and salary costs of employee time in formal and informal training
Organisational structure (costs of organisational change and development; company formation expenses)	No broad statistical information and no clear consensus on scope.
	a. Purchased "organisational" or "structural" capital, estimated using SAS data on the revenues of the management consulting industry. b. Own-account component, estimated as value of executive time using BLS data on employment and wages in executive occupations.

Source: Corrado et al. (2005)

## APPENDIX 2

### Characteristics of intangibles per asset type

Table III.A2.1: Characteristics of intangibles per asset type

Appropriability excludability separability transferability	Non-rivalry scalability network-externalities	Spill-overs		
partly excludable, transferable	fully non-rival, scalable, network-external	high (codified)	high	potentially high
partly excludable, transferable	fully non-rival, scalable, net	high (codified)	high	potentially high
partly excludable, separable / transfer e.g. as patents	fully non-rival, scalable, network-external	for published results high; partly otherwise	very high	high
partly excludable (depending on IPR), transferable	fully non-rival, scalable	high (codified)	high	potentially high
low excludability for 'visible' items, transferable (IPR)	fully non-rival, scalable	high for 'visible' products; partly otherwise	potentially high	potentially high
high excludability, non- separable, transfer via M&A	largely rival, scalable	low / firm- specific	high	potentially high
high excludability, non- separable, transfer through staff mobility	largely rival, scalable	partly, large if high staff mobility	very high	very high
partly excludable, non- separable, transfer	largely non-rival, scalable	partly	high	potentially high
high excludability (if non- disclosure), separable, transfer	fully non-rival, scalable	partly	high	high

Note that 'market research' (e.g. feasibility studies, firm-specific foresight exercises etc.) is not an explicit asset category according to the definition of Corrado et al. (2005). However, it is considered to be relevant here and, since it cannot be easily grouped into any of the other categories, it is added to the corresponding typology.

Source: own illustration, adapted and extended from Andrews and de Serres (2012)

## APPENDIX 3

### Drivers and barriers to investment in intangibles by asset type

Table III.A3.1: Drivers and barriers to investment in intangibles by asset type

		Public support		Financial conditions	Regulatory framework	Availability of human capital	Macro-economic conditions
		Need for action?					
		Direct grants, etc.	Indirect e.g. tax incentives				
Do these drivers and barriers affect the respective asset types?							
Computerised information	Computer software	potentially	potentially	yes, as difficult to collateralise but easily transferable (codified)	yes, to strike the right balance between addressing competition distortion (i.e. network externalities) and protecting rents to cover uncertainty	yes, mainly technical skills	yes
	Computerised databases	potentially	potentially	yes, as difficult to collateralise but easily transferable (codified)	yes, to strike the right balance between addressing competition distortion (i.e. network externalities) and protecting rents to cover uncertainty	yes, mainly technical skills	yes
Innovative property	Scientific R&D	yes	yes	yes, as difficult to collateralise, uncertainty but easily transferable if patented	yes, to strike the right balance between addressing competition distortion and protecting rents to cover uncertainty	yes, mainly high skills: knowledge stock and knowledge transfer are equally important	yes
	Creative property	potentially	no	yes, as difficult to collateralise but easily transferable (codified)	yes, to strike the right balance between addressing competition distortion and protecting rents to cover uncertainty	yes, mainly creative skills	yes
	Design	potentially	potentially	yes, as difficult to collateralise but easily transferable (codified)	yes, to strike the right balance between addressing competition distortion and protecting rents to cover uncertainty	yes, mainly creative skills	yes
Economic Competences	Brand equity	no	no	yes, as difficult to collateralise: transferable via firm ownership	yes, as competition can act as a driver to create a brand	yes, mainly creative skills	yes
	Firm-specific human capital	yes	yes	yes, as difficult to collateralise: transferable via hiring	yes, as competition can act as a driver to improve human capital	yes, mainly generic skills complementary to specific skills learned during training	yes
	Organisational capital	no	no	yes, as difficult to collateralise and not easily transferable	yes, as competition can act as a driver to innovate management techniques	yes, mainly interpersonal skills	yes
	Market research	no	no	yes, as difficult to collateralise: transferable via firm ownership	yes, as competition can act as a driver	yes, mainly analytical skills	yes

(1) 'Potentially' stands for cases in which there are clear trade-offs; for instance in the case of unlocking investment in computer software, small and medium-size enterprises could be subsidised when using new technology but these subsidies could lead to lock-in effects as they do not give firms the incentive to grow. (2) The assignment of the degree of transferability in the column 'Financial conditions' is taken from Andrews and de Serres (2012). (3) Note that 'market research' (e.g. in the sense of feasibility studies, firm-specific foresight exercises, etc.) is not an explicit asset category according to the definition of Corrado et al. (2005). However, it is considered to be relevant here and, since it cannot be easily grouped into any other categories, it is added to the corresponding typology.

Source: own illustration, adapted and extended from Andrews and de Serres (2012)



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