The economic benefits of regulation in architectural services

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Foreword by ACE President

The economic benefits of regulation in architectural services

"As the leading voice of the Architecture profession in Europe, over the years, the Architects' Council of Europe (ACE) has commissioned various studies arguing that defending the importance of certain types of professional regulation in the public interest and disproving suggestions that such regulation does not produces unjustified restrictive effects.

Two possibly contradictory developments can be observed at EU level and even within the EU Commission. While the publicly perceived socio-political and environmental importance of planning has never been higher than today thanks to the "NEB" initiative of Commission President von der Leyen, the civil service continues to see planning as almost exclusively internal market-relevant and thus an economic factor that should be deregulated as far as possible.

Now, driven by a positive belief that our profession can work together with the EU Commission, the OECD and others - we are shifting focus to developing a set of economic arguments in a professional, cogent analysis that clearly identifies the positive effects that professional regulation contributes to the economic, social, environmental and sanitary well-being of European citizens.

Taking into account the specific characteristics of the architectural market, in a way that we believe has not been done before, we have – despite a relative lack of empirical data – achieved what we consider to be a significant step forward in creating a shared understanding of how the impact of our profession and its regulation should be analysed and understood. In addition to helping to track the impact of regulation – through an innovative "Economic Impact of Architectural Regulation Index (EIARI)", this study can help to determine how professional regulations may be justified in the light of the Proportionality Test Directive, the application of which, as yet, has not benefitted from market studies that are sufficiently robust in terms of being grounded in behavioural and empirical studies.

In addition, this study makes reference to common characteristics of the market and examines regulations that control access to the profession (ex ante) in Germany, the practice of architecture (ex post) in Finland; or hybrid models (involving both) in Spain.

In doing so, it enriches our understanding of both the common protection afforded to EU citizens, by regulation of our profession, as well as its ability to flexibly respond to a broad diversity of legal, climactic, building custom and social contexts that affect the practice of our profession in different Member States.

Key issues examined – some of which are taken from the EU's Regulatory Restrictiveness Indicator or the OECD's Services Trade Restrictiveness Index – include: regulation of title and compulsory registration; regulation of practice, reserves of function and practice requirements e.g. building permission; - as well as compensation and asymmetry of information; public procurement and architectural design competitions; quality-assurance issues e.g. codes of conduct, insurance and Continuing Professional development – and we explore the positive economic effects each of these could have.

Each regulation is specific to its jurisdiction and cannot easily be transported to another as its impact will be felt differently given that the scope of service is not harmonised across the EU. But no system is better than another; they are equivalent and achieve the same purpose in different ways.

As well as being illuminating in their own right, as a narrative, the conclusions of each chapter flow logically into the creation of the EIARI Indicator enabling us to evaluate the positive economic benefits of regulation in a broad manner, consistent with our underlying analysis. These benefits include consumer protection; public interest; ensuring independent advice to clients; undertaking tasks that would otherwise have to be performed / financed by the State and illustrating how investment in good quality design produces savings in maintenance costs over the life-cycle of a building. The relative importance of these factors provides, in turn, a notional weighting for the indicator.

We are particularly grateful to the consortium comprising Marc Coleman & Frank Hughes (Ireland), Eugenio Sanchez Gallego & Elena Cordoba (Spain) and Alexander Rasch (Germany) for their excellent work, and to Kathryn Meghen, Rafael Pellicer (who provided the inspiration for this initiative) and Ian Pritchard for overseeing the project".

Ruth Schagemann
ACE President

Executive summary - Key recommendations

The aim of this report is to ensure a constructive contribution by the Architectural profession to the debate on the regulation of the profession.

The need for this contribution stems from growing discussion, debate and policy formation in recent years. This needs to be as balanced and holistic as possible in considering evidence, as inclusive as possible of both industry and stakeholder perspectives and guided always and everywhere by the public interest.

Our report finds that there exists a strong public interest justification for regulating architecture.

This includes the role of regulation in a range of beneficial activities, notably:

- Regulation of title
- Oversight of professional training, qualifications and Continuous Professional Development
- Compulsory Registration
- Compensation mechanisms and insurance schemes
- Industry certification schemes and quality controls
- Requirements for knowledge of local and urban planning laws
- Granting building permissions and inspection
- Codes of Conduct
- Influencing official procurement policies

Through these activities, the regulation of architecture promotes safe, efficient, desirable, environmentally sustainable and aesthetically pleasing built environments for European citizens.

The report ensures a balanced and holistic approach to evidence by

- Providing, in Chapter 1, a 'Tour d'Horizon' of the policy context of this report in terms of recent publications and evidence on the impact of regulating the Architectural Services profession and also recent policy initiatives in the areas of professional services

- Comprehensively, in Chapter 2, examining the clear economic reasons why regulating architecture is in the public interest. Principally, these include the complexity and asymmetry of information between the user and provider of the service and also the lasting and potentially serious social, economic and environment impacts that can arise from a lack of sound regulation.

- Providing a robust quantitative assessment, in Chapter 3. This is done in two ways: Firstly, by demonstrating the positive impacts of regulating architecture in terms of beneficial social, economic and environmental outcomes using an econometric model. Secondly, by the development of an innovative index – the 'Economic Impact of Architecture Regulation Index' (EIARI) – for future use in tracking the benefits of regulation.

- Demonstrating, in Chapter 4, country case studies for Spain, Germany and Finland illustrating both the diversity of regulation as well as common features that protect consumers and citizens across EU. They also show the importance of highlighting the benefits of regulation during current EU policy discussions in the context of the application of public interest tests when applying the Proportionality Directive in the regulation of architecture.

Architecture – Dynamic, Diverse, Digital and Sustainable

- The Architecture sector is a gender diverse sector; 42 per cent of those employed are women, a share that is rising steadily over time.
- It is a young profession, with 34 per cent of practitioners under the age of 40.
- It is a dynamic and digital profession with 22 per cent of practitioners having been educated in a country other than the country where they practice and 31 per cent adopting digital technology.
- It is a sector that embraces environmental sustainability with 57 per cent of practitioners frequently engaged in designing low energy buildings.

Promoting policy dialogue

Beginning in 2013 with a Communication to the European Parliament and European Economic and Social Committee, the European Commission has issued a series of studies and proposals aimed at promoting cross border mobility in the professions including Architecture.

While this objective is fully desirable these efforts have sometimes regarded professional regulation as a "barrier" to mobility rather than a guarantor of the public interest. This stems from a failure to recognise the clear and distinct features of architectural services.

In a spirit of positive engagement and constructive dialogue, this report aims to create a clear and shared understanding of these features so that the beneficial impacts – economic but also social and environmental – can be recognised and accounted for by all stakeholders.

Behaviour and Empirical analysis
What makes Architectural Services different from "classical goods" in terms of the impact of regulation?

A first clear difference is the information asymmetry between providers and customers which - digitisation of the profession notwithstanding - puts customers at a disadvantage.

With less information at their disposal, customers risk adverse outcomes in the provision of services compared to "classic" goods and services (for which customers and providers share similar levels of knowledge). These outcomes include:

- The under provision of necessary service levels (with adverse consequences for safety, utility or design quality)
- The overpricing of service provision
- The possibility that services may exceed customer requirements, with higher cost implications

If unregulated, markets with these characteristics can encourage suppliers to focus competition disproportionately on price (which is transparent and customers can observe) to the detriment of quality (which is subject to asymmetric information). Falling service quality, reduced market confidence and the exit of high quality providers can result with possible existential implications for market stability. This situation could be aggravated in an economic downturn, such as the current pandemic or previous Global Financial Crisis. By contrast in a situation where regulation exists, firms have an incentive to invest in quality of service provision. This in turn boosts customer experience and confidence.

A second clear difference is the heterogeneity and complexity of architectural service provision compared to other goods and services. More complex contracts, lengthier negotiation periods, more complicated pricing structures and a more complex environment for monitoring performance and redress, and compensation for non-performance all require good regulation in order to reduce transaction costs for clients and ensure confidence and market stability. The intangible nature of the service benefit to the customer is also a feature of architecture: price may be the most observable part of a transaction from the customer point of view, but is unlikely to play as significant a role as it does in the provision of "classical" goods and services.

A third clear difference relates to externalities in the provision of Architectural Services to third parties in a transaction and in society generally in the form of public safety, health, general wellbeing and quality of life and – of great current significance – environmental impact. When performing adequately – that is when free from market imperfections such as asymmetric information – these externalities can be positive.

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Measuring the Economic Impact of Architectural Services and its regulation.

Architectural Services – evolution and behaviour of economic impact
Architecture makes a significant contribution to the EU's economy and employment. It contributes €17 billion annually in Gross Value Added (GVA) to the EU economy and employs 560,000 people. After the Global Financial Crisis of 2008 to 2013, the sector recovered from a decline. For instance the number of building permits rose by 20 per cent in the EU between 2015 and 2018.
The sector is highly "atomised", that is it consists of a large number of small operators. This is a very important observation as it puts in context fears of a lack of competition arising from regulation: Compared to more concentrated professional services, architecture is already competitive at a Member State level.
Exports in the sector are also growing very significantly, rising by over 70 per cent between 2013 and 2019. This emphasises that the degree of competition is high not only within Member States, but is rising between Member States.

Measuring the Economic benefits of regulation: Introducing the 'Economic Impact of Architectural Regulation Index (EIARI)'
Taking 'public interest' objectives as enumerated by the European Commission we have identified a list of benefits of relevance to architectural services including the health and safety of buildings; protection of consumers, users and workers; Environmental protection; protection of the urban environment; intellectual property protection; national historical and artistic heritage; and social and cultural policy. Using Eurostat and Member State data for three selected countries – Spain, Germany and Finland - we built an "Economic Impact of Architecture Regulation Index" (EIARI) to measure the benefits of regulation as reflected in a weighted index composed of indicators of both a social nature (including investment in quality services, expenditure on maintenance and repair of buildings, volume of housing over 50 years old) and of an environmental and health nature (including overcrowding, consumption of renewables and biofuels by households, greenhouse gas emission, pollution and noise).
The EIARI the index is calibrated so that a movement above 1 is seen as positive (see Appendix A) and suggests that regulation is having a positive and improving socio- economic and environmental impact.
This indicator is experimental and opens a promising horizon for future research.

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Econometric Model
To estimate the intensity of the studied relationships in the macroeconomic analysis above, as well as the influence of the regulation in the three countries on economic performance and EIARI, we have developed an econometric model based on similar models to those used by European Commission in evaluating the influence of professional services regulation.

We take a three step approach:
First, we seek to estimate the influence of regulatory indicators on Gross Operating Rates or profitability in architectural services. According to our estimates this influence is limited.
Second, given the weak relationship detected in step one, we detect other channels by which regulation can impact the public interest – via other macroeconomic variables and more indirectly - the second step of our model seems to identify variables that most determine growth of profitability. Here we find that the behaviour of Gross Operating Rates can contribute to providing more quality in architectural services as is consistent with the aim of regulation in each country. This suggests that investment levels help to explain the evolution of Gross Operating Rates and, in turn, the level of resources available to invest in public welfare enhancing service quality.
This suggests that, in a regulated environment, there is an incentive to invest and supply quality, thus helping to secure the collective public reputation of the sector.
Finally, in the third equation we estimate the influence of regulatory indicators of architectural services on the economic improvements indicator (EIARI). We do this for both Ex ante and Ex Post regulatory indicators. This latter relationship **establishes that an increase in the reading for the ex ante regulation and ex post regulatory indicators (from their current levels), represents an improvement in the EIARI. The detection of this rise is a significant finding of our model as it is suggests a positive possible link - albeit one subject to the caveats that, as recommended in Chapter 5, we further refine this model and develop improved sources of data - between regulation and public welfare.**

Further research is desirable to test this latter estimation so as to corroborate and refine - with more data - the strength of this relationship between regulation and the indicator of resulting economic improvements.

Country Case Studies and common features of regulation
Our key findings for Chapter 4, in relation to country case studies, are as follows:

Spain
With 47,600 architects and a market value of €593 million Spain's market for architectural services is significant in European terms (nearly one tenth of total employment) and significant in terms of employment and demand in Spain's economy. As shown in Chapter4, Spain has a highly atomised competitive market.

Germany
With 177,500 architects and a market value of €4,577 million Germany is Europe's most dominant market for architectural services (ACE, 2020). This adds to the significance of the HOAI case finding: while requiring the abolition of minimum and maximum fees for technical reasons, this case nonetheless established that, in principle, price regulation is justified to protect the public from deteriorating quality.

Finland
With 3,800 architects and a market value of €166 million Finland's market, although much smaller than those of Germany and Spain, enjoys a relatively high degree of value per practicing architect: €43,650 compared to an EU average of €27,300

Common features of regulation
The common features of regulation between all three countries include the following:
- A 5 year minimum level of qualification
- Systems of registration with professional bodies (compulsory in Spain and Germany (at regional state level in Germany) and voluntary membership of a professional body in Finland).
- Continuous Professional Development either recommended or checked by a controlling authority.
- Mandatory fee scales are prohibited
- All three countries attempt to safeguard the public interest with reference to criteria that are similar and correspond to the Proportionality Directive public interest test.
- Professional bodies in all three countries are responding positively to global initiatives such asthe Davos "Baukultur" quality system, UN Charter for Sustainability/EU climate change policies.

Avenues for further research and collaboration
Further research and collaboration should be undertaken to improve shared knowledge and understanding, particularly in the following three areas:

First, we suggest improving the availability of NACE data on architectural services to a higher level of resolution, coverage and frequency than currently exist. As a sector accounting for over half a million employed professionals and a €17 billion contribution to the EU economy, this greater attention is warranted.

Second, we recommend the regular collection of surveys of public satisfaction with the built environment as referred to in Chapter 3.

Third, we suggest collaborative work to further develop and improve the quality of the proxy variables we have identified and used in building the EIARI index.

Project Consultants

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Alexander Rasch is a Professor of Applied Microeconomics at the Duesseldorf Institute for Competition Economics (DICE), University of Duesseldorf. He studied international business at the University of Erlangen-Nuremberg, Germany, and at the University of International Business and Economics (UIBE), Beijing, China. He holds a PhD in economics from the University of Cologne. His research interests are in theoretical industrial organization, information economics and experimental economics. He has published in the leading economics journals and served as a co-author for several policy studies. Moreover, he has served as an expert in expert hearings.

Octavian Economics– Project manager and report delivery
Octavian Economics designed, project managed and delivered this report. Octavian Economics is a research, publications, advisory and public affairs consultancy which researches, publishes and disseminates economic and business researched reports and policy submissions on behalf of International, EU, national and local government clients (see www.octavian.ie). Octavian Economics Founder Marc Coleman published the world's first strategic response to the Covid-19 crisis "An Economic Response to Covid-19" (April 2020). Its public affairs arm, Octavian Public Affairs, designs and delivers both public affairs campaigns and policy conferences and webinars for national and global clients. Founder, Marc Coleman has previously worked in the European Central Bank, as a senior manager in Ireland's leading trade association (Ibec) as Economics Editor of the Irish Timesand is the author of influential books on economic recovery. He holds qualifications from the Kiel Institute of World Economics (ASP), University College Dublin and Trinity College Dublin.

Elena Córdoba Azcárate - Lead expert in EU competition policy and legal issues
Elena Córdoba Azcárate is a Spanish lawyer, specialised in public affairs and international relations. She holds a double degree in Law and Business Administration and Management from the *Universidad Complutense de Madrid* and did part of her studies at the City University of London. Her experience in European Union law led to her selection by the European Commission as one of the 19 experts of the European Platform Fit For Future (2020) which is responsible for reviewing and evaluating EU legislation. Liberal professions are the cornerstone of her work, which she combines with the practice of law and consultancy work.

Frank Hughes - Lead expert in design and quality of built environment
Frank has over 30 years' experience as an architect working in Ireland, France, the UK, and the French West Indies across a broad range of commercial , residential , educational , Leisure , Cultural and Conservation , Film projects in the private and public sectors of these countries. His practice Frankarchitecture was engaged with the Dublin World Design Capital Bid in 2014 focusing on Technology and Innovation and has developed a digital research platform prototype with Limerick Institute of Technology. He has acted on the Board of The Dublin Civic (Conservation) Trust and mentored master's Students in the Digital Skills Academy Dublin as business partner. He specialises in applying cross disciplinary problem solving methodology to architectural practice and research.

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Chapter 1: Introduction, context and approach

This report, commissioned by the Architects Council of Europe, sets out to clearly show how the regulation of architects - by professional bodies working in the public interest – improves the economic, social and environmental welfare of Europe's citizens.

From protecting buildings and citizens against the risk of overcrowding and fire in ancient Rome to the creation today of highly sophisticated digitised, climate friendly, pandemic proof design – and creating in between many public buildings that beautify and uplift the daily life of people around Europe – architects have been making a better world for us to live in and does so in ways that regulation have been essential. Key aspects of regulation examined in this report include: Regulation of Title, Oversight of Training, Qualifications and Continuous Professional Development, Compulsory Registration, Compensation and Insurance schemes, Industry Certification schemes and Quality Controls, Urban and Local Planning Law and Building Permission and Inspection expertise, Codes of Conduct and lastly procurement. These are elaborated in Chapters 2, 3 and 4.

A positive, proactive study, this report aims first and foremost to place the public understanding of the beneficial impact of architecture on a firm empirical, research and theoretical footing. In doing so, it also informs current topical legal and regulatory discussion in a constructive and innovative way. Its contribution to our understanding of the crucial role of regulation in architectural services and its benefits is threefold:
First, it uses economic theory and empirical findings to build a robust foundation for a thorough, focused analysis of the economic impact of architectural regulation, a vital starting point for a constructive renewal of policy discussion based on dialogue and an agreed understanding of core principles, rather than incomplete, simplistic and potentially damaging narratives.
Second it develops a comprehensive, sophisticated econometric model linking key elements of architectural regulation (see below) to positive economic social and environmental benefits for European citizens.

It also develops an innovative experimental indicator, the Economic Improvement from Architectural Regulation Index (EIARI), that offers policy makers and the architectural service profession the exciting opportunity to jointly work on transparent tools and methodologies that can track and improve the way in which regulation meets the needs of Europe's citizenry.
Third and finally it examines three country case studies (Spain, Germany and Finland) to show how regulation can serve to provide both a common EU base of shared protections while at the same time the ability to flexibly vary regulation according to local needs.
This study will contribute to a discussion and debate on the role of regulation in architecture that has, as Appendix C shows, gathered momentum over the last decade. In 2013 a Communication to the European Parliament and European Economic and Social Committee identified requirements for professional service providers to supply services in other Member States and a Directive (2013/55/EU) promoted greater recognition of professional qualifications across the EU to facilitate cross border mobility.

As shown below, over one fifth of architects have worked in a country other than the Member States in which they were trained, inferring reasonable levels of professional mobility. A subsequent 2017 EU Commission study alleged that "significant" administrative barriers remained and a communication called for the submission of "National Action Plans" to reform access to professional practice. A 2018 Directive of the European Parliament and Council laid down criteria for the use of the Proportionality Test in controlling access to professions in the public interest. On 9 July last, the European Commission updated its reform recommendations in relation to professional services. In this update it continued to refer to "business services" in the context of needing to "improve the competitiveness and resilience of our Single Market".
In Chapter 3 we provide evidence of considerable levels of competition already existing in architectural services and in Chapter 4 we illustrate that national regulatory systems are consistent with shared values and features across the EU.

"The Insomnia causes most deaths here . . . Show me the apartment that lets you sleep! …it's a long way up to the rooftops, and a falling tile can brain you.. pray and hope (poor you!) that the local housewives drop nothing worse on your head than a pailful of slop. "

Roman satirist Juvenal on the hazards of life in ancient Rome (Satires 3)

CONTEXTS – PANDEMIC RECOVERY, CLIMATE ACTION AND ECONOMIC TRANSITION

The importance of the architectural profession to the future of Europe and its economy has arguably never been greater. That importance has several aspects the first of which is pandemic recovery and resilience, the second is climate action and the third is achieving a dynamic transition to a more diverse and digitised economy.

RECOVERY FROM THE ECONOMIC IMPACT OF PANDEMIC

The architectural services market is essential to the recovery of the EU economy and Member States' economies . The first reason for this is that, as shown in its most recent (2020) report on the state of the Architectural services market, this sector is a substantial part of the European economy in its own right, specifically:

- Over half a million Europeans are employed in the provision of Architectural services.
- Architectural services annual fee income (from private practitioners) amounts to €17 billion.

But even this significant contribution – which is a static picture – understates the dynamic contribution that architecture is making to the EU recovery. Under the "EU Green New Deal", the architectural services sector will be a crucial partner in the sustainable renovation and retrofitting of buildings around Europe (that is an increasingly strong feature of recovery policies in Europe*) and in the construction of a new generation of energy neutral buildings that are vital to achieving a carbon neutral future. Likewise architects are helping to advance the digitisation of the European economy through the design of a new generation of smart buildings.

CLIMATE ACTION

Since the endorsement in December 2019 of the Paris Agreement objectives on climate sustainability by the European Council, climate action has become a key priority for the EU Commission and EU Member States. It is also a priority that is becoming more integrated with the post pandemic recovery agenda with investment in sustainable energy and low carbon buildings featuring in the recovery plans for many Member States (see for instance Ireland's 2020 Programme for Government). As show in Chapter 4, the role architectural associations play in the regulation, training, accreditation and validation of professional standards makes them essential partners for both EU and national authorities in achieving climate targets.

Recognising this incontrovertible fact underscores a deeper and broader point that is central to this report: Just as the climate action agenda recognises how, if left to their own devices, market forces can produce impacts that require regulatory and government intervention to guard the long-term public interest, so there is an equal need to recognise how other adverse impacts can arise from a lack of regulation.

Market forces are a powerful and largely benign force for good. But like few other professional service sectors, architecture is one in which – as we show in Chapter 2 – potentially negative (or positive) impacts can arise in the absence (or presence) of good regulation for both paying clients but also third parties, due to the existence of "market failure" that threaten the safety, environmental sustainability and social and aesthetic well-being of citizens.

This applies to citizens as both consumers and also third parties who are affected by the quality of the built environment in which they live and work.

For consumer citizens, the complexity of architecture and the fact that service providers are generally much better informed than customers can – as acknowledged in law (HOAI case – see Chapter 4) – give regulation a valid and powerful role to play in ensuring consumers receive high quality, safe and durable services.

Good regulation in architectural services can also avert a more generalised "race to the bottom" whereby pressure to reduce costs gives rise, in extremis, to an erosion of service quality that could harm the long term interests of both the client and the public and, in turn, encourage replacement of higher quality by lower quality providers to a point that could create a possibly existential threat to public confidence in the safety, design quality and environmental standards of the profession.

Good regulation also protects against adverse "externality" effects. In extreme cases tragedies such as the Grenfell Tower fire in London (2017), the collapse of the Morandi bridge in Genoa (2018) and in Ireland more recently the campaign for Mica redress by home owners affected by the use of deficient concrete blocks in home building also point to the need to strengthen, rather than weaken, the protection of the public in the framework.

[1]

**See for instance a substantial commitment to investing in the retrofitting of buildings in Ireland's Programme for Government (July, 2020)*

TRANSITION TO A DIVERSE AND DIGITISED FUTURE

The fact that in 2020, 42% of architects in the EU were women illustrates a profession that is diversifying. In some EU Member States (Sweden, Denmark and Finland) women are now a majority of the profession (ACE, 2020). Architecture is also embracing digitisation with 62 per cent of practitioners using 3D modelling and 31 per cent using digitised Building Information Management (BIM) systems in their work. Architecture is also embracing the climate action agenda. In 2020, some 57% of architects in the EU were engaged in the building of low carbon buildings. Architecture is also a profession in which 22% of practitioners, in 2020, were educated or partly educated in a country other than the one in which they are currently practising, illustrating a profession that is mobile. Clearly, architecture is a modern and dynamic profession in which regulation plays an active role in embracing a dynamic future.

APPROACH OF THIS REPORT

Our aim in this report is positively and proactively to demonstrate the economic, social and environmental benefits of regulating the Architectural Services profession. In doing so we have - as a secondary aim - a constructive reset of the common understanding in the policy community as to how regulation and competition impact on the public welfare – moving away from simplistic narratives and paradigms to promoting shared understanding, constructive dialogue and collaborative engagement. We start this report by showing clearly why and how the regulation of architectural services differs from many other goods and services through the analysis of theoretical and empirical literature.

We then follow through from this to undertake a quantitative exploration of the positive economic impacts of Architecture and the regulation of Architectural Services establishing, in the process, encouraging and positive linkages between regulation and public welfare outcomes and developing an “Economic Improvement from Architecture Regulation Indicator (EIARI)” as an innovative collaborative tool for achieving a better understanding of regulatory impacts.

We then provide practical illustrations of regulation in action by providing country case analysis of regulation for Germany, Spain and Finland to identify both common features of regulation but also key difference between ex ante (Germany and Spain) and ex post (Finland) approaches (differences that are noted and embedded in the aforementioned quantitative exploration of the positive impacts of regulation).

Finally, we draw conclusions, the most important of which is that from a narrative that sees regulation as merely an obstacle to “quick fix” economic growth, the narrative driving discussion and debate on the regulation of architectural services must be grounded, become more evidence based, sustainable and focused service quality.

Likewise collaborative and shared understandings, frameworks and methodologies for analysis needs to replace the isolated simplistic analysis of the past. National regulatory regimes that are well grounded in locally applicable legal systems, building customs and norms and training methods – and delivered in the language and consistent with the regulations that accumulated and been tried and tested in each specific Member State over generations – are the obvious channels to ensure public safety and well-being in architectural service regulation.

This notwithstanding, there are exciting opportunities for architects’ professional bodies to contribute to important EU Commission work promoting low carbon buildings and digitisation of the EU economy, goals that - as shown below - the architecture profession is already enthusiastically embracing.

Chapter 2: Economic Analysis

INTRODUCTION: ECONOMICALLY RELEVANT PARTICULARITIES OF ARCHITECTURAL SERVICES MARKETS

Understanding how the Architectural profession impacts public welfare requires a clear understanding of both the microeconomic theoretical and macroeconomic foundations that prevail in this market. By analysing regulatory impacts on these solid foundations we can help ensure that policy aimed at intervention in regulation will be well targeted and positively beneficial.

Like other professional services markets, architecture has two particularly important and distinctive economic characteristics that distinguish it from markets for "classic" goods and which can justify different regulatory treatment to account for specific economic incentives.
Firstly, there is the existence of an asymmetry of information* between the service provider (expert) and the customer. In such markets, the expert knows which type of quality the customer needs; in contrast, the customer does not have this information. This makes architectural services so-called experience or "credence goods". In the case of information asymmetry, the question arises as to how an effective customer-protection regime can be implemented.

To this end, we discuss the effects of market entry regulation and price regulation.
The second aspect that distinguishes architectural services from classic goods is that these services are provided individually and personally, and, hence, cannot be easily standardised or commoditised. We will argue that this calls for a more careful evaluation of the productivity of such services and, in particular, the often misguided assumption that one can always raise productivity in a sector by implementing a policy of aggressive deregulation.

INFORMATION ASYMMETRY

Information asymmetry describes a situation in which some market participants, usually clients, are less informed than service providers (Nelson, 1970; Darby and Karni, 1973)** Architects' specific training, education and experience give them levels of information about service quality and customers' needs that are significantly in excess of customer knowledge. The more individual and personalised nature of architectural services (compared for instance to accountancy and legal services) also makes it more difficult for customers to compare offers across different providers of architectural services.

EXPERIENCE GOODS

A good example of a transaction where a customer cannot tell the quality before the purchase ("experience goods") is given by the second-hand purchase of a car. The price is known to both supplier and customer. But whether the car meets the customers' expectations, what its costs for repairs and maintenance will be and how long its useful life is are all less clear. In principle, such information could be searched for before the purchase. But the search, cost in time and money, may be too high for the customer. For architectural services, most customers are probably lacking all but basic levels of information: crucial necessary safety aspects of design or materials, the implications of choosing a provider for future usage and maintenance etc.

** Recent developments in digitalisation may have had some limited impact on asymmetries at a supply chain level as noted in (Commission, 2020), however this is unlikely to impact significantly on customer client asymmetry as most clients of architectural firms are unlikely to use architectural services sufficiently frequently to create the fluency in relevant digital technology necessary to interact with service providers on an equal footing.*
*** This chapter draws on ideas from section 3.2 (for experience goods) and from section 3.5 (for credence goods) in Haucap and Rasch (2019).*

Inset

INSET: THE "LEMONS" PROBLEM

Beginning with Akerlof (1970) there is a wealth of microeconomic literature highlighting how informational asymmetries can lead to drastic market inefficiencies, that is, market breakdown*. In Akerlof's study of the market for used cars, the quality of car may be good or bad (the latter are referred to as "lemons"), and the cost to the supplier of providing the latter lower. Customers have different (and constant) willingness to pay for the two, exogenously given quality levels. If customers are perfectly informed about a product's (car's) quality then two separate markets exist. In one customers with a high willingness to pay for quality pay higher prices for higher quality cars and in the other customers with a low willingness to pay for quality pay a lower price. High-quality sellers cannot profitably offer their products in the market for lower quality cars and, due to perfect customer information, low quality sellers will not get away with selling their products in a high quality market. The market outcome is therefore efficient with two price levels appropriately corresponding to two different levels of quality of product. We refer to this below as "the benchmark" case.

Now consider the case in which customers only know that different levels of quality are offered but cannot tell which particular cars are of high or low in quality. In this situation, they have a willingness to pay based on the average product quality in the market. As a result, the equilibrium price in a market that is now unified – with high and low cars sold together - lies between the two benchmark prices. Because sellers are paid the same price independent of the quality that they offer, high-quality sellers reduce their supply and low-quality sellers increase theirs. This acts to reduce average quality in the market and over time customers have a lower willingness to pay. Market price and quality falls reducing the incentive for providers to invest in high quality service provision despite the fact that there are customers who are willing to pay a higher price for products of higher quality.

The "Lemons problem" described in the inset box above is rooted in the fact that it makes individual sense for high quality providers to withdraw but the societal impact is highly adverse.

Even where a seller opts for a higher quality, he or she cannot fully reap the benefits from this choice in the form of a higher average price, because other sellers also profit from the impact that this has on a higher average quality and resultant average willingness to pay. Thus the total value from an increase in quality is larger than the private value for the individual seller and the individual seller's investment in quality, is shared by other sellers who make no contribution to it.

CREDENCE GOODS

Providers of "credence goods" know the type of quality that the customer needs, but the customer does not have this information (Darby and Karni, 1973). As a result, the customer must trust the expert provider. Classic examples are repair services and professional services such as medical treatments, legal advice, architectural services. There are three ways this can lead to adverse consumer outcomes: First, a more extensive and expensive service than is actually needed could be provided ("overtreatment"). This results in higher costs but does not give customers a resultant benefit therefore creating lower market efficiency (a waste of resources). An example might be the provision of a more expensive than necessary building material (marble rather than stone). Second, a higher service quality than is actually needed might be provided ("overcharging"). This could result in a decline in trust on the customer side and resultant inefficiencies if customers - "once bitten twice shy" subsequently fail to pay for safeguards that are actually needed (fire safety, air vents) due to high prices charged in the past (see Dulleck and Kerschbamer, 2006).
Third, an expert can provide an insufficient service, such that the service is of no value to the customer who nevertheless has to pay for it ("undertreatment"). In the case of undertreatment, as for experience goods, the customer has this information. But in the cases of overtreatment and overcharging, the customer cannot tell whether they were defrauded.

** For the following, see also Pindyck and Rubinfeld (2017), section 17.1.*

***This is a rather strong assumption that is made for simplification. The basic argument that follows, that is, that average market quality is reduced due to informational asymmetries, remains valid also if we lift this assumption.*

EFFICIENT AND INEFFICIENT MARKET OUTCOMES

Consider the following situation (Dulleck and Kerschbamer, 2006). Customers face the need for either a high quality or low quality service but, while they know the probability that they face needs a higher or lower service, they do not specifically know which case applies to them. Experts - who can correctly diagnose the problem – can be consulted and these experts can choose between two service levels, higher or lower, where service prices are set and known to customers before consultation. Whereas the more costly, higher quality service solves both problems and is of value to the customer, the lower quality service only solves the lower level problem and, thus, is worthless in the case where a higher level of service is needed.

Customers who receive a certain service recommendation accept and pay for it; the expert's profit per customer equals the price minus the service cost.
In a case where service quality levels are verifiable (the "verifiability assumption") and experts are liable then undertreatment is not an option for the expert and nor is overcharging: The customer can observe the type of service provided. With regard to overtreatment, Dulleck and Kerschbamer (2006) show that an expert chooses equal price-cost margins for both service levels in equilibrium and so – facing equal margins - has no incentive to overtreat. This is credibly signalled to customers and as a result, the market outcome is efficient. Where the customer is unable to closely monitor the service the verifiability assumption is violated. Moreover, if certain problems arise only after the building process has been finalised for quite some time, liability may not be binding anymore. In this case it is always optimal for the expert to choose the lower quality service treatment while charging for the higher quality treatment.

This means that the market outcome is inefficient and, even worse, the market could witness the entry of providers who are incorrectly trained and lacking in competence. : The latter outcome happens if the benefit from a sufficient service is (very) low, because customers anticipate the expert's fraudulent behaviour and know that they end up with paying the service price without getting anything in return.

REGULATION OF TITLE AND COMPULSORY REGISTRATION & REGULATION OF PRACTICE

Overcoming the challenge of information asymmetry can be achieved in several ways.
Firstly, through the introduction of licensing requirements ensuring a minimum quality of service provision capacity as a condition to practice. In a theoretical study by Leland (1979) the effects of entry restrictions in a market with asymmetric information is compared to a "benchmark case" (without licensing requirements) quite similar to that in Akerlof (1970). Leland (1979) considers a situation in which sellers of different quality compete in prices*. Customers who demand less at higher prices observe the price on offer from individual suppliers but, while they know the average quality of service in the market, cannot observe the quality of individual suppliers. Sellers who offer higher quality obviously incur higher costs of provision and as a result - when the market is open to anyone (that is when there is no minimum-quality of service requirement for being a supplier), there will be an under provision of quality relative to the socially optimal level of quality. Put differently, the price is relatively low resulting in higher quality providers abstain from market entry**.
Introducing a licensing standard means that the lowest quality levels are no longer provided: Such sellers are denied market entry. The net effect on market entry is a priori not clear: Low-quality services are not provided, but given the rise in average quality and, hence, the higher market price, services of higher quality will now be provided. Leland (1979) uses an example to show that licensing tends to result in a higher welfare when customers have a greater sensitivity to quality variations, when the responsiveness of customer demand to changes*** in price is low relative to other goods and services, when the marginal costs for quality are small and when a low quality gives customers only little benefit. For architectural services, one would, in particular, expect a rather low elasticity of demand and low value for low-quality services. Note that this result assumes that there is a "benevolent social planner" who values the economic surplus (welfare) of sellers and customers equally and sets an optimal minimum-quality standard.
As an alternative assumption, a professional body may be involved in organising market entry. Under the assumption that the professional body maximises seller profits, Leland (1979) shows that the chosen standard may be too high or too low. However, if the too high standard lies only slightly above the socially optimal standard –, a welfare improvement is very likely. Moreover, one must keep in mind that this result is derived under the extreme assumption that the professional body only cares about seller profits****.

As such, firms cannot choose their service quality. In his Section V., he argues that his results go through when allowing for endogenous quality levels. This mirrors the above-mentioned insights from Akerlof (1970) with exogenous and endogenous quality levels.
***This can be explained as follows: The marginal costs for the highest service quality that is provided in equilibrium equals the price for an additional service of average quality. However, because the highest quality that is provided is above the average quality level, the social benefit from providing the quality is larger than the marginal cost. This means that a higher quality should be provided from a social welfare point of view. As before, this does not occur due to the fact that the individual seller cannot reap all benefits from their quality investment.*
****The "price elasticity of demand" In reality professional bodies will be concerned to maintain good relations with government, the public and the media.*
*****Note that the study by Chaserant and Harnay (2015) is motivated by observations from the legal profession, but the underlying economic incentives and effects carry over to architectural services.*

REGULATION OF PRACTICE/MINIMUM QUALITY STANDARDS

Once firms enter the market, they must have an incentive to provide a high/sufficient quality. But if they do so, as we have seen above, consumers cannot necessarily tell due to information asymmetry.

Theoretical analysis by Chaserant and Harnay (2015) investigates how self-regulation by a professional body can help to overcome this problem by focusing on self-regulation as way of disciplining members to ensure a good collective professional reputation. The authors also distinguish between services with an experience-good (routine and standardised services) and those with a credence-good character (architectural services).

Considering a situation where customers observe quality delivered in the past ,which is an imperfect guide to service quality in the future, and also derive information about service quality from the collective reputation of the professional body: whereas a customer can punish a low-quality seller in the current period only, the professional association can apply self-regulation in the sense that it excludes such a member forever*.

The authors show that reputation can help to overcome problems arising from information asymmetry when services have an experience-good character where customers can assess quality ex post and inform others**.

In this case, sellers have an interest in providing high quality to build up a good reputation: This ensures sales in the future that are higher than short-term gains in profit from providing a lower quality at a lower cost in the current period.But when customers have very little information about a seller's past behaviour - because services are very individualised and unique (credence goods) - building up a good reputation is very difficult: Customers cannot assess service quality ex post and, so, cannot inform others.

Then, a seller's forgone profits in the future are a lot lower, because fewer customers learn about the low quality and the short-term gains from providing a low quality loom large. In this case, the introduction of self-regulation by the professional body can help to improve quality and benefit the association itself. The association has an incentive to maintain a good collective reputation and to exclude members with a low-quality permanently, because this leads to a higher average quality.

This higher average quality is anticipated by customers who are therefore willing to pay a higher prices for higher quality services and therefore, the better the collective reputation the cheating member loses out. Thus, the threat of losing their title (which can be observed by customers) disciplines sellers even if their quality cannot be assessed by customers.

Note that such self-regulation is also in the members' interest, because it credibly conveys the information of higher average quality in the profession to customers, resulting in an ability to charge higher prices for higher quality services for sellers.

The authors conclude that an unregulated market where only individual rather than collective reputation-building is possible (in principle) leads to lower average quality than a market in which self-regulation and collective reputation-building is allowed.

They also point out that an external regulator cannot do better than self-regulation by the profession itself. This is because the external regulator's remuneration typically does not depend on the profits of the professional body as a whole, and the incentives to exclude low-quality members and build up a good collective reputation are likely to be lower.

PRICE REGULATION

A study by Pesendorfer and Wolinsky (2003) considers a credence goods market in which customers do not know the necessary treatment, but can search at a cost for multiple opinions from different experts. Experts can correctly diagnose the problem through costly effort, but that effort cannot be observed by customers.

All treatments lead to the same costs. Experts can only perform a treatment when they have performed the diagnosis. Experts compete in two-part tariffs, one tariff for the diagnosis and the other for the treatment payable if the customer does not search for a second opinion. By assumption, experts are not liable if the treatment they recommend is not successful (as in medical services for example). In this case market efficiency is driven by customers' search for second opinions and experts' diagnosis efforts. Social welfare is maximised when experts always exert diagnosis effort and customers never search for second opinions. But although customers as a whole are always served best by this approach and search costs (which are often high) are minimised it is not individually in the interests of customers and experts. This is because if experts know that a customer will not search for second opinions and instead accepts any recommendation, experts will save on diagnosis costs and overcharge.

**A similar assumption is to levy a hefty fine or to exclude the member for a certain period of time when the individual discount factor is sufficiently low. See https://www.aia.de/news/aia-news-13072018/praxis-keine-lappalie-fortbildungspflicht-missachtet/ for a case in Germany.*

***Moreover, note that in the model, granting market access to sellers of high quality at the hiring (market-entry) stage increases the probability of achieving a high-quality market outcome. This is in line with the observations from above. Furthermore, because a low-quality equilibrium still exists, and reputation cannot guarantee high quality with certainty, there is still room for restrictions to market entry.*

As a result, any market equilibrium is inefficient. Compared to price regulation, the authors show that in this case price competition always results in an under provision of diagnosis by experts.

In a “vicious circle” effect, experts only have an incentive to diagnose the customer’s needs if the customer can verify the accuracy of inaccuracy of that diagnosis by checking with other experts. Without price regulation – or a professional association to impose a requirement on members to do such diagnosis - experts calculate the probability of customers being able to accurately check for a second opinion as low given both the cost to the customer of obtaining such a verification and the uncertainty surrounding its veracity. Given this customer disincentive to search for a second opinion, experts have little interest in exerting diagnosis effort and customers make badly informed choices. Under price regulation, the authors show that experts exert diagnosis effort and hence, provide correct treatment with high probability.*

PRODUCTIVITY

Advocates of deregulation in the professional services often argue that deregulation can help to overcome the lower-than-average development of productivity in this sector of the economy (OECD 2012, 2014, 2016)**.
As noted above, most Architectural services are carried out on an individual and personal basis. In economics, it is well-known that service sector productivity develops at a slower rate than industrial products, a phenomenon called Baumol’s cost disease (Baumol and Bowen, 1965, 1966; Baumol, 1967). While industrial production can be rationalised more easily – that is, human labour can be replaced by machines – the production of complex services (such as a consultancy combining architecture, legal and building cost consulting services) is, harder to automate and digitise.

In his model, Baumol (1967) assumes that there are two sectors in the economy. In the first progressive sector, products and services can be easily automated, such that productivity increases. Because machines replace human labour, a certain output quantity can be produced with less human labour. Under a policy where wages are linked to productivity, wages increase. The higher productivity makes up for the increase in costs for labour, such that product prices remain unchanged. In the second stagnating sector, human labour plays an essential role in providing services and cannot be replaced by machines. There may be some scope for productivity gains through digitalisation, but the scope is rather limited.
In the two-sector model with asymmetric growth, Baumol (1967) formally shows the following: The relative use of human labour and the relative per-unit costs for services increase over time compared to the industrial sector. When output shares remain constant and the prices develop accordingly the cost increases, this implies that the service sector will be characterised by an increasing share of human labour. Because wages for equally qualified employees must be the same in both sectors in the long run, products in the service sector become more expensive. As a consequence, productivity in the service sector declines, but this development is rooted in the different characteristics of the industrial and the service sectors and does not reflect an actual gap in productivity. Compared to the service sector, the industrial sector benefits from a higher use of capital per employee, better technology, better skills, better management and economies of scale (mass production, storage, tangibility). We thus conclude that any productivity gap is more likely due to the nature of such services, and that a comparison of productivity across industries may be misguided.

CONCLUSION

The workings of the Architectural services market are demonstrated by both theoretical and empirical literature to be subject to dynamics that are fundamentally different from markets in which information asymmetry and externalities are less in evidence. We have shown that regulation of entry and price – by an industry which can internalise the long-term incentive to raise quality and value of service provided – delivers superior social outcomes compared to a “laissez faire” situation.
Note that the milder form of certification/labelling to mitigate problems of asymmetric information appears to be less effective, as has been shown in other contexts (see, for example, education, consumer goods). Due to the above-mentioned complexity and uniqueness of most architectural services, other market institutions (information markets/intermediaries) do not appear to be feasible either.

** Starting from this scenario, suppose for example that prices are flexible. When an expert sets a lower price, the customer wants to patronize this expert, even if the probability of receiving the correct diagnosis and treatment is slightly lower. The reason for this is that – as pointed out above – it is relatively easy for the customer to verify the recommendation by searching for a second opinion due to the high probability of correct diagnoses by other experts. This means that it is profitable for an expert to reduce their price because of a higher likelihood of selling their service. As a consequence, the high probability of correct diagnoses under price regulation cannot be maintained under flexible prices due to free-riding behaviour by the experts. This implies that service quality is lower under price competition than under price regulation.*

***This part draws on arguments that are discussed in Haucap et al. (2017), Hartwig and Krämer (2018) and Haucap and Rasch (2019).*

Chapter 3 The economic benefits of regulation in architectural services

CONTEXT AND MACROECONOMIC ANALYSIS

Based on the strong theoretical case for the argument that the regulation of architectural services can have positive social and economic impact, this section of our report uses both an econometric model and a new experimental indicator of the economic impact of regulation to establish a clear empirical link. Choosing Germany, Spain and Finland —who together represent a good sample of different concepts of culture and regulatory approaches— we review more precisely the recent overall economic performance of the architectural services markets in each country, in order to properly understand the role and benefits —to both professionals and society— of architectural regulation.

METHODOLOGICAL CONSIDERATIONS AND ANALYTICAL ASSUMPTIONS

Our analysis is based as far as possible on the most widely used and reliable statistical sources, in particular class 71.11 Architectural activities as defined by European Community (NACE* Rev.2) to maximise the accuracy of the data we use. This is also consistent with the Architects' Council of Europe (ACE), publication "The architectural profession in Europe, a sector study" which we also take as a reference in our study.
Chapter 2 has already identified how regulation can —by ensuring the provision of higher quality and of positive "externalities** — create the right incentives for professionals to invest in quality and, in doing so, improve their service provision, raise public confidence in their profession and satisfy the demands of clients and society in terms of quality and safety.

Chapter 1 and 2 have outlined key areas of regulation from market entry and practice to reserved functions and implementing codes of conduct. These regulations help individually to produce and amplify positive externalities and, when added together, raise the public reputation of the profession and contribution to the creation of a high quality built environment, which is the main object of architectural services. (See Appendix)

BEHAVIOUR OF THE MAIN MACROECONOMIC VARIABLES

In this section we assess the macroeconomic significance and behaviour of the architectural profession in the EU as a whole (this is also outlined in Chapter 4 on a country level for the three countries examined in our study: Germany, Spain and Finland).

GROSS VALUE ADDED

In terms of economic activity, architectural services accounts in Germany for 0.24% in terms of total Gross Value Added (GVA) of its economy, 0.18% in Finland, and 0.14% in Spain (estimations from Eurostat data for 2018). Within the broad "technical and scientific" field covered by division 71 of NACE, architectural services varies from accounting for 16.6% of total value added in this technical division 71 in Germany, to 14.22% in Spain and 9.6% in Finland.
Additionally, we can see a very different evolution of GVA in architectural services (see Figure 1 Appendix A): Between 2008-2018, Germany demonstrated robust activity and the least impact in the wake of the Great Recession of 2008 with the construction sector rising from 4.0 % to 4.9% of German GVA. However, Spain suffered more adversely with a fall in construction as a share of GVA from 11.3% to 6.11% over the same period. Meanwhile, Finland experienced a more contained impact of the crisis on architectural services in comparison. Already, this preliminary analysis serves as a strong caution against using trends in this aggregate in forming policy prescriptions: operating conditions can differ widely in Member States and as shown in Chapter 4, this can arise from differences in the size of the demand for architectural services when adjusted for the number of architects (a factor that can be influenced by differing Member States).

BUILDING PERMITS

The number of building permits, published by Eurostat, provides an additional measure of activity in the sector. As shown in Figure 2 (see Appendix A) since 2015 this index has grown by over 20% since 2015 for the three countries in question and the European Union.
Spain —hit hardest by the Great Recession— is in 2008 starting from very high levels of building permits due to the real estate bubble, the adjustment of which ended in 2013 since when its Gross Value Added has progressively returned to a higher rate of growth.

**NACE is the statistical classification of economic activities in the European Community.*
***Externalities refer to the benefits or costs that arise from a socio-economic activity or the consumption of a product or service on third parties*

EMPLOYMENT

Most recent data for 2018 shows that in Germany architectural services generated 0.35% of its total employment, the same as Spain, and compared to 0.19% in Finland (the EU 27 figure is 0.28%). Compared to 2008 —as shown in Figure 3 (see Appendix A)—, Germany increased the share of architects in the labour force while, in Spain and the EU, this share fell and remained unchanged in Finland.

Figure 4 (see Appendix A) shows how the three countries differed in terms of the percentage of owners in total employment. Spain stands out with the highest percentage of over 70%. This reflects a smaller average business size, or atomisation, and the decline in salaried employment until 2013 due to the most intense period of the crisis, which forced a reduction in the workforce or staff in the enterprises. In Germany this figure is below 40%, pointing to a somewhat higher average business size and recent growth in recruitment (this is matched also by the number of persons employed per enterprise reported further below). Finland, on the other hand, has the lowest weight of owner-occupation at around 20%, reflecting a higher volume of salaried employment and a larger average size of architectural practice. This figure even increased from 2014 with the beginning of the economic recovery.

In the following section we examine other variables related to employment such as persons employed per enterprise, and apparent labour productivity to achieve an understanding of the relationship between architectural services regulation in these countries and market dynamics and, also, how volume of owners in aggregate influences the behavior of a key term in our econometric study: the Gross Operating Rate or profitability (see note in Appendix A).

EXPORTS OF SERVICES

A further indicator of architectural services activity —and also of the degree of innovation and competitiveness— is international trade. As Altomonte et al. (2014) argue, a greater export orientation produces more incentives to innovate and reduce production costs (many of these services are provided digitally or through physical mobility and between countries*). For this purpose, we focus specifically on the volume of exports of architectural services within Eurozone countries.
Figure 5 (see Appendix A) showing data, beginning in 2013 just after the Great Recession, can be interpreted as indicating a clear recovery of activity within the Eurozone. In Germany, which was less adversely affected by the previous crisis, exports of architectural services to the rest of the Eurozone grew by 28.61% between 2014 and 2019. In Finland, meanwhile, there appears to have been little change between 2013 and 2019 (it should be noted that data is not regularly available for points in between these years).

For Spain, although Eurostat data is not available, National Statistics Institute data for technical services (which includes architectural services) suggests volume of exports to Eurozone countries grew by 77.82% over the 2014-2019 period, in line with that of the Eurozone as a whole. This trade indicator may be helping to explain trends in Gross Operating Rates according to Loecker and Warzinski (2012) as well as regulation. One hypothesis is that increased export activity can increase profitability. However, we do not have enough data available to draw firm conclusions on this point.

APPROACH TO THE ECONOMIC INTERACTION BETWEEN THE PERFORMANCE OF ARCHITECTURAL SERVICES AND ITS REGULATION

In this section we analyse how the evolution of other variables and indicators of architectural services provide helps explain the performance of this market, its degree of competition and the influence of regulation on these trends. Going beyond the common doctrine on the general equilibrium of markets —which implies a purely quantitative assessment of consumer welfare that is proportionate to lower prices and greater quantity of supply— we aim to better interpret and capture the socio-economic benefits of the regulation of architecture in each country in a way that reflects the clear theoretical insights laid down in Chapter 2.

The variables we analyse are:

- Investment effort,
- Apparent labour productivity or productivity per person employed,
- The business churn rate
- Persons employed per enterprise
- Density of enterprises per 10,000 inhabitants
- The Gross Operating Rates or profitability

These variables were chosen because they are some of the most widely recognised and used in order to gauge and approximate the influence of regulation on market performance and because they have been used in important and relevant studies**.

**According to World Trade Organisation (WTO) definition "Mode 1" definition which describes the receipt by a user in Country A of services from country B through its telecommunications or postal infrastructure".*

*** Some of these variables were used, for example, in the document Mutual evaluation of regulated professions: Overview of the regulatory framework in the business services sector using the example of Architects (2015) or also in the study The Economic Impact of Professional Services Liberalisation (2014) of the European Commission. However, in the first case its approach was superficial and only descriptive, and in the second one, the diagnosis and treatment of services, including architecture, was too orthodox in terms of the common functioning of markets, and did not sufficiently consider the particularities of professional services. Here, we improve on these approaches with a richer understanding of the relationships between key variables and a more insightful understanding of how architectural services markets differ from other "classical" goods and services.*

In short, the main hypothesis in this study is that there are detectable benefits and positive externalities arising from the current regulation of architecture in terms of social welfare effects, the competitiveness of economic sectors that demand these services, and some aspects of the built environment.

INVESTMENT EFFORT

One of the most important variables in our study reflects the degree of investment, or gross fixed capital formation, over the Gross Value Added (used in the case of a sector) generated by the business sector of architectural services, a ratio that we can call "investment effort". This is useful as a predictor of the level of quality implemented, although its variations may also respond to more exogenous factors and to the economic cycle. As seen in Figure 6 (see Appendix A) data for 2008, 2013 and 2018 shows a comparable performance between architectural services for this indicator and between the two conceptually closest sectors in operation: engineering services and technical testing and analysis services.

Data also shows that, a priori, the crisis may have influenced a reduction of investment effort in all these sectors between 2008 and 2013. **Since then, there has been a clear recovery or stability of these levels in 2018 in the three countries analysed.** In this sense, it is worth reflecting on the context and some of the reasons that could be behind this behaviour.

It is understood that the concept used by Eurostat is that of productive investment relating to capital goods or machinery, other technologies or training. Here the human aspect of productivity and investment in professional services —also architectural services— must be emphasized: compared to industrial investment which is capital intensive, the accumulation of knowledge, experience and specialised training in view of the heterogeneity of clients and their needs – the development of "human capital" is much more important. Moreover, from Conway et al. (2005) if we look at the recovery of investment effort levels, it would be possible to suggest some indications that there are no barriers that significantly impair investment and, therefore, no barriers that impair competition in architectural services in the three countries.

In architectural services, investment in training and experience contributes significantly to service quality and it cannot be ruled out that such investment —required or encouraged by national regulatory regimes— is greater than would be the case in a non-regulated environment and that, in the future, official investment data will be closer to reality.

What influence has the current regulation of architectural services had, in these three countries, on the degree of investment effort?

If reduced investment in architectural services activity were of a structural nature and made stronger by less effective or less far-reaching practice controls, it is very likely that a post-crisis economic recovery would —as a result of a disincentive to maintain quality and compete solely on price — not have seen the extent of investment effort that in fact occurred in reality. As a result, the quality and safety of services provided could have been eroded by the recent crisis and recovery. **In summary, this logic suggests that it is thanks to current levels of regulation in the three countries surveyed that the level of investment in the profession recovered and, in some cases exceeded pre crisis levels once broader economic recovery had taken place.**

APPARENT LABOUR PRODUCTIVITY

To analyse the productivity of architectural services in a professional services framework, one must address specific characteristics of the profession's behaviour. Traditionally, it is established that achieving higher productivity growth is desirable as a main and endogenous factor of a sound and stable development of the economy.

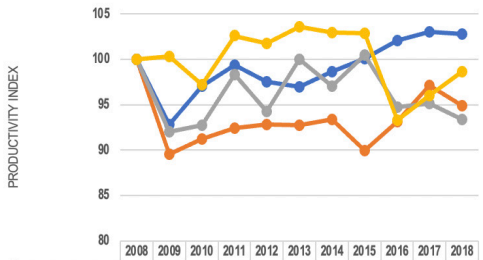
However, by its nature, Mclaughlin and Coffrey (1990) have already pointed out the difficulties of measuring productivity in services due to the resources employed, the degree of customisation or the problem of heterogeneity in provision. In architectural services behaviour and determinants of productivity can be even more complex. **As Haucap and Rasch (2018) have pointed out, the commonly used concept of productivity is not designed for professional services and the comparison between different sectors may be misleading. The most critical cause of this is the high relevance of intangible production factors in service provision and the difficulty they lead to when trying to calibrate and interpret the evolution of productivity, as implied by Lowendhal (1997).**

While this is a key grounding feature of our approach to this report, we nonetheless and for reference take the analysis of productivity performance data as provided by Eurostat in order to consider the behavioural dynamics of architectural services and the role of its regulation on this variable. Specifically, we focus —using indices— on the data on the apparent labour productivity or productivity per person employed at constant 2015 prices in architectural services published by Eurostat. We then compare this with the data provided for three other services, namely engineering services, technical testing and analysis services, and for the economy as a whole.

Germany (Figure 1, below) is the only country whose economy has recorded productivity growth of almost 3% in the period 2008-2018. Meanwhile, the evolution of productivity in architectural services has shown a stable trend in recent years, similar to other sectors such as engineering or technical analysis once the crisis has been overcome.

Source Figure 1: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Apparent labour productivity (Gross value added per person employed).

FIGURE 1. APPARENT LABOUR PRODUCTIVITY IN GERMANY AT CONSTANT PRICES (2015). INDEX 2008 = 100; 2008-2018

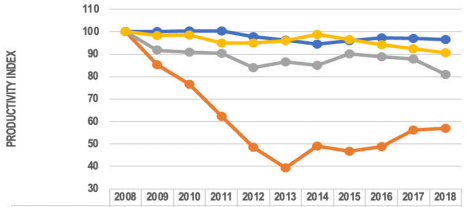


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ECONOMY	100,0	92,8	97,0	99,3	97,5	97,0	98,6	100,1	102,1	103,0	102,8
ARC. SER.	100,0	89,5	91,2	92,4	92,8	92,7	93,4	90,0	93,1	97,2	94,9
ENG. SERV.	100,0	92,0	92,8	98,3	94,2	100,0	97,0	100,4	94,7	95,1	93,4
TEC. ANA.	100,0	100,3	97,2	102,6	101,8	103,6	103,0	102,9	93,3	96,0	98,7

For Spain, (Figure 2, below) productivity in architectural services showed an intense decline caused by recession related correction in the construction sector but a sustained recovery ensued bringing productivity in the sector closer to more similar sectors. However, the context is the Spanish economy as a whole, with its slightly downward sloping trend inherent to the productive sector, the lower presence of the industrial sector and an intensification of low value-added services during the recession. Furthermore, we should not forget the dwindling weight in the Spanish economy of the construction sector, which is practically half of what it was in 2008, and of the industrial sector, which may also require architectural services. In any case, it is one of the reasons that can explain the dynamics of behaviour and the size of the architectural services sector.

Source Figure 2: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Apparent labour productivity (Gross value added per person employed).

FIGURE 2. APPARENT LABOUR PRODUCTIVITY IN SPAIN AT CONSTANT PRICES (2015). INDEX 2008 = 100; 2008-2018

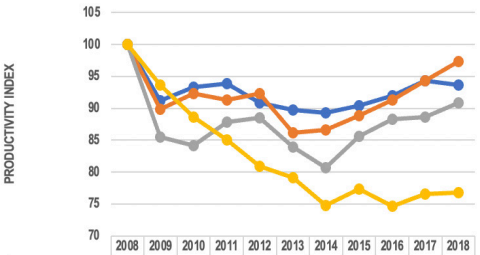


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ECONOMY	100,0	100,1	100,4	100,2	97,9	96,2	94,6	96,0	97,4	96,9	96,4
ARC. SER.	100,0	85,4	76,7	62,3	48,5	39,3	49,1	46,7	48,8	56,1	56,9
ENG. SER.	100,0	91,8	91,0	90,4	84,0	86,6	84,9	90,1	88,9	87,9	80,9
TEC. ANA.	100,0	98,4	98,6	95,0	94,9	96,0	98,9	96,6	94,1	92,5	90,8

Finally, Finland, (Figure 3, below) is the only one of the three countries where productivity per person employed in architectural services shows vigorous recovery since the minimum recorded in 2013. This is a similar trend as seen in engineering services but contrasts with sharper falls in technical analysis services and the gentler slope of the economy as a whole. This may, as suggested by the evolution of GVA in architectural services, be influenced by the gain in weight of the construction sector and the industrial sectors in the Finnish economy between 2008 and 2018.

Source Figure 3: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Apparent labour productivity (Gross value added per person employed).

FIGURE 3. APPARENT LABOUR PRODUCTIVITY IN FINLAND AT CONSTANT PRICES (2015). INDEX 2008 = 100; 2008-2018



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ECONOMY	100,0	91,2	93,2	93,8	90,8	89,7	89,3	90,4	91,9	94,3	93,6
ARC. SER.	100,0	89,8	92,3	91,3	92,3	86,2	86,6	88,9	91,3	94,3	97,3
ENG. SER.	100,0	85,5	84,1	87,8	88,5	83,9	80,6	85,6	88,3	88,6	90,8
TEC. ANA.	100,0	93,7	88,6	85,0	80,9	79,1	74,8	77,3	74,7	76,5	76,7

Compared to analysis of equilibria and price/demand dynamics in more conventional or "classical" markets for goods and services the greater presence of intangibility (a lower visibility and comparability from a consumer point of view) and greater heterogeneity in defining the value to consumers —and also the greater external effect on third parties affected by the delivery of Architectural services— if we apply the "classical" recommendations for increasing productivity in architectural services, this may be overly simplistic in creating an emphasis on price that can lead to dangerous results in encouraging policy makers to implement policies that drive down price (the visible component of the transaction) to the detriment of service quality. The existence of these factors also serves to explain why regulation of the profession can exert a positive influence on productivity.

In a regulatory context of effective ex ante and ex post controls, in order to favour market dynamics with higher average quality and confidence for economic agents, productivity is linked to parameters that are based on the concept of accountability.

The most common inefficiencies in professional services such as architecture —overtreatment, undertreatment and overcharging— Dulleck and Kerschbamer (2006) can, when effective regulation is absent, be worsened in a credence goods market with negative productivity implications. We discuss these now in turn:

Overtreatment —providing a service above the necessary requirements— is most often found where a client has insurance and is therefore more willing to accept a higher price as they have insufficient criteria and a lower incentive to assess the exact service they need. In architecture, without proper regulation, this phenomenon can affect the design of some buildings, solutions proposed or materials suggested and can depend in its scope on both the type of client and the insurance policies they have for the service. These factors could lead to a certain increase in productivity per person employed by generating a higher income, but would be more inefficient and undesirable for society.

Undertreatment consists of providing a service with a lower or insufficient level of quality compared to what is necessary. Without effective regulation, it can lead to structural problems in buildings that can even persist or worsen over time. Another undesirable consequence of this situation, in terms of quality and confidence for the profession and for clients, would be a certain increase in productivity due to the repetition of services that would entail solving problems because an incorrect or insufficient solution has been applied.

Finally, *overcharging* —where a service is provided at a higher price than the quality applied— can be very characteristic of a market in which regulation affecting quality is not effective. In such cases architects could take advantage of asymmetry of information by proposing designs for buildings that exploit client vulnerability. In this way, it would increase its productivity through higher Gross Operating Rate.

So, to summarise the foregoing —in the absence of effective regulation or an appropriate regulatory framework— overtreatment, undertreatment and overcharging could lead to a measured increase in productivity but of a kind that is less beneficial than if appropriate regulation exists.

This does not imply that beneficial productivity growth is blocked or irrelevant in the absence of appropriate regulation. However, the following quality-enhancing productivity factors can be expected to have less weight or not to be encouraged without adequate regulation: innovation of management techniques, the application of new technologies or the growing digitalisation can explain a large part of the increases in its productivity.

Likewise, the intellectual component in the provision of architecture can contribute to maintaining or slightly improving productivity growth by updating it through continuous training and experience, and is enhanced by advances and innovations in, and some degree of integration between specific sub disciplines of architecture such as diagnosis and treatment so that, if these skills are combined, economies of scope with cost savings can be reaped.

Thus, according to our observations and economic evidence, it can be argued that the core of current regulation in Germany, Spain and Finland contributes to favouring desirable productivity growth in terms of efficiency and welfare reflected in the built environment.

BUSINESS CHURN RATE

The business churn rate is an indicator that is usually used as a proxy variable for the influence of a regulatory system on the degree of flexibility of entry and exit of operators in a market. In effect, its calculation is a ratio between the sum of market entries and exits and the total volume of the network of operators in a sector over a given period, usually one year. According to Pelksman (2017)*, this indicator helps measure the impact of technological change on the market, but can also sufficiently detect relevant regulatory changes. But its interpretation is qualified by the effects the business cycle can have.

Taking as a reference for this indicator the EU-27 average index (see Figure 7 Appendix A) we see a slight upturn until 2013 due to the economic crisis (which led to the exit of many companies) followed by stabilisation. For all of our three countries the index value is below but close to this EU-27 value.

However, Spain shows the greatest variation (exceeding 20%) in 2013 explained by the greater impact of the real estate and financial crisis on the level of exits from the market before subsequent recovery. Finland, in contrast, has the lowest business churn rate of the three countries (somewhat counterintuitively given its more flexible regulatory architecture compared to Germany or Spain). And Germany has the most pronounced downward trend in recent years, and where the business churn rate is also already below the European average.

Therefore, it can be argued that a business churn rate which is close to, or even slightly below, the EU average can be favourable to provide a sufficient incentive for architectural operators to invest in quality, to stay in the market for a longer period of time and to provide a better service to clients. This is in contrast to the idea that high churn rates signify dynamic competition and a better outcome for clients.

Conversely, a business churn rate which is too high —interpreted as a sign of a liberalised market with free entry and exit (or as happened in Spain in 2013 due to the economic cycle of the crisis)— can be associated with negative effects on the stability of architecture sector, due to insufficient incentives to invest in quality and greater incentives to retain a larger market share through inefficiencies such as overtreatment or undertreatment.

By this reasoning, a market characterised by demand inelasticity (as is architectural services according to Weisbach and Macdonald. (2004)), tends —in the absence of such appropriate regulation— to produce excessive entry of operators into the market (Gu and Wentzel. (2009)). Such a situation would be adverse to market welfare as it could lead to competition that erodes security and customer/user confidence (Kahn (1988)).

Thus, the role of architects' regulation —with its ex ante and ex post controls in each country— can act as a market balancing mechanism and, in particularly, help to ensure that market entry is accompanied by sufficient incentives and stability over time for operators to invest in quality service provision.

This reasoning is consistent with the idea of collective reputation developed by Chaserant and Harnay (2013), under which operators belonging to a professional organisation that orders and controls their practice gives them a greater incentive to provide higher quality, and also to expel those members who engage in malpractice or undesirable conduct. The aim is to keep the reputation of their profession high.

In this way, clients and users of architectural services, although they cannot in many cases directly and accurately assess the level of quality received, can have greater confidence and a more solid perception when they can check whether the professional is a member of their organization and is subject to professional conduct rules.

Thus, the challenges of addressing the market inefficiencies identified in section 2 are overcome.

** in a report for the European Commission*

PERSONS EMPLOYED PER ENTERPRISE

Another measure of atomisation or fragmentation in markets is provided by the number of people employed per enterprise. As Figure 8 (see Appendix A) shows the average size of enterprise in architectural services remains well below 10 employed. However, the course of the last decade the size has gone from 2.1 employed in 2008 to 1.9 in 2018 in the EU, a fall of 9.52%. In short, this confirms the findings in relation to the small average size of architectural enterprise in the Architects' Council of Europe biannual industry profile.

Amongst the three countries, Spain has the most stable average size but one that is also the smallest with only 1.4 employed in 2018, 6.67% less than in 2008. It suggests a further atomisation of the market. In addition, the overall size of the volume of architectural services firms decreased in this period by 21.97% due to the greater impact on the construction sector (but started to recover from 2016 onwards). In contrast, both Germany and Finland saw average business size rise by almost 25% compared to 2008, reaching or almost reaching 4 employed per firm. This is significant, as despite having very different architectural regulatory systems (see Chapter 4) they were able to grow at a similar rate.

Another important must be discussed: the impact of the financial crisis on average firm size. As the crisis might have favoured mergers or takeovers between market operators (in order to survive) the number of these firms fell. For example, in Finland the fall in the number of firms was 18.05% in the period under consideration and yet the average numbers employed per firm rose. In contrast, Germany increased it's number of firms by 26.64% in the period under review, while at the same time raising average size. If the average firm size grows, this can translate positively into a greater capacity of own resources to undertake investments on a regular basis. However, with appropriate regulation, the objective would be to grow in order to provide more quality, not just to increase productivity.

DENSITY OF ENTERPRISES PER 10.000 INHABITANTS

Closely related to the analysis of the degree of competition —and accessibility and quality of service— we have constructed an indicator of the density of architecture enterprises per 10,000 inhabitants (as is common in the literature on professional services such as used by Gottschalk et al. (2019)). Using the EU-27 data as our benchmark for the three countries under study we see there is a measure of almost 7 firms providing architectural services per 10,000 inhabitants, a ratio that we will take as reasonable or benchmark for our analysis, as shown in Figure 9 (see Appendix A).

But data differs greatly for the three countries examined with Spain showing the highest number at 10.7 in 2018. This level is broadly stable since 2013 when the worst of the economic crisis passed but compares with 14.01 in 2008, i.e. 23.57% less (significant given a more modest population growth of just 1.51% over this period).

In Finland, with a much lower number of 2.42 companies per 10,000 inhabitants there was a 20.91% decrease compared to the 2008 level of 3.06. But here population growth was higher (3.60% in the same period). Meanwhile, Germany, whose regulation is different from that of Spain or Finland registered an increase of 25.13% in the number of companies per 10,000 inhabitants up to 4.78 (for population growth of just 1.24% in the same period).

The above results compare with data on the density of architects per 1,000 inhabitants published by the Architects' Council of Europe in its 2018 edition* in which Germany and Spain were more evenly matched with 1.3 and 1.2 architects per 1,000 inhabitants, respectively, and Finland lagged somewhat further behind with 0.7.

Aspects of market dynamics and reasoning should be cautious as the divergences between the three countries are relatively clear in terms of the density shown. However, now that the effect of the crisis has passed, it seems reasonable to think that the size of the business sector in each country is reaching its equilibrium point after the harsh adjustment that took place up to 2013-2014.

Likewise, while it could be argued that competition is higher in Spain —with a greater number of architectural services firms competing with each other— compared to Finland, this is not conclusive: geographic, demographic, fiscal factors and the profile of demand (economic sectors and households) may influence the number enterprises per 10,000 inhabitants. In addition, we consider the current evidence on the incentives and benefits on the level of quality introduced by the current regulatory framework for architecture in the three countries.

Thus, the main favourable impact of regulation in these three countries on the density of competition in each market —which depends on several factors— lies in ensuring that such density is characterised by incentives for operators to improve quality and ensure good service quality. In this way, such density will not lead to the kind of price competition that erodes quality in order to pursue market share.

**Although later ACE (2020) data is available, data from 2018 is referred to in order to maintain consistency with the 2008-2018 analytical time period.*

GROSS OPERATING RATES

Last, we address the analysis of the Gross Operating Rate (GOR) or profitability —the ratio between the Gross Operating Surplus and the total turnover—. Gross operating surplus indicates, the income that remains, once the labour factor has been remunerated, to pay suppliers of equity and debt, to pay taxes, or finance investment. It also encompasses —but does not automatically equate to— net profit and remuneration to the owner.

The Gross Operating Rate is also recognised in economic literature as a gauge of the degree of market competition. Generally, a relatively higher measure of this variable is taken to indicate more constrained competition and the relative ability of suppliers to raise prices and thereby capture rents and profits. Relatively lower measures suggest a relatively higher degree of competition as operators are more constrained in extracting higher profits with the risk of losing market share or even being left out of the market. But as an indicator of profit, it should be studied with caution: it includes not just net profit but other amortization, depreciation and investment items and is influenced by many other variables and factors.

This variable has common trends for all three countries examined: firstly, this GOR or profitability fell by an average of 20% for the three countries between 2008 and 2018 (although from different levels). Meanwhile, in the EU-27 the reduction was milder, 11.71%. Figure 10 (see Appendix A) shows the general trend described above, in index format for a better understanding. It is worth noting how in Spain —where the GOR or profitability fell more sharply until 2014— they have regained momentum since then, a recovery that is also in line with improved investment levels, as noted above. By contrast, the fall in this profitability has been more sustained for Germany and Finland.

Delving deeper into the economic evidence, we find support for some economic reasoning on the impact of regulation on these Gross Operating Rate data. In a market with inelastic demand such as that of architectural services, as recognised by Weisbach and Macdonald (2004), an expected movement could be for operators to increase their Gross Operating Rates, according to Ferrer (2017), insofar as clients have little margin for choice, services are very heterogeneous and there is a high degree of personalisation. Logically, professional architectural services have no substitutes as such and other alternatives have a value close to zero for potential consumers.

Therefore, according to this literature, architectural operators could have taken advantage of this inelasticity of demand to raise prices to customers, a phenomenon that would increase their gross operating rate and, probably, their net profit. However, when we look at the evolution of the gross operating rate in Figure 11 (see Appendix A), the general trend in all three countries shows a rather steady decline, especially in Germany and Finland.

On the other hand, difficulties in access to finance for operators may also be related to an increase in the Gross Operating Rate according to Chevalier and Scharstein (1996). The explanation for this relationship is that if firms experience a rise in the cost of or loss of access to credit, they may have more incentive to increase the Gross Operating Rate or profitability in order to accumulate more equity to withstand prolonged periods of reduced activity or debt repayment, even if this means losing market share over a period of time.

Likewise, to think that the reduction in gross operating rates is due to a lower level of investment does not seem reasonable. This is because, as we showed in our analysis above, investment effort did not fall but actually recovered between 2013 and 2018. Thus, it is reasonable to conclude that regulation could have offset the downward trend observed in Gross Operating Rates by acting to sustain investment levels. This implies a positive role of regulation that would encourage quality improvement through increased investment.

As noted by Ferrer (2017) other influences on Gross Operating Rates or profitability include recessionary phases of the economic cycle, for example, specifically the impact of a contraction in demand in the construction sector that can intensify competition and puts downward pressure on profitability. But at the same time, if the severity and duration of the crisis is great, it may also lead to firms with tighter profitability being forced out of the market due to lack of resources to sustain themselves. The aggregate result of this in the market would be a rise in profitability.

Consequently, we could make a first inference in the case of an atomised business sector in the three architectural services markets:

- **A level of Gross Operating Rates interpreted as high should not be synonymous with a lack of competition**
- **Rather in many cases the opposite can be true: higher Gross Operating Rates imply greater solidity and solvency in the market and a consequent ability to continue providing services without eroding quality**
- **It should also be considered that profitability tend to be slightly higher for self-employed operators where the weight of the gross operating surplus might be higher in terms of turnover if there is little or no labour remuneration.**

On the other hand, if gross operating rates or profitability in the architectural services market show a slight but sustained decline, this could also be due to other factors to some extent. Among them, it could be a sign of a period of normalisation following the moderation in demand for their services due to the crisis and the readjustment of economic sectors such as construction. Moreover, if we assume that the regulatory framework in each country encourages investment in training (often organised by the professional organisations themselves) and in quality, —as we have seen according to the behaviour of the previous macroeconomic variables— and also a better adaptation to changing market conditions with greater mobility and flexibility, it is possible that architectural professionals are intensifying their allocative efficiency, and their technical efficiency.

Allocative efficiency would occur when the professional is able to use the means and resources to carry out his or her activity at the lowest cost (without reducing quality). In turn, the professional would also be more technically efficient if he/she is able to combine his/her productive resources to provide more services in the best possible way. In this sense, greater training, experience and technology could speed up and improve certain processes in the provision of architectural services.

In short, in the aggregate reduction of the gross operating rate of the market, it cannot be ruled out that the better criteria applied by architects thanks to the current regulatory framework in each country may contribute, for example, to a better selection of the amortisation of certain productive resources that can reduce the financial burden and, at the same time, maintain a desirable level of investment in order to provide the necessary quality. All of this could favour a slight moderation of the gross operating rate, although it is to be hoped that it would never be too low if there is adequate regulation to avoid the incentive to reduce investment in quality.

We have seen that there are two main exogenous factors in the evolution of these Gross Operating Rates: the economic cycle and the conditions of access to financing, which can put upward or downward pressure on these levels.

However, we have also seen that there is another series of endogenous factors associated with the very nature of the architectural services sector that can also explain the evolution of Gross Operating Rates far from the orthodoxy of the functioning of a common market. These include: the degree of atomisation of operators, the inelasticity of demand, levels of investment, and training and experience in the management of means and resources.

In all these endogenous factors, the current regulation of architectural services would play an important role in the behaviour of market players and their decisions, which ultimately influence Gross Operating Rates.

Consequently, the core regulation of architectural services in Germany, Spain and Finland, insofar as it introduces certain conditions of access, exercise and responsibility, exerts a stabilising force on the market dynamics in favour of improving the average level of quality.

CONCLUSION

In section 3.1. we carried out an analysis of the architectural services sector, with a fundamental theoretical foundation, to demonstrate how regulation can have a favourable social and economic impacts. For this purpose and using the most accurate and reliable official data on architectural services for the period 2008-2018 for Spain, Germany and Finland we have followed a logical study structure whose aim has been to empirically demonstrate this positive impact of regulation for society.

In section 3.1.2. we analysed the overall performance of the main macroeconomic variables. We found that the impact of the Great Recession of 2008 and the real estate bubble affected the three countries with different intensity, a situation that provides a warning about the risks of applying the same economic and regulatory policy when there are different exogenous and endogenous conditions.

However, after the recovery, the three countries have experienced a normalisation of their activity and also some synchronisation with a growth in building permits of 20% since 2015. This recovery can also be seen in the positive evolution of exports of architectural services since 2013 within the Eurozone, a sign of level competitiveness and innovation in architectural services. Meanwhile, in terms of employment, our analysis shows a high degree of atomisation in business ownership, especially in Spain.

In section 3.1.3 we examined the relationship between the performance of a series of macroeconomic variables in the three countries on the one hand and regulation on the other. This leads to the following conclusions: First, after the 2008 crisis, regulation acts as a stabiliser of investment levels that determine the level of quality applied; Second, intangible assets such as training are determinant in architectural services and regulation encourages desirable productivity growth by reducing the risk of overtreatment, undertreatment and overcharging.

In terms of churn rate, regulation can contribute to greater stability of operators in the market. This in turn can provide more incentives to deliver quality and strengthening the collective reputation of the profession.

On the other hand, atomisation of ownership in the three countries does not seem to erode the dynamics of competition based on quality. Similarly, with regard to the behaviour of the Gross Operating Rate, it is possible to point out that a level considered high should not be interpreted as denoting a lack of competition, but rather in most cases shows adequate solvency to offer the necessary quality. Moreover, in a market that is too fragmented or atomised, it should be considered that operators' net profits may tend to be lower.

In the following sections of chapter 3, we explore the influence of architecture regulation from other perspectives, in section 3.2 we present the experimental development of our Economic Improvements through Architecture Regulation Indicator (EIARI) and in section 3.3 we test the strength of the relationships between the macroeconomic variables and regulation that we studied in section 3.1.3.

APPROACHING THE IMPACT OF THE QUALITY OF ARCHITECTURAL SERVICES

This section explores the concept of quality in architectural services in greater depth and aims to measure it by means of various variables and indicators. Here we put this in the context of the European Directive 2018/958 on the proportionality test, which states that Member States must ensure that regulations governing access to and the exercise of professions are justified by "public interest" objectives.

Among the "public interest" objectives listed by the European Commission, the Architects' Council of Europe (ACE) identifies a number that are particularly relevant to architectural services:

- Public health and safety
- Protection of consumers
- Protections of recipients and workers
- Protection of the environment
- Protection of the urban environment
- Safeguarding intellectual property
- Protection and conservation of national historical and artistic heritage
- Upholding social policy and cultural policy

The architectural profession has a wide range of impacts. These carry with them externalities affecting the socio-economic sector, externalities that regulation can condition in various ways, as shown above. In this section we aim to capture, in a proximate way, how these public interest objectives are addressed by regulation and their relationship —which may be indirect— with the level of quality achieved in the built environment and its evolution.

The concept of the quality of the built environment, or Baukultur, cited in the HOAI case, is a compelling reason of general interest that can only be justified if it is proven that this objective is ensured by the legal system and not in isolation.

In this respect, as an example, if we refer to the quality of the architectural project, it will basically consist of three parts:

1. Design and Documentation
2. Execution of work
3. Management of a building during its useful life.

The first of these can play a more decisive role than the other two when it comes to determining the average quality level of a building in the medium and long term, as well as avoiding possible risks and cost overruns.

These elements —with a focus on the built environment— are used here to define the necessary criteria with which to search for and select some variables and indicators that can better capture the impact of the quality of architectural services as consistent with the achievement of public interest objectives.

To this end, we will use the statistics provided by Eurostat to point out the relevance of the variables and indicators selected. And we will reflect on all of them to assess how we might construct an aggregate indicator that integrates them and gives an approximate periodic and interpretable gauge of the economic improvements that result from architecture as currently regulated.

WEIGHTED AND UPDATED INDICATOR ON ECONOMIC IMPROVEMENTS THROUGH THE REGULATION OF ARCHITECTURE (EIARI)

Having presented the conceptual and technical framework to measure the welfare impact of architectural service quality, we now address the key variables selected that help us measure its economic, social and environmental aspects and, when integrated, provide an "Economic Improvements through Architecture Regulation Indicator" (EIARI).

We present an experimental indicator that aims to capture, approximately, the level and evolution of the economic improvements due to the regulatory framework of architecture in each country. Its composition is derived from a series of variables used together with what we call the investment effort —collected in the macroeconomic analysis above—that, using a specific logic and treatment, are transformed into components of the indicator in order to better identify this concept (of economic improvements) at both a component and aggregate level.

For simplicity, we imagine two broad types of effect: socio-economic and environmental-health. Thus defined, they can lay the groundwork for developing and refining an index that is calibrated as accurately as possible in a way that is consistent with our conceptual approach.

METHODOLOGY AND CONSIDERATIONS

The EIARI calculation is an aggregate of the result of the eight components that make up the two blocks we have mentioned: socio-economic and environmental-health. In general terms, the result of each component in each of the three countries is established as a ratio of the data it reflects in the European Union of 27.

Consequently, if the EIARI score is equal to or greater than 1, it will be a positive sign of the economic, environmental and health improvements brought about by the practice of architecture in a country with its regulation, with respect to the EU-27. On the contrary, if the EIARI is less than 1, it will indicate that the economic, environmental and health improvements brought about by architecture with its regulation are below the performance of the EU-27.

This ratio, around 1, is then given specific weights (see 3.2.1.2 and 3.2.1.3. below) for each of the eight selected components. The sum of these components is the resulting EIARI index value for each year, which, as described above, would normally be around 1. To obtain the evolution of the EIARI index value it will be necessary to calibrate the data for the eight components each year.

The EIARI is experimental and in future, as other data becomes available, the references used for each could be enhanced and improved in ways that reflect more precisely what we are trying to measure. Ideally it would enable us to measure absolute rather than just relative (improvement or worsening) trends.

Together with the more directly measurable variables on architecture, we have chosen a series of variables that reflect common criterion: They have an indirect but sufficient relationship with architecture and are usable as proxy variables (this approach is common in experimental economic analysis and in our case necessitated by limited data availability). In Chapter 5 we recommend developing and regularising the collection of data in future to enhance accuracy.

SOCIO-ECONOMIC IMPACT COMPONENTS IN THE EIARI

Investment effort of the business sector of architectural services (20% weight in EIARI): This is interpreted as a predictor of the economic improvements that can be introduced by the regulation of architecture creating incentives to improve service quality.

Expenditure on maintenance and repair of dwellings (10% weight in EIARI): This component is a proxy signal on the basic implemented quality on a dwelling. It captures expenditure incurred to maintain dwellings in good working order. It is assumed that this expenditure will not be too high or too low due to the current regulation in each country (this assumes in turn a minimum level of quality and safety standards).

Volume in relative terms of housing over 50 years old (20% weight in EIARI): This component aims to observe a signal on the proper rehabilitation work carried out by architecture that allows to maintain and generate economic improvements. After 50 years, dwellings must undergo various technical and assessment reports in order to remain habitable in full condition, for example in Spain. Moreover, according to Life Cycle Assessment (LCA) studies, buildings generally have a useful life of 50 years.

ENVIRONMENTAL AND HEALTH IMPACT COMPONENTS IN THE EIARI

Overcrowding and distribution of dwellings from territory (20% weight in EIARI): This component focuses on the concept of overcrowding* (see footnote* below). This component provides a proxy signal about the degree of population agglomeration. Evidence suggests that overcrowded households tend to be in the urban areas most in demand for living for either work, economic or cultural reasons. A shortage of housing —leading to higher purchase and rental prices— may also lead to overcrowding as occupants share costs of housing. It also takes into account the distribution of the number of dwellings in each country according to the type of territory defined by the EU Buildings Database (See Appendix A). Overcrowding causes a likely deterioration of the built environment that can lead to saturation of public spaces, poorer mobility, poorer "liveability" conditions and a reduced efficiency of some economic activities, all situations that may require architectural responses to overcome.

Final consumption of renewable energies and bio-fuels by households (10% weight in EIARI): This component aims to obtain an approximate measure of the installed capacity and availability of households to consume renewable energy and bio-fuels both in their homes and the rest of the built environment.

Greenhouse gas emissions by construction (5% weight in EIARI): This component establishes a relationship between the economic relevance of construction and its impact on pollution.

Pollution, grime and other environmental problems (10% weight in EIARI): This component captures the percentage of the population in each country that does not consider their housing to be affected by issues such as road dust, vehicle emissions, smoke, dust or unpleasant odours from factories, sewage, or polluted water from pipes.

Noise from neighbours or from the street. (5% weight in EIARI): This component captures the percentage of the population in each country that does not consider their dwelling to be affected by outdoor noise problems linked to traffic (street or road, aircraft, railway), linked to businesses, factories, agricultural activities, or yards, etc.

EVOLUTION OF THE EIARI

Having defined and calculated the components that make up our EIARI, we now analyse its performance for Germany, Spain and Finland between 2008 and 2018. For all three countries the value of EIARI is above 1. This means that their level and evolution have remained within desirable margins in recent years. For most recent data, for 2018, EIARI values of between 1.1 and 1.5 were recorded for each country. But it is worth noting that all three countries have remained, with slight variations above 1 in the period 2008-2018.

Germany recorded an EIARI of 1,03 in 2018, showing an essentially flat evolution over recent years but with gentle downward slope that stabilised from 2013 onwards. In addition, Germany has the most balanced distribution of the two blocks, with a slightly more favourable weight of the socio-economic components.

Spain recorded an EIARI of 1,51 in 2018 showing the most positive evolution of the three countries of the EIARI, and exceeding a level of 1.50, a figure that seems to have been consolidated in recent years after the crisis. The figure for the socio-economic components remains stable and it is the figure for the environmental and health components that explains the better overall balance of the EIARI.

Finally, **Finland** recorded an EIARI of 1,30 in 2018 reflecting two trends so far: between 2008 and 2013 (the depths of the global financial crisis) there was to decrease that of three tenths of a point, from 1.6 to 1.3 (more pronounced than in Germany). Since 2013, its behaviour has been more stable at around 1.3 with less change in its components.

SUMMARY OVERVIEW OF BOTH SOCIO-ECONOMIC AND ENVIRONMENTAL-HEALTH SUB-COMPONENTS

In this section we present the graphical evolution (see Figure 4, below) together with the evolution of its two main component blocks: socio-economic and environment and health. As described above, all three countries have remained above 1 in the overall EIARI in the period 2008 - 2018. This evolution is mainly explained by the evolution of their components as we can see in table 1. Thus, in the case of Germany, it has shown the most stable evolution, especially since 2013.

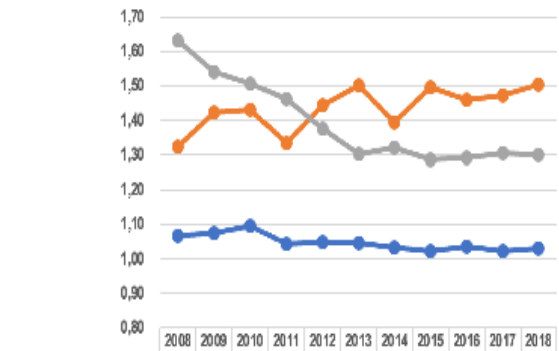
In this line, its block of socio-economic components has shown the best performance. If we look at Spain's progression, its line has been slightly upward and the block of environmental and health components has been more favourable. Meanwhile, in the case of Finland, despite a slight drop until 2013 due to a slight deterioration in the block of socio-economic components, since then it has achieved a stable and still positive trend.

** The overcrowding rate is defined as the percentage of the population living in an overcrowded household. An overcrowded household is defined as one that does not have at its disposal a minimum number of rooms equal to: One room for the household; one room per couple in the household; one room for each single person aged 18 or more; one room per pair of single people of the same gender between 12 and 17 years of age; one room for each single person between 12 and 17 years of age and not included in the previous category; one room per pair of children under 12 years of age.*

Therefore, the work initiated with this indicator opens a promising horizon for future research to achieve a deeper and more precise development of the described objectives that the EIARI intends to measure in absolute and relative terms. In short, it can be a reference of interest and common dialogue between the European Commission and professional architectural organisations on the impacts of regulation.

*Source Figure 4: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Value added at factor cost; and National accounts aggregates by industry (up to NACE A*64) (nama_10_a64).*

FIGURE 4. ECONOMIC IMPROVEMENTS THROUGH ARCHITECTURE REGULATION INDICATOR (EIARI)



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EIARI - GERMANY	1,07	1,08	1,10	1,04	1,05	1,05	1,03	1,02	1,04	1,02	1,03
EIARI - SPAIN	1,32	1,42	1,43	1,33	1,44	1,50	1,39	1,50	1,46	1,47	1,51
EIARI - FINLAND	1,63	1,54	1,51	1,46	1,38	1,30	1,32	1,29	1,29	1,31	1,30

ECONOMETRIC MODEL

The purpose of this section is to estimate approximately the intensity of the relationships studied and established in the macroeconomic analysis, as well as the influence of the regulation of architectural services in the three countries on their economic performance and on the economic improvement indicator (EIARI). In this way, we propose a model supported by economic evidence which invites us to continue and contrast its line in future research. (See Appendix B)

The design of the following equations of our model has reference in those used by the European Commission in some studies that have evaluated the influence of the regulation on some professional services on Gross Operating Rates, on the growth of the number of operators, or on the dynamism of the market through the business churn rate.

In the first equation we seek to estimate the influence of the OECD ex ante and ex post PMR regulation indicators on Gross Operating Rates or profitability in the architectural services sector. According to our estimates, both the indicator that captures the level of ex ante, or entry, regulation and the indicator of the level of ex post, or conduct, regulation have a limited influence on the behaviour of this profitability. A situation that invites us to reflect on a more indirect impact of regulation through other macroeconomic variables whose relationship we estimate in the following equation.

In the following equation, we estimate the role of the main macroeconomic variables, which may be influenced by architecture regulation and, at the same time, influence on Gross Operating Rates or profitability in architectural services. We take a closer look at some of the relationships described and studied in the macroeconomic analysis in order to get a more approximate dimension of the impact of the regulation of architecture in the three countries.

In conclusion, the behaviour of Gross Operating Rates would contribute, to a greater extent, to providing more quality in architectural services in line with the purpose of their regulation in each country.

TABLE 1. EIARI EVOLUTION 2008-2018

COUNTRIES	EIARI	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GERMANY	TOTAL	1,07	1,08	1,10	1,04	1,05	1,05	1,03	1,02	1,04	1,02	1,03
	ECO	0,59	0,60	0,61	0,55	0,55	0,55	0,54	0,53	0,55	0,54	0,54
	E & H	0,48	0,48	0,49	0,49	0,50	0,49	0,49	0,49	0,48	0,49	0,49
SPAIN	TOTAL	1,32	1,42	1,43	1,33	1,44	1,50	1,39	1,50	1,46	1,47	1,51
	ECO	0,48	0,49	0,52	0,41	0,55	0,45	0,35	0,45	0,45	0,50	0,53
	E & H	0,84	0,93	0,91	0,92	0,89	1,06	1,05	1,05	1,01	0,97	0,97
FINLAND	TOTAL	1,63	1,54	1,51	1,46	1,38	1,30	1,32	1,29	1,29	1,31	1,30
	ECO	1,06	0,97	0,94	0,89	0,81	0,75	0,76	0,72	0,72	0,71	0,71
	E & H	0,58	0,57	0,57	0,57	0,56	0,56	0,56	0,57	0,57	0,59	0,59

Source Table 1: Own elaboration. Notes: TOTAL: overall result of the EIARI; ECO: result of the socio-economic components; E & H: result of the environmental and health components.

We could point out that, a priori, investment is a factor with sufficient weight to explain the evolution of Gross Operating Rates. A situation in line with the argumentation reflected in the macroeconomic analysis. It is possible to point out with some solidity that an increase in investment and, therefore, its upward pressure on profitability, would be encouraged by regulation in order to improve the level of quality provided to clients, and to strengthen the collective reputation of the profession.

We can argue that if the impact of productivity increases may be less than the impact on the rise in Gross Operating Rates, it cannot be ruled out that this may be due to the regulatory framework of the profession in the three countries. In other words, the effect of current regulation would favour the reduction of the inefficiencies of overtreatment, undertreatment and overcharging. It would also support the argument that current regulation allows for competition and does not excessively damage Gross Operating Rates so that architecture operators can provide the necessary quality in their services.

Another variable of great interest in explaining the growth of Gross Operating Rates is the higher percentage of self-employed architects over total employment in the business sector of architectural services. However, the explanation for this is that, as they do not have to pay staff remuneration, this leaves more room for profitability. It should be remembered that the gross operating rate takes into account several elements, such as the operator's disposable income to pay equity and debt providers, to pay taxes or finance investments. It also includes the net profit and the owner's remuneration, but this part is likely to be minimal in a market that is too fragmented or atomised.

Finally, with the third equation we estimate the influence of ex ante and ex post regulation indicators of architectural services on the economic improvements indicator (EIARI). In this sense, in the estimation exercise on the relationship between the ex ante and ex post regulation indicators on the indicator of economic improvements produced by the architecture due to its regulation, we can cautiously point out some issues. First, we see that both indicators would be significant in explaining the evolution of the indicator of economic improvements, albeit with some differences. The relationship establishes that if the ex ante regulation and ex post regulation indicators rise from current levels, this may lead to improvements in the EIARI.

Among them, we observe that the ex ante regulation indicator has a greater impact on this indicator in percentage terms, while the ex post indicator has a positive, albeit less intense, influence. However, the effect of the latter is felt one year later, as we can see when introducing a time lag in the estimation.

Consequently, future research is especially invited to test this latter estimation in order to corroborate and refine with more data the strength of this relationship between regulation and the indicator of economic improvements favoured by the exercise of architecture through its regulation.

Chapter 4 Context, case studies and commonalities

INTRODUCTION

As noted in Chapter 1 (subsection 1.2.2.2) the issue of regulation in Architectural Services in the EU is the subject of intensifying discussion and analysis by the EU Commission. Unfortunately, this discussion and analysis is not situated in the correct theoretical and empirical context, nor is it informed by adequate analysis or study. The preceding chapters of this report have demonstrated how important regulation of Architectural Services is to public welfare. In this chapter we examine approaches to regulation in three selected countries of the EU. As well as further underlining the necessary contribution of regulation to the public interest, this is done with two additional goals in mind:

First, **the complexity and diversity of these approaches needs to be underlined**: Attempting to do away with this diversity to pursue short-term and arguably short-sighted goals of growth through "greater competition" ignores the fact that regulatory approaches differ for a reason: Differences in climate, language and legal systems necessarily dictate different approaches to building, different standards and choice of materials and methods, different training and different systems of insurance, redress and monitoring: There are also long standing and distinctive cultural and historical features and traditions of architecture in each Member State, which are intimately supportive of the public credibility that supports the profession in these countries (a characteristic that, as we have seen from Chapter 2, is crucial to the public interest). Therefore, attempting to superimpose a "one size fits all" regime on such diversity is clearly fraught with risk.

Second, **by identifying common features of regulation** we hope that we can move dialogue between the Architectural profession and the EU Commission from weak foundations and short-term perspectives to much stronger foundations (building on areas of common interest such as advancing the low carbon and digitisation agendas in the industry) and a longer-term more sustainable approach to growth, productivity and competitiveness, that focuses on the dimensions of productivity that – as we have shown in Chapters 2 and 3 – are appropriate for the Architectural profession: Improving public safety and economic, social and environmental welfare by improving the quality of the built environment.

EX ANTE AND EX POST REGULATION

In terms of regulation and monitoring tools, it has to be noted from the very beginning that there are two main models of regulation in Europe:

- **"Ex ante control systems"**, referring to title protection, compulsory registration and, in some cases, duly justified reserved functions.
- **"Ex post control systems",** referring to insurance requirement, Continuing Professional Development-CPD, professional certifications schemes, local regulations or building inspections.

All European models of architectural professional regulation are nonetheless united in pursuit of the general interest, regardless of national culture or legal order, reflecting a common pursuit, by professional architecture bodies, of improving their impact on the rights and welfare of the citizens they serve.

The model as a whole, whatever its regulatory structure may be, cannot be considered as unjustified under European law. Decisions about opportunity, necessity and proportionality of specific regulations require an adequate and detailed analysis of each rule and provision as stated in the Proportionality Directive.

It has been shown how, as a whole, differing European regulatory models have undoubtedly reached the objectives of general interest at the highest level of required standards in the framework of building and architecture. But what needs to be stressed is how this has been achieved: not just by overarching commonalities, but by the varying contexts at Member State level that, by adapting professional capacity to specific local conditions, have enabled qualifications to receive automatic recognition and allowed this system to work correctly in the architectural sector.

No significant problems have been detected in this sub-sector. And through the recognition of qualifications across the EU, as shown in Chapter 1, the profession has achieved a significant share of architects working (22%) who have been trained in countries other than their current country of practice, a sign that the policy of Community harmonisation is working and is consistent with distinctive national regulation. Models must be further developed of course and in this chapter we aim to contribute positively to thinking in this area. Two main EU objectives are important: facilitating the mobility of architectural professionals and boosting their competitiveness in a long-term sustainable manner.

Overview of education and training of architects in the European Union
Third Level Architectural training – which is equivalent across Europe and, under Directive 2005/36/EC also recognised across the EU typically covers a common set of subjects for all EU Member States. Professional qualifications* are most typically achieved by a bachelor's degree (3 years) followed by a Master's degree (2 years) on a speciality design area or 6 years academic training (longer in some countries).

In recognising the importance for the public interest and its impact, Directive 2005/36/EC further requires that "*all providers of architectural services shall ensure that they continually maintain and develop their professional knowledge and skill in all areas relevant to their practices*** ".

This is typically achieved through practical project work experience and Continuing Professional Development (CPD) hours (which is either mandatory by law, Code of Conduct, encouraged, facilitated and monitored by professional architectural bodies or by self-assessment). Some countries in the EU additionally require relevant professional experience, in years, in order to register as architects (ex ante control) or perform demanding design tasks (ex post control) as in Finland. Overleaf, we examine case studies for the regulation of architectural services in Spain, Germany and Finland.

CASE STUDIES
SPAIN

SPAIN	
WEIGHT OF ARCHITECTURAL SERVICES	
IN GROSS VALUE ADDED	0,14%
IN TOTAL EMPLOYMENT	0,35%
IN BUSINESS FABRIC	1,90%
PERSONS EMPLOYED PER ENTERPRISE	1,4
ARCHITECTURAL PROFESSION	47.600 ARCHITECTS

SOURCE: OWN ELABORATION AND THE ARCHITECTURAL PROFESSION IN EUROPE 2020 A SECTOR STUDY (ARCHITECTS' COUNCIL OF EUROPE) 2018 AND 2020.

Regulatory approach: The general framework for building sector and architectural practice regulation is established at national (as distinct from autonomous state) level in Spain. Architectural regulation in Spain refers to title protection, compulsory registration, project authorization and reserved functions. Spain can therefore be described as an **ex ante control system,** in accordance with continental legal tradition. The key legislative pillars of architectural regulation in Spain can be consulted in the Annex.

Education of architects and recognition of professional qualifications
The 1999 Building Act sets out reserved functions for architects as designers or project managers and gives them exclusive rights when the principal use of the building falls into one of the following categories: *"Administrative, health, religious, residential, educational and cultural buildings".*

This is prompted by the uses of buildings covered by those reserved functions require a type of horizontal training focused on functions, inhabitability, and safety which only architects have received.

The need to have a diploma in architecture to pursue such professional activities is included amongst the "obligations of the designer", this being the law itself that establishes the causal link between reserved functions (requirement of a Diploma in architecture) and public interest (guarantees for users and definition of basic requirements).

The 1999 Building Act assumes that there is an indivisible bond between qualifications and professional competence which is based on a core principle: **professional functions are linked to qualifications.**

Architects benefit from the **automatic recognition** on the basis of harmonised minimum training requirements of professional qualifications laid down in the referred Directive 2005/36/EC.

Regulation
Regulation of title/Registration: compulsory professional Order membership.

Requirement for Professional Experience for registration: No

Mandatory CPD: Not by law but recommended by Code of Conduct.

Reserved activities: Spanish legislators have considered that only architects have the necessary training for certain exclusively reserved professional activities. (See above)

Validation of competence and control: compulsory Professional Order membership makes a decisive contribution to the guaranteed safety of the building - and hence of its users. It ensures that the professional skills contracted by the client are applied by someone who has the necessary technical qualifications and compulsory professional Order endorsement, as well as a commitment to a Code of Ethics.

[1]

** https://www.ace-cae.eu/architects-in-europe/*
***Article 22(b) and Recital 39 of the Qualifications Directive, 2005/36/EC*

The National Professional Order in Spain is the Consejo Superior de Colegios de Arquitectos de España (CSCAE, www.cscae.com) Protection of the Spanish architectural, historical-cultural heritage and town planning is thus achieved by compulsory professional Order membership. Without this instrument to control and manage the profession, the quality of architecture and the responsibility of an architect's professional practice would clearly be left unprotected. The Royal Decree 1000/2010 of 5 August clearly states that the endorsement by **Architects' Orders of technical projects** ensures the safety of buildings and hence public safety.

A Professional Order's ex ante endorsement of projects is a **public function**, one that transcends purely internal obligations of the professional Order to its members. Being entrusted with this responsibility, Spain's Professional Orders control of the members' practice - in a public as well as professional capacity – through a dual function:

- Subjectively by removing the risks of encroachment and by guaranteeing professional, technical and legal suitability of the author of a particular project; and
- Objectively, by controlling, checking and certifying that the project is complete.

Official Professional Order endorsement is an ideal technical planning tool to increase the quality of buildings. At the same time, the previous design control contributes to accelerate building permissions by local administrations.

Professional Insurance: There is no obligation at state level to have liability insurance for the exercise of the profession. There are, however, autonomous regulations that require it.

Regulated Pricing: For the time being, fee tariffs are prohibited as well as the recommendation of fees.

Justifications/specific risks or benefits: Taking into account the Spanish reasoning included in legal texts and Court of Justice case law, the Spanish regulation concerning protection of title, reserved functions, compulsory registration and compulsory endorsement of projects by Architects' Orders can, in the public interest, avoid or minimize risks in the areas of building safety, client's and user's rights protection, environmental damage, heritage damage, urban damage, quality of the built environment.

Tasks of architects covered by this regulation:
Professional functions in the construction sector that are the competence of architects under legislation in force are of a general nature, reflecting their integral, transversal nature, while other professionals have accessory functions in the building industry when the specific work or action is covered by their specialised fields. Core competences and other duties developed by Architects in Spain could be consulted in the Annex.

GERMANY	
WEIGHT OF ARCHITECTURAL SERVICES	
IN GROSS VALUE ADDED	0,24%
IN TOTAL EMPLOYMENT	0,35%
IN BUSINESS FABRIC	1,52%
PERSONS EMPLOYED PER ENTERPRISE	4
ARCHITECTURAL PROFESSION	117.500 ARCHITECTS

SOURCE: OWN ELABORATION AND THE ARCHITECTURAL PROFESSION IN EUROPE 2020 A SECTOR STUDY (ARCHITECTS' COUNCIL OF EUROPE) 2018 AND 2020.

Regulatory approach: The regulatory approach in Germany can be considered an ex ante control system. The key legislative pillars of architectural regulation in Germany can be consulted in the Annex.

Education of architects and recognition of professional qualifications
For registration as architect (see below), a diploma (Master) and at least two years of practice are required. At German universities, acquiring a bachelor's and master's degree takes about five to six years. The bachelor's degree from a German University of Applied Science takes a minimum of three to four years.

Recognition of qualifications: Architects benefit from the automatic recognition on the basis of harmonised minimum training requirements of professional qualifications laid down in Directive 2005/36/EC.

Regulation
Regulation of title/Registration: In Germany, the profession of architects is one of the liberal professions whose titles are protected by law. Architects are obliged to register at the chamber of the federal state ("Länderkammer") where they are settled and are awarded the title ("Architekt").

The regulations vary between the different states. The same holds for the professional titles of "Innenarchitekt" (interior architect), "Landschaftsarchitekt" (landscape architect) and "Stadtplaner" (urban planner).

Professional experience: For registration as architect a diploma (Master) and at least two years of practice are required.

Validation of competence to design buildings: In Germany, chambers of architects oversee the protection of the professional title of architect in the context of their mandate. The chambers of the federal states safeguard the professional interests of their members and the reputation of the profession, advise the members on matters relating to professional practice and supervise the performance of professional duties. Moreover, the chambers promote and provide vocational training.

Professional liability insurance for architects: The conclusion of a professional liability insurance contract is mandatory for membership in the chambers of the states.

Regulated pricing: In Germany, remuneration for architectural services used to be based on the Fee scale for architects and engineers ("Honorarordnung für Architekten und Ingenieure", HOAI). The fee scale defined upper and lower limits for architects' fees.

In July 2019, the European Court of Justice (CJEU) ruled that obligatory binding minimum and maximum fees do not comply with European law. Binding minimum and maximum fees were abolished, but now serve as a recommendation and orientation. Whenever there is no or no valid agreement, the minimum fee rate of the HOAI is deemed to have been agreed.

Regulatory approach: The regulatory approach in Germany can be considered an ex ante control system. In recent decades, there has been a de-bureaucratisation and deregulation of the building permit procedure. As a consequence, the German supervisory authorities for the building sector are becoming less and less involved in the preventative scrutiny of construction projects. The significant increase in the degree of responsibility is also reflected in architects' entitlement to submit building documents (that is the right to draw up and sign building documents and thus to assume the responsibility under public law for the completeness and appropriateness of these documents).

Justifications/Specific risks or benefits:

- Consumer protection
- Public health and safety
- Protection of the environment and the urban environment, including town and country planning
- Heritage protection
- De-bureaucratisation and deregulation of building permit procedure (see above)

Tasks, roles and duties of (architects) designers

The general spectrum of an architect's professional responsibilities include the design, technical, energy-related, economic, environmental and social planning of buildings, the production of building documents and the supervision of the building work (cf. Section 3 of the Model Architects Act and the architects acts of the states). Specifically: Design documentation; Construction planning; Construction management; Cost controlling; Tender and bidding; Project management; Heritage protection and Facility management.

FINLAND	
WEIGHT OF ARCHITECTURAL SERVICES	
IN GROSS VALUE ADDED	0,18%
IN TOTAL EMPLOYMENT	0,19%
IN BUSINESS FABRIC	0,58%
PERSONS EMPLOYED PER ENTERPRISE	3,7
ARCHITECTURAL PROFESSION	3,800 ARCHITECTS

SOURCE: OWN ELABORATION AND THE ARCHITECTURAL PROFESSION IN EUROPE 2020 A SECTOR STUDY (ARCHITECTS' COUNCIL OF EUROPE) 2018 AND 2020.

In Finland neither architecture nor the profession is regulated, Planning, design and building is regulated.

The **title** of architect is not regulated in FInland, **nor are there reserved functions for architects**. An ex post control regulatory model for building / urban design is used here.
Regulation is based on the assessment of difficulty classes of building design tasks in a project and the validation of educational qualifications and work experience of the project designers. The assessment and validation process is administered by the Building Supervision Authorities in which the project is located on a case by case basis at the single stage Building Permit process.

Regulatory approach: The general framework for the building sector and the design of buildings in Finland is established at national level. Regulation of all building design professions (including architects) in Finland refers to the validation by the local Supervising Building Authority (in a building permit process) on a case by case basis of the academic training and work experience credentials of designers matched to the specific demands of the Design Tasks involved in a building project. Regulation is therefore framed within **an ex post control system** within the continental legal tradition. The key legislative pillars of architectural regulation in Finland can be consulted in the Annex. The Finnish government is currently in the process of reforming the primary Land Use and Building Act. The reforms planned include a focus on Design Quality, mandatory registration of **building inspectors as well** as designers practicing difficult, (very difficult) and exceptionally difficult design tasks **in the context of Building Permit process.**

Education of architects and recognition of professional qualifications

The Finnish system of regulation permits Building Designers with differing levels of architectural and construction education and work experience to design buildings based on the difficulty class of design tasks involved.
The Land Use and Building Act clearly establishes that the competence of building designers, provided through their specific academic / formal education and work experience determines their ability to meet the demands of design tasks of differing levels of complexity, and deliver Design Quality and Value in the general interest. The requirements for education cannot be compensated with experience or vice versa.

The Difficulty Classes of Design Task*
These are defined as Minor, Conventional, Difficult and Exceptionally Difficult.

Only university qualified Architects are generally permitted as Building Designers / Principal Designers for Exceptionally Difficult Design Tasks once work experience validation (6 years) requirements are also met. This recognition within the Act explicitly values the unique competence of Architects / Building Designers with higher university degrees through their training and experience** to successfully meet the most demanding building design tasks. Other Designers can act as Building Designers based on their training and work experience. For example Construction Architects for classes of Minor, Conventional and Difficult Design Tasks once validation requirements are met or gain additional higher level qualifications for Exceptionally Difficult Design Tasks (maximum of 5% of all building design tasks annually). The Land Use and Building Act assumes that there is an indivisible bond between qualifications, relevant work experience and professional competence which is based on a core principle: **professional functions are linked to qualifications and experience**. An architect's professional competence is defined in Europe by Directive 2005/36/EC, and in Finland by The National Framework for Qualifications Act 93/2017,which sets out the requirements for university degrees in architecture, suitability criteria (qualitative training) and sufficiency (quantitative training). Together these form the basis for the education of Architects, and Architects trained in Finland can benefit from **automatic recognition** across Europe once the training meets the criteria set out in Directive 2005/36/EC. Architects trained in other EU countries must currently follow the process administered by T**he Finnish National Agency for Education** to receive formal recognition of equivalent qualifications to work only as Responsible Principal / Building Designer (Architect) in Finland.

Continuing Professional Development is promoted, provided by **SAFA*****, (Finnish Association of Architects representing 75% of architects) and partner organisations, Universities, and Firms. It is not mandatory but a core requirement of the Code of Ethics / Conduct of **FISE ******** (Independent voluntary Certification body for the Construction, HVAC and Real Estate Sectors). SAFA promotes best professional practice through its activities and its members commitment to its Code of Conduct. FISE maintains a voluntary register for architects and other design professionals within the industry, and based on validated qualifications, employment records and training. This register is optional under law for Supervising Building Authorities to use in their assessment of qualifications and experience of Designers for each project / building permit assessed. SAFA and FISE do not have a legal mandate under current legislation.

Regulation
Validation of competence and control: In Finland the *Supervising Building Authority* in each local area has the sole legal responsibility for the validation of the educational qualifications and work experience required of Architects (Principal Designers, Building Designers,) Special Designers and Responsible Site Manager to design and implement building projects on a case by case basis for the design task complexity. Contents and details of drawings, calculations and reports are set out in the legislation. Protection of the Finnish architectural quality, historical-cultural heritage and town planning is thus achieved by one state entity regulating the building design and construction tasks As a single stage Building Permit process where detailed master details drawings, calculations and reports are submitted, the competence of the designers, validated by the Building Supervising Authority will determine the design quality outcome.

Professional Insurance: There is no obligation at state level to have liability insurance for the exercise of the profession, but many clients do request it.

Regulated Pricing: Fee tariffs are prohibited since early 1990's, as well as the recommendation of fees.

Justifications/specific risks or benefits: The current ex post control system is able to minimise risks based on the following overriding reasons of general interest: safety risks, protection of client's and user's rights, environmental damage, heritage damage, urban damage, quality of the built environment. In validating the credentials of designers to meet the specific demands of design tasks the Building Supervising Authority protects the general interest.

Tasks, roles and duties of architects / designers
The professional functions in the construction sector which are the competence of architects under the legislation in force are of a general type due to their integral, transversal nature, while other designers have accessory functions in the building industry when the specific work or action is covered by their specialised fields. Architects / Designers perform the roles of Principal Designer and / or Building Designer in this system. Core competences and other competences developed by Architects in Finland can be consulted in the Annex.

COMMONALITIES
As differing regulatory systems are based on national legal frameworks, direct comparisons between their effects is not always possible. We can, however, observe how they respond to safeguarding the key characteristics of the architectural profession and the public interest motives that underly regulations in the first place, ultimately protecting the recipients of the services and society from negative external effects.

**National Building Code Guidelines YM1 https://ym.fi/en/the-national-building-code-of-finland*
***National Building Code Guidelines YM2*
**** https://www.safa.fi/en/*
*****https://fise.fi/en/*

These overriding reasons of public interest and the analysis of the proportionality of regulations enable us to observe that, despite their variety, there is a strong convergence in serving the public interest, due to 'commonalities' in the objectives of regulations which apply sensitively in national legal contexts. As set out in Article 15 of the Services Directive and recently further developed by the Proportionality Directive, regulatory requirements must be neither directly nor indirectly discriminatory, must be justified by overriding public interest reasons, must be suitable to secure the objective pursued, must not go beyond what is necessary to attain that objective and must not be excessive. Furthermore, and in any case, proportionality analyses must observe the cumulative effect of the regulations but always under a premise set out in the Proportionality Directive itself: It is Member States that decide whether and how to regulate a profession within the limits of the principles of non-discrimination and proportionality.

In parallel with our analysis is Chapter 2, the European Commission justifies the regulation of professional services not only in terms of the asymmetry of information that characterises the professional client relationship, but also externalities and reasons of public interest. While not the aim of this study to analyse and justify every single regulation based on these criteria, we believe it is appropriate to point out the public interest reasons that underlie them all: Public Health and Safety, Consumer Protection, Recipients and Workers, Environmental Protection, Protection of the Urban Environment, Intellectual Property, Protection and Preservation of National Historic and Artist Heritage, Social Policy and Cultural Policy. All of them, taken from judgments of the Court of Justice of the European Union, represent an evolving jurisprudence to which a new overriding reason of public interest has recently been added, as already underlined by the Davos Declaration 'Towards a High-quality Baukultur for Europe' adopted in January 2018, and which is well worth a moment's pause: the "Quality of the Built Environment . The quality of the built environment is an overriding reason of public interest that impacts not just physically and visually, but also impacts on the current and future health and safety of society. It can only be justified if we prove that this objective of quality is assured throughout the national legal order and not only with an isolated regulation. It is a multi-faceted concept that includes the value and quality of the design.

Design Quality in architecture describes how a building project is conceived, designed, managed and technically constructed for both the client and the public interest, meeting national and EU policy and regulatory demands as well as client and end user needs and experiences in a specific site context. It can be summarised under three headings;

- *Functionality* - effective spatial organisation and navigation, orientation, natural light, air,
- *Build Quality* - stability, energy efficient systems and sensory comfort, sustainability / durability of materials, safety and economy in use
- *Impact:* Intangible sensory and aesthetic impact of building, comfort, security, sense of place, character, part of something bigger, beauty, innovation.

Once again we are reminded of the findings in Chapter 2 that unlike more homogeneous classical goods and services, where the value to the customer and competitive dynamics are both more closely aligned with tangible and quantifiable measurements such as price and quantity supplied, this crucial characteristic of design quality often defies such a simplistic analysis: To assess the beneficial impact of Architectural Services on clients and society we need much more sophisticated measurements of the kind developed in Chapter 3 and for which we recommend further development in Chapter 5.

That a well-designed building with strong design quality will bring economic, social and environmental and health value **(Design Value)** to the building owners, users, its immediate neighbourhood and wider society stands to reason and is evidenced by increased educational outcomes and employment prospects, positive health outcomes, social cohesion, environmental sustainability, security, increased property values, increased economic activity, staff retention and civic pride . A poorly designed building can bring the opposite. The breadth of an architect's training and skills equips him / her to understand the significance of design and design quality and value and to technically implement the design, co-ordinate the inputs of other technical and professional specialists into the finished project, and to do so in a historical, cultural, regulatory, locational, climatic and budgetary context that is often unique to the national Member State if not the region.

Externalities are of particular importance to public interest in this regard: They affect not only the interests of direct clients and the services market in which they are delivered but often other markets and third parties not included in the legal instruments or contractual relationships of the relevant transaction also. The difference between good or poor execution can make the difference between public safety and well-being with legacy effects that can last for generations. It must be remembered that architecture is a liberal profession mostly provided by independent professionals acting under parameters of personal responsibility and on the basis of common deontological principles . These principles include general obligations of integrity, competency and professionalism and obligations to the public interest, clients and their own profession. When judging the appropriateness and proportionality of a given regulation, these characteristics of the profession should be accounted for in a holistic, complete fashion.

To conclude, we must specify that, regardless of the underlying regulation, architecture professionals are overridingly driven and motivated by and committed to a sense of duty to their profession and to the public at large. This commitment is closely connected with their profession's contribution to achieving priority objectives of the European internal market and to global objectives such as those contained in the United Nations 2030 Agenda for Sustainable Development. Achieving important climate action and digital transition in our economy will depend critically on our ability to create an environmentally sustainable and digitised built environment. The involvement and contribution of the architectural profession and its consolidated model of regulation – a model that has demonstrated its quality and effectiveness over the years – will be critical to delivering this.

Chapter 5 Conclusions, findings, recommendations

KEY CONCLUSIONS

Our report is a proactive, positive analysis of both how regulation of the Architectural profession benefits the public interest in economic social and environmental terms. It differs clearly from foregoing analyses in several key respects, namely:

- It underlines the crucial importance of grounding analysis of the impact of regulation in the market for Architectural Services on critical features - including asymmetric information, the complex nature of the service and the existence of significant external impacts – that explain why regulation is much more in the public interest than is the case in many other markets.
- Using innovative modelling and analysis and shows how architectural regulation is linked to positive economic, social, health and environmental public welfare benefits.
- It an exciting experimental indicator, the Economic Improvement of Architectural Regulation Indicator (EIARI) which shows how country specific regulation impacts public welfare. This offers the opportunity for collaboration between the Architectural profession and both EU and global policy influencing and implementing bodies (EU, OECD) to develop a better and shared understanding of regulatory impacts that, in turn, can facilitate better decision making, avoid false and damaging conclusions and facilitate collaboration in meeting shared challenges such as climate action and economic digitisation.
- Using case studies of regulation in Spain, Germany and Finland it details how national regulatory systems are compatible with the delivery of a common foundation of consumer and public protection across the EU.

FINDINGS AND RECOMMENDATIONS

In General

The Architectural sector is **a significant employer and generator of value added in the EU economy,** through the employment of over half a million employees and annual fee income of over €17 billion (2020 figures), respectively.

This sector is also essential to **the delivery of public infrastructure investment currently undertaken in a pandemic recovery context by Member States.**
The sector is also crucial to e**nsuring the carbon neutrality and future pandemic resilience of our emerging built environment.**

Architects are therefore indispensable partners for the EU Commission in achieving the objectives of the EU Green New Deal, a considerations that underlines the need to create an approach to analysing regulation that is robust, shared and evidenced based rather than one based on fragmented, disputed or theoretically or empirically questionable foundations.

The Architectural profession is embracing gender diversity, digitisation and professional mobility. The architecture profession is gender diverse with 42% of practitioners being women - and in some countries women constitute a majority of the profession.

The Architecture profession is increasingly environmentally aware with the share of the profession engaged in building low carbon buildings standing at 57% in 2020.
With 22% of architects were trained in a country other than their country of practice, the Architecture profession shows significant international mobility.

The Architecture profession is also increasingly digital with 62% of architects using 3D modelling and 31% using Building Information Management (BIM) systems in their work.

The need for a specific, rather than "one size fits all" approach to analysing regulation in Architecture

Chapter 2 has illustrated how A**rchitecture differs significantly from many other markets for goods and services** – ones to which deregulation strategies have been successfully applied – in several key respects:
First, **asymmetric information** gives service providers an informational advantage over consumers..
Second, t**ransactions are more complex in nature and as a result service quality and productivity is less easily defined, standardised and measured.**
Third, the **externality effects of transactions** are significant and long term and affect third parties and the public generally.

As shown in Chapter 2, these factors can – the absence of sound regulation - lead to highly detrimental impacts on the long-term public interest. Chapter 2 demonstrates who these unique features of Architectural Services make the regulation of the profession central to ensuring public confidence in the quality and safety of service provision

How regulation benefits public welfare in a competitive market for Architecture Services
Chapter 3 shows how, far from being anti-competitive or "closed" to outside competition, Architecture enjoys a **competitive market structure** (with high "atomisation" levels) as evidenced by

- A high number of practitioners in the profession in the "case study" countries examined
- the 20% increase in building permits observed since 2015 in the "case study" countries examined.
- A significantly increase in the exports of Architectural Services

These trends contradict the idea that architectural regulation is impeding growth and innovation. On the contrary, by acting as a complement to high levels of competition, regulation is likely to have prevented a destabilising erosion of quality enhancing investment during the last recession: By ensuring the ability of practitioner to adapt to rapidly changing demand conditions – through the provision of high quality training – professional regulatory bodies have, as the evidence presented in Chapter 3 suggests, prevented a damaging exit of high quality practitioners, an exit that could have lowered service quality and in addition exerted upward price pressures (due to fewer competitors in the market) during the ensuing economic recovery.

Demonstrating the positive impact of regulation in Architecture Services on Public Welfare
In an innovative and experimental indicator – the Economic Improvement from Architectural Regulation Indicator (EIARI) **we find evidence of a favourable trend for regulatory impact** in the three "case study" countries considered: The value for the EIARI has, for all three, remained above 1 in period 2008 - 2018. Particularly interesting is the inference in the trend of this indicator since the end of the previous recession in 2013: This trend suggests that good regulation is consistent with long-term competitive pressure that is based on quality provision of services – where practitioners respond to an economic downturn by adapting to new conditions - rather than experiencing market attrition linked to the exit of higher quality providers and a less competitive (with fewer remaining practitioners) market in the ensuing recovery (which can lead to price increases)

In a comprehensive and detailed econometric model we find that the EIARI responds positively to measurements of industry regulation. This is the most significant finding of our model as it is the detection (albeit subject to the caveats that, as recommended in Chapter 5, we further refine this model and develop improved sources of data) of a possible positive link between regulation and public welfare.

Future research is, of course, desirable to test this latter estimation so as to corroborate and refine - with more data - the strength of this relationship between regulation and public welfare. But we believe that in establishing both this model and the EIARI we have made a major and constructive contribution to a shared and greatly improved understanding of regulatory impacts on public welfare in Architectural Services.

Country Case Studies and common features of regulation
Our key findings for Chapter 4, in relation to country case studies, are as follows:

Spain
With 47,600 architects and a market value of €593 million Spain's market for architectural services is significant in European terms (nearly one tenth of total employment) and significant in terms of employment and demand in Spain's economy. As shown in Chapter 3, Spain has a highly atomized competitive market.

Spain requires 6 year diploma for professional practice and Continual Professional Development is also advised by code of conduct. Membership of a professional body/ order is mandatory and there is a link between reserved functions and the public interest. There is no obligation to have liability insurance at state level but several autonomous regulations do require it at regional level. Fee tariffs are currently prohibited as is the recommendation of fees. Justifications for regulatory intervention include safety risks, protection of client and user rights, environmental damage, heritage damage urban damage and quality of the built environment. Spain is undergoing a public consultation regarding the text of a proposed law which aims to recognise the quality of architecture and the built environment as a goal of public interest.

Germany
With 177,500 architects and a market value of €4,577 million Germany is Europe's most dominant market for architectural services (ACE, 2020). This makes adds to the significance of the HOAI case finding: While requiring the abolition of minimum and maximum fees for technical reasons, this case nonetheless established that, in principle, price regulation is justified to protect the public from deteriorating quality.

In Germany registration is compulsory at state rather than federal level . Title and registration are regulated and building codes apply. Professional insurance is mandatory. Price controls have, as noted above, been abolished however justifications for regulatory intervention are clearly established in the areas of safety risks, protection of client and user rights, environmental damage, heritage damage urban damage and quality of the built environment.

Finland
With 3,800 architects and a market value of €166 million Finland's market, although much smaller than those of Germany and Spain, enjoys a relatively high degree of value per practicing architect: €43,650 compared to an EU average of €27,300. million Spain's market for architectural services is significant in European terms (nearly one tenth of total employment) and significant in terms of employment and demand in the Spanish economy.

Finland has two levels of degree requirement, 3 and 5 years, respectively, for basic and higher design task classes. There is a requirement for 6 year's professional practice Membership of a professional association/order is not compulsory and registration is voluntary only. This is substantially different from Germany and Spain and most other EU countries. Competence and control is validated by a building supervisory authority checking work experience and qualifications on a case by case basis. There is no obligation at state level to have liability insurance for the exercise of the profession. Fee tariffs are prohibited as is the recommendation of fees. Justifications for regulatory intervention include safety risks, protection of client and user rights, environmental damage, heritage damage urban damage and quality of the built environment. Finland is planning mandatory registration for design teams, site supervisors and inspectors.

Common features of regulation
Despite the diversity in the size of the Architecture profession and in approaches to regulation in each of the case study countries, our study shows that there is a shared platform of common features of regulation in all three countries, a shared platform that underlines the consistency of national regulation with an EU wide protection of the consumer and public interest. This shared platform includes the following aspects:

- A 4 year minimum level of qualification across the EU (and a minimum of 5 years in most countries)
- Systems of registration with or membership of professional bodies (compulsory in Spain and Germany (at regional state level in Germany) and voluntary in Finland).
- Continuous Professional Development either recommended or checked by a controlling authority.
- Fee tariffs are prohibited

All three countries attempt to safeguard the public interest with reference to criteria that are similar and correspond to the Proportionality Directive public interest test. Professional bodies in all three countries are responding positively to global and EU initiatives such as, respectively, the Davos "Baukultur" quality system, the UN Charter for Sustainability and EU climate change policies.

AVENUES FOR FURTHER RESEARCH AND COLLABORATION

In this study we have begun an innovative, positive, proactive and important phase in the analysis of how regulation of Architectural Services impacts positively on public welfare. As a practical opening recommendation we suggest improving the availability of NACE data on architectural services to a higher level of resolution, coverage and frequency that currently exist. As a sector accounting for over half a million employed and a €17 billion contribution to the EU economy, this greater attention is warranted. Secondly, we recommend the regular collection of surveys of public satisfaction with the built environment as referred to in Chapter 3. Thirdly, we suggest collaborative work too.

Our most important suggestion for collaboration, however, relates to the clear need to improve dialogue and shared understanding – goals towards which the practical suggestions above can begin progress – to ensure that policy in relation to regulation is clearly long-term and public interest focused and based on a partnership approach that combines a quality based – rather than quality erosion based - competitive dynamic that focuses on long term sustainable outcomes that are consistent with economic recovery, climate action and the transition to a dynamic, digitized and diverse European post pandemic economy.

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Glossary of Terms and Acronyms

Terms

Allocative Efficiency	A characteristic of an efficient market in which capital is assigned in a manner most beneficial to the public welfare: Goods and Services are optimally distributed and parties to a transaction are able to use readily available data reflected in the market to utilize their resources. Allocative efficiency requires efficiency in transactions and information. Likewise, allocative efficiency is also the combination of means and resources at the best cost. (see below)
Asymmetric Information	Also known as “Information Failure”, Asymmetric Information occurs when one party to an economic transaction possesses greater material knowledge than another. Almost all economic transactions involve some degree of information asymmetry but the degree can differ substantially depending on the complexity of the product and nature of the good or service in question. When information asymmetry is significant, a seller can take advantage of a buyer
Credence Good	A credence good is a type of good or service with qualities that cannot be observed by the consumer after purchase, thus making it difficult to assess its utility. Due to information asymmetry (see above) credence goods often exhibit a direct relationship between price and demand.
Experience Good	An experience good is a type of good or service for which a buyer cannot determine the total value and total cost – including hidden costs (such as maintenance) without actually purchasing the good or service in question.
Gross Operating Rate	According to Eurostat, This is an indicator of profitability that corresponds to the share of gross operating surplus in turnover. The gross operating surplus is the surplus generated by operating activities after the labour factor input has been recompensed. It can be calculated from the value-added at factor cost less the personnel costs. Turnover is the total of all sales (excluding VAT) of goods and services carried out by the enterprise of a given sector during the reference period.
Gross Fixed Capital Formation	Also known as “Investment”, Gross Fixed Capital Formation (GFCF) is defined as the acquisition of “produced assets” – including the purchase of second-hand assets – by producers for their own use. The calculation of GFCF is arrived at by deducting any disposals of assets during the relevant period of calculation. “Produced assets” are those assets – and only those assets – that come into existence as a result of the investment activity.
Marginal Cost	The additional financial cost arising from the production of one additional unit of a good or service.
Overcrowding	As defined by Eurostat a person is considered as living in an overcrowded household if the household does not have at its disposal a minimum number of rooms equal to one room for the household (in aggregate i.e. a shared space); one room per couple in the household; one room for each single person aged 18 or more; one room per pair of single people of the same gender between 12 and 17 years of age; one room for each single person between 12 and 17 years of age and not included in the previous category and one room per pair of children under 12 years of age.
Price Cost Margin	The Price Cost Margin is the difference between the price of a unit of a good or service and its marginal cost (see above), expressed as a percentage of its price.
Productivity	The effectiveness of productive effort as measured in terms of the rate of output per unit of input. Compared to the measurement of productivity for a tangible good, productivity measurement for a service can be complicated by its more intangible and subjective characteristics.
Turnover	As defined in Annex IV to the EU Commission Implementing Regulation (EU) No. 117/2020 , turnover equals all income arising during a reference period in the course of ordinary business activities of a statistical unit, net of price reductions, discounts and rebates it has granted in the course of transactions.

Acronyms

ACE	Architects Council of Europe
EESC	European Economic and Social Committee
EIARI	Economic Impact of Architecture Regulation Index
OECD	Organisation for Economic Cooperation and Development

Appendix A - Methodological Note on Data & EIARI Indicator

A.1 INTRODUCTION – SOURCES AND GUIDING PRINCIPLES

A.1.1 SOURCES

The core element of this report —the economic analysis of the impact of architecture, the econometric model demonstrating the positive impact of regulation on the European economy and the indicators of performance for the architectural services market— is contained in Chapter 3 and this is a chapter which, more than any other, relies on the use of data.

This note outlines the approach to data usage underlying this report. The **selection of macroeconomic variables and indicators** is based on the common criterion of providing as **much available and accurate data as possible on architectural services** in the three selected countries and in the European Union.

The lack of data availability for the architectural profession is a significant limitation in assessing the benefits and positive externalities to economy and society that arise from regulation of the architectural profession. However

Data usage in our report aims as far as possible to be:

1. Of credible source
2. Clearly defined
3. Appropriately used

Below we take these three criteria in turn:

A.1.1.1 CREDIBILITY OF SOURCE

In order to conform with European Community standards an appropriate for a study that addresses an issue of EU Commission policy, we are working with statistical dimensions that are either

(a) Used by the official statistics agency of the European Union, Eurostat, OECD, national statistical institutes or where necessary by data originating or provided by other sources (e.g. national professional bodies such as SAFA, or EU buildings Database)

(b) Our own developed variables and indicators

Data reported in section 3.1

A.1.1.2 DEFINITIONS

(a) EU level, national data or data from national professional bodies

At EU level of our data corresponds to what is known as class **71.11 Architectural activities** under the official Statistical classification of economic activities in the European Community which is known as NACE[1] Rev 2[2]. Eurostat (the official statistical agency of the European Union) usually publishes only data at level 71 which is a lower level of granularity and aggregates data for architecture with other services such as engineering. In some cases we have adjusted the data (see Appendix of Chapter 3 of report

Data here includes:
- Gross Value Added
- Building permits
- Employment.
- Exports of services

Data also includes an approach to the economic interaction between the performance of architectural services and its regulation in the following variables:
- Investment effort
- Apparent labour productivity (Gross Value Added per person employed) or productivity per person employed
- Business churn rate
- Persons employed per enterprise

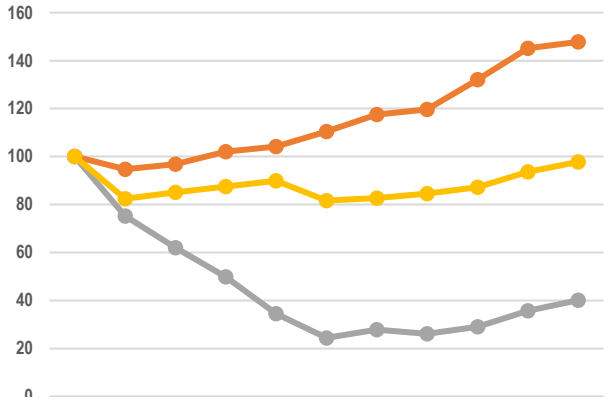
[1] NACE is an abbreviation of the French term: **N**omenclature statistique des **A**ctivités économiques dan la **C**ommunauté **E**uropéenne.

[2] "Rev. 2" refers to a significant and latest available revision of NACE definitions undertaken in 2002 to update terminology for emerging new industries (e.g. online activities) and resulted in a rise in classification of classes. The codification of data is broadly similar to previous revisions of NACE (1 and 1.1). The significance of the revision for this report is limited; we are just indicating with this reference that our selection of data is compliant with the latest NACE definitions.

- Density of enterprises per 10,000 inhabitants
- Gross Operating Rates

A.1.1.3 FIGURES

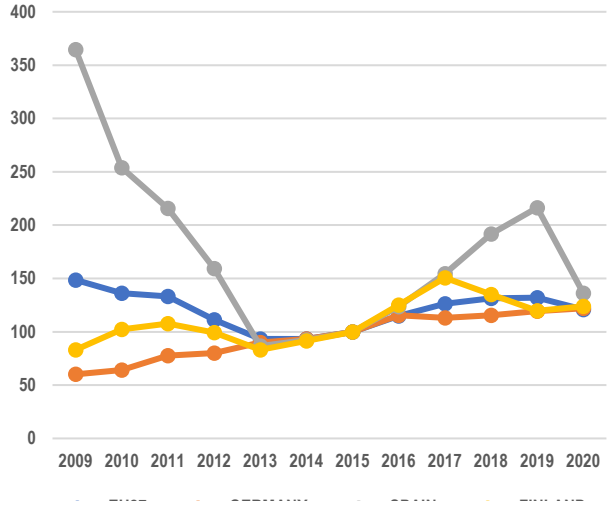
FIGURE 1. GROSS VALUE ADDED AT CONSTANT PRICES (2015) GENERATED BY THE ARQUITECTURAL SERVICES BUSINESS FABRIC. INDEX 2008 = 100



3.1.2.1. GROSS VALUE ADDED (FIGURE 1)

Source Figure 1: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Value added at factor cost; and National accounts aggregates by industry (up to NACE A*64) (nama_10_a64).

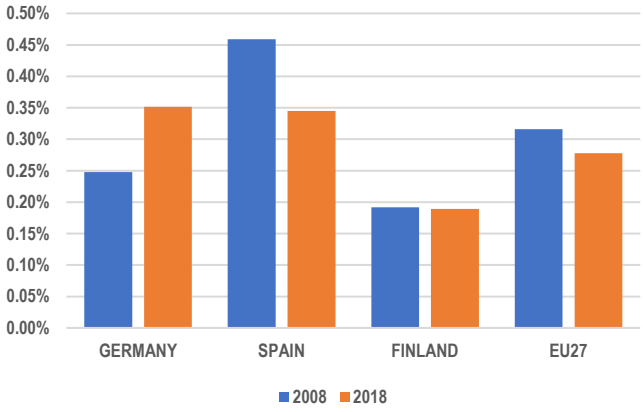
FIGURE 2. EVOLUTION OF BUILDING PERMITS



3.1.2.2. BUILDING PERMITS (FIGURE 2)

Source Figure 2: own elaboration from the data published in the Short-term statistics by Eurostat; Construction, building and civil engineering; Building permits.

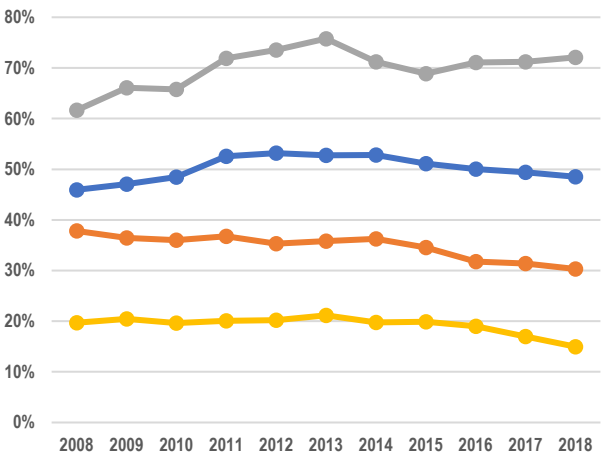
FIGURE 3. WEIGHT OF THE EMPLOYMENT OF THE BUSINESS FABRIC OF ARCHITECTURAL SERVICES OVER THE TOTAL EMPLOYMENT



3.1.2.3. EMPLOYMENT (FIGURE 3 AND 4)

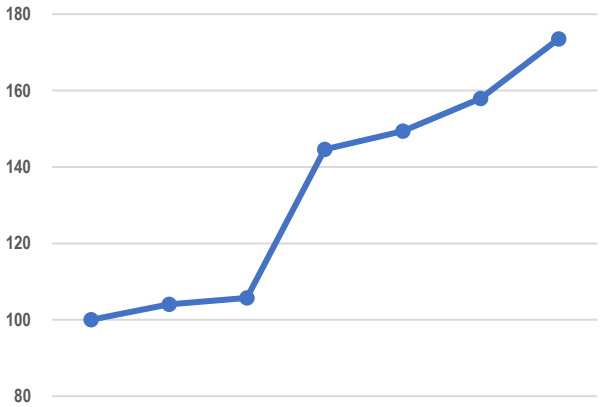
Source Figure 3: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); and National accounts employment data by industry (up to NACE A*64) (nama_10_a64_e) by Eurostat.

FIGURE 4. WEIGHT OF OWNERS OVER TOTAL EMPLOYMENT IN THE ARCHITECTURAL SERVICES BUSINESS FABRIC



Source Figure 4: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Unpaid persons employed.

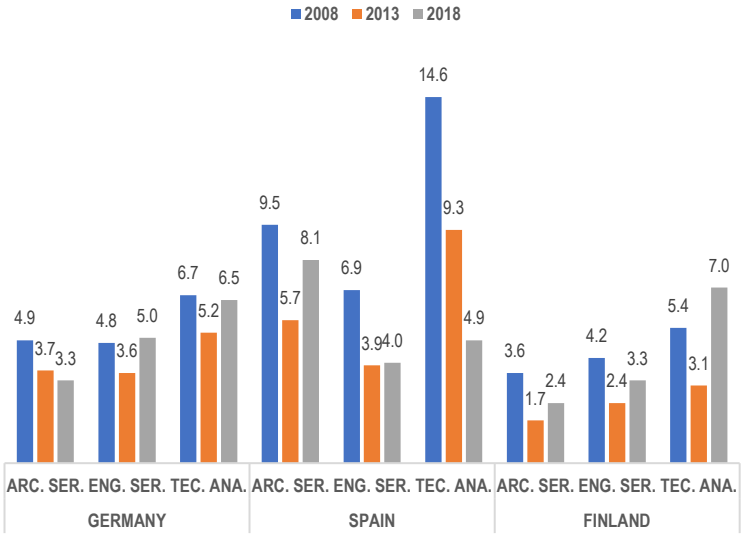
FIGURE 5. VOLUMEN OF EXPORTS OF ARCHITECTURAL SERVICES IN THE EUROZONE. 2013-2019



3.1.2.4. EXPORTS OF SERVICES (FIGURE 5)

Source Figure 5: own elaboration from the data published in International trade in services (since 2010) (BPM6) (bop_its6_det) by Eurostat.

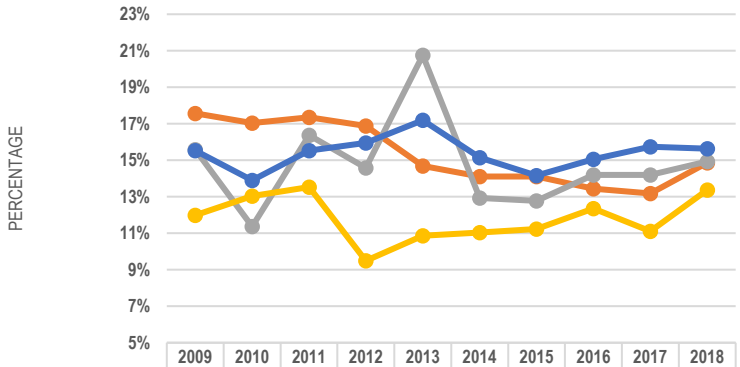
FIGURE 6. INVESTMENT RATE (INVESTMENT/VALUE ADDED AT FACTOR COST)



3.1.3.1. INVESTMENT EFFORT (FIGURE 6)

Source Figure 6: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Investment rate (investment/value added at factor costs).

FIGURE 7. BUSINESS CHURN RATE IN ARCHITECTURAL SERVICES. 2008-2018

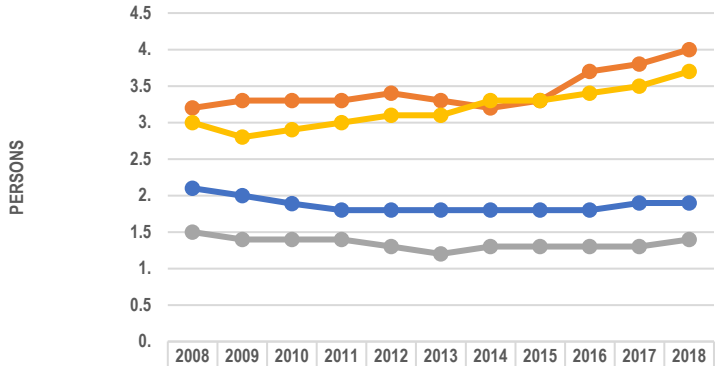


	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GERMANY	17.57	17.03	17.36	16.88	14.68	14.11	14.10	13.45	13.18	14.86
SPAIN	15.59	11.37	16.37	14.59	20.75	12.93	12.77	14.20	14.19	14.94
FINLAND	11.99	13.03	13.53	9.49	10.86	11.04	11.24	12.36	11.11	13.38

3.1.3.3. BUSINESS CHURN RATE (FIGURE 7)

Source Figure 7: own elaboration from the data published in the Structural Business Statistics by Eurostat. Business demography by legal form (from 2004 onwards, NACE Rev. 2). Business churn rate.

FIGURE 8. PERSONS EMPLOYED PER ENTERPRISE. 2008-2018

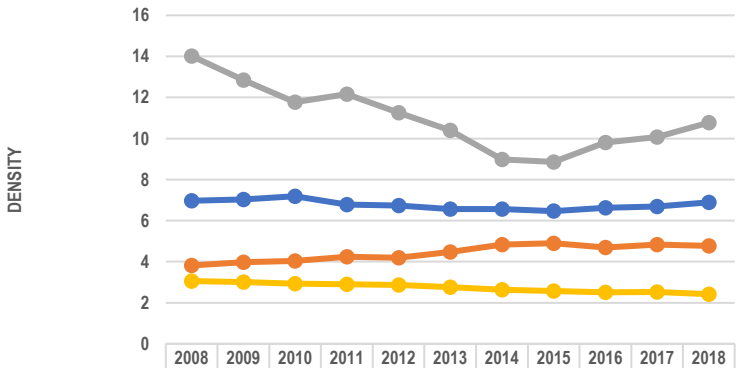


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EU27	2.1	2.0	1.89	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9
GERMANY	3.2	3.3	3.3	3.3	3.4	3.3	3.2	3.3	3.7	3.8	4.0
SPAIN	1.5	1.4	1.4	1.4	1.3	1.2	1.3	1.3	1.3	1.3	1.4
FINLAND	3.0	2.8	2.9	3.0	3.1	3.1	3.3	3.3	3.4	3.5	3.7

3.1.3.4. PERSONS EMPLOYED PER ENTERPRISE (FIGURE 8)

Source Figure 8: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Persons employed per enterprise.

FIGURE 9. DENSITY OF ENTERPRISES PER 10.000 INHABITANTS. 2008-2018

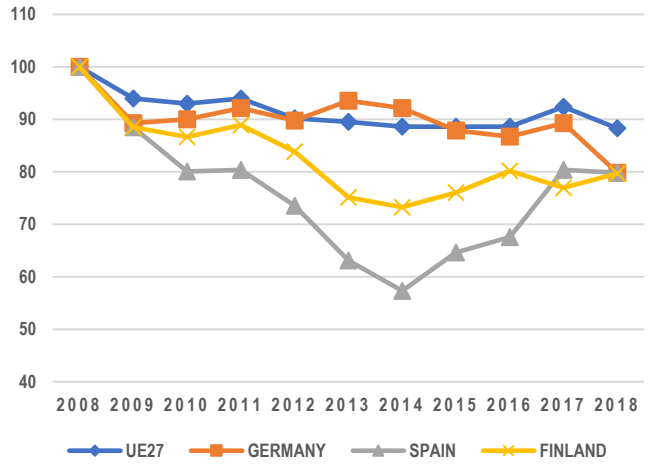


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EU27	6.96	7.02	7.19	6.77	6.74	6.56	6.56	6.46	6.63	6.69	6.88
GERMANY	3.82	3.97	4.04	4.25	4.20	4.48	4.82	4.90	4.69	4.84	4.78
SPAIN	14.01	12.85	11.77	12.17	11.26	10.40	8.97	8.86	9.81	10.08	10.77
FINLAND	3.06	3.01	2.93	2.90	2.87	2.77	2.63	2.56	2.52	2.52	2.42

3.1.3.5. DENSITY OF ENTERPRISES PER 10.000 INHABITANTS (FIGURE 9)

Source Figure 9: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Population: demography, population projections, census, asylum & migration.

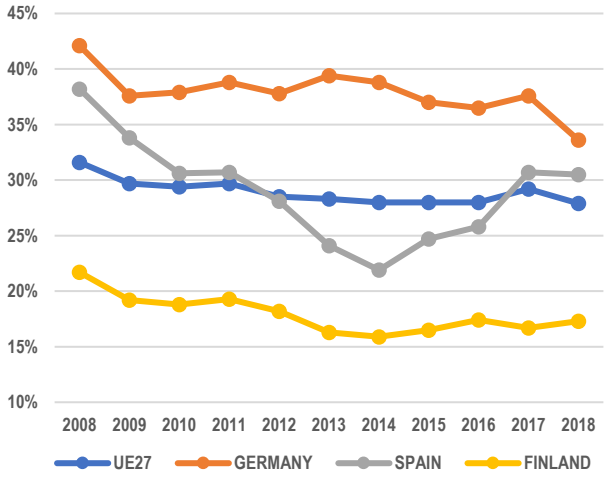
FIGURE 10. GROSS OPERATING RATE. 2008-2018
INDEX 2008 = 100



3.1.3.6. GROSS OPERATING RATES (FIGURE 10 AND 11)

Source Figure 10: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Gross operating surplus / turnover (gross operating rate).

FIGURE 11. GROSS OPERATING RATE IN PERCENTAGE. 2008-2018



Source Figure 11: own elaboration from the data published in the Structural Business Statistics by Eurostat. Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95); Gross operating surplus / turnover (gross operating rate).

These data are used in section 3.1 of the report "Context and Macroeconomic Analysis" both in assessing the recent performance of the architectural sector as part of the overall EU economy (section 3.1.2), in section 3.2 presenting the Economic Improvements through Architecture Regulation Indicator (EIARI) and in section 3.3 presenting the results of the econometric model.

(b) Our own developed indicators

In order to measure the beneficial impact and positive externalities of architectural regulation —and also to develop indicators for measuring this impact in the future— we have developed our own data methodology that is described below in sections B (for the econometric model) and C (for the indicator).

A.1.1.4 APPROPRIATE USE

Data must be used appropriately and in the analysis of architectural services this has not always been the case. Examples of questionable use of data include the *"Overview of the regulatory framework in the business services sector using the example of Architects"* (2015) and also the study *"The Economic Impact of Professional Services Liberalisation"* (2014) of the European Commission. The first report is arguably too superficial and purely descriptive rather than analytical approach to data usage and in its diagnosis and treatment of services, including architecture, the second report was too orthodox and simplistic in that it applied a "one size fits all" approach to data usage and analysis that failed to appreciate the clearly different particularities of professional services that have been clearly explained in Chapter 2 of our report.

Within the macroeconomic analysis, a comparison is made with data showing the variables of other similar sectors such as engineering services, technical testing and analysis services, or the economy as a whole**. The objective of this comparison is to have a reference for a more adequate interpretation.** These comparisons are only those necessary and caution is exercised in the assessments.

- ✓ They provide us a **better criterion on the functioning of architectural services and its connection with the benefits introduced by the current regulation** on well-being, competitiveness and confidence in socio-economic agents.

- ✓ Better approximation to the favourable externalities generated by the current regulation of architecture on the built environment.

- ✓ The profile of most of **the selected variables and indicators is in line with the so-called panel data pattern** that can be **useful for the configuration of the econometric model equations** to calibrate the impact of regulation.

A.2 INDICATORS

A.2.1 INTRODUCTION

A core mission of this report is to analyse and demonstrate a clear positive and beneficial impact of regulation of the architectural profession on the quality of professional services and, through this channel, the socio-economic well-being of European citizens. To accomplish this task we have developed our own [experimental] methodology which is explained in section 3.2 of the report and in Chapter 3 Appendix material. A brief synopsis of the approach is given here below:

An approach based on "quality of service" and contextualized in the proportionality test

Member states must, according to the proportionality test, ensure that regulations governing access to and the exercise of the professions are "justified by public interest objectives" that include —as identified in ACE studies— the following:

- Public health and safety
- Protection of consumers, recipients and workers
- Protection of the environment
- Protection of the urban environment
- Intellectual property
- Protection and conservation of national historical and artistic heritage
- Social and cultural policy

Obviously, data limitations are a barrier to analysing how architectural regulation helps to achieve these objectives. There is as yet no indicator for "Protection and conservation of national historical and artistic heritage", for instance (Chapter 5 of our report will make recommendations for further data collection and studies in areas where we feel further progress in identifying and measuring such variables is feasible and desirable).

Of data that is available and of interest includes data from surveys on publication satisfaction with the built or designed environment, such as public satisfaction with regard to the landscape of the built environment, with Green and recreational areas and with the beauty of streets and buildings in neighbourhoods. Survey findings on this, however, are irregular (Chapter 5 will recommend collecting such data more frequently).

A.2.2 THE ECONOMIC IMPROVEMENT OF ARCHITECTURAL REGULATION INDICATOR (EIARI)

We have developed an experimental indicator —the Economic Improvements through Architecture Regulation Indicator (EIARI)— which focuses on some socio-economic, environmental and health components on which the practice of architecture has an impact through its regulation. An index using component data for these variables is constructed (see Appendix material for Chapter 3) that is calibrated at a notional level around to "1" which benchmarks a position between desirable (equal or better above 1) or undesirable (below 1) in relation to the EU average using equivalent data for EU-27 data as a benchmark. **In all three countries surveyed the EIARI value is above 1 in the survey period of 2008 to 2018.**

A key limitation of this approach —in particular the need to recognize other factors (regulatory, social, cultural) that impact on the economic and social effects of regulation— are noted in the report. Nonetheless given the scarcity of data, this approach is deemed the best one and comes significantly closer to measuring the welfare effects of architectural regulation than recent influential studies cited from European Commission.

A.2.2.1 SOCIO-ECONOMIC COMPONENTS (50% WEIGHT)

These components include:

- **Investment effort of the business sector of architectural services (20% weight in EIARI):** This is interpreted as a predictor of the economic improvements that can be introduced by the regulation of architecture creating incentives to improve service quality. It is calculated as the ratio between the percentage of the investment effort (see subsection 3.1.3.1 above) by the Architectural services sector in one country divided by the percentage of investment effort by the architectural services in the EU. each country and the percentage of the same variable in the European Union. If equal to or greater than 1, it will be favourable for the EIARI. Due to its direct relationship with architecture, its weight is 20%.**Expenditure on maintenance and repair of dwellings (10% weight in EIARI):** This component is a proxy signal on the basic implemented quality on a dwelling. It captures the expenditure incurred to maintain the dwelling in good working order. It is calculated as the ratio of two variables. The first (numerator) is the ratio of the percentage of households in one country (in millions of euro at constant prices) over the number of households in the EU. The second (denominator) is the ratio of expenditure on

maintenance on repair and dwellings in one country (in millions of euro at constant prices) over the relevant expenditure for the EU. If equal to or greater than 1, it is favourable for the EIARI. It is assumed that this expenditure will not be too high or too low due to the current regulation in each country (this assumes in turn a minimum level of quality and safety standards). As this component may be influenced by other factors besides architectural practice, its weight in the EIARI is 10%.**Volume in relative terms of housing over 50 years old (20% weight in EIARI):** This component aims to observe a signal on the proper rehabilitation work carried out by architecture that allows to maintain and generate economic improvements. After 50 years, dwellings must undergo various technical and assessment reports in order to remain habitable in full condition, for example in Spain. Moreover, according to Life Cycle Assessment (LCA) studies, buildings generally have a useful life of 50 years. Therefore, the calculation of this component is a ratio of available built dwellings older than 50 years over the total number of available built dwellings in one country. If the percentage increases, it will be positive for the EIARI. As architectural practice can have a strong influence on this component, its weight is 20%.

A.2.2.2 ENVIRONMENTAL AND HEALTH COMPONENTS (50% WEIGHT)

These components include:

- **Overcrowding and distribution of dwellings from territory. (20% weight in EIARI):** This component focuses on the concept of overcrowding (see footnote 25 below). This component provides a proxy signal about the degree of population agglomeration. Evidence suggests that overcrowded households tend to be in the urban areas most in demand for living for either work, economic or cultural reasons. A shortage of housing - leading to higher purchase and rental prices – may also lead to overcrowding as occupants share costs of housing. It also takes into account the distribution of the number of dwellings in each country according to the type of territory defined by the EU Buildings Database. Overcrowding causes a likely deterioration of the built environment that can lead to saturation of public spaces, poorer mobility, poorer "livability" conditions and a reduced efficiency of some economic activities, all situations that may require architectural responses to overcome.
  The calculation of this component is a ratio between the population not living in overcrowded conditions in a given country and the same variable for the European Union as a whole. If equal to or greater than 1, it will be favourable for the EIARI. As architecture plays a relevant role alongside other factors, its weight is 20% weight.

  Precisely, we can strengthen the explanatory and descriptive character of this variable when we observe its data in the context of the statistics offered by the European Commission in its EU Buildings Database. Specifically, on the concentration of the number of dwellings according to area.

  According to the latest data for 2018, Spain presents the most particular distribution, as 50.70% of dwellings are in densely populated areas or urban centres, 23.40% in intermediate urbanised areas or urban nuclei, and 25.90% in sparsely populated or rural areas. This behaviour also responds to its demographic and territorial structure, with the capital, Madrid, and the main cities absorbing more and more population from the provinces in recent decades. The biggest problem of overcrowding would be in the cities, with 5.3% of the population. However, it seems that, for the time being, this rate of overcrowding is not as high as in the European Union with 18.7%.

  In the case of Germany, it is worth noting that 40% of the dwellings are located in the intermediate built-up areas or urban centres. Meanwhile, 36.30% of the dwellings are in densely populated areas or urban centres, where the greatest problems of overcrowding are registered, with 11.5% of the population in this situation. The rest, 23% of its dwellings, are in rural or sparsely populated areas.

  Meanwhile, Finland has the most homogeneous distribution of dwellings in its territory. 38.90% are in urban centres, 32.50% in urban centres, and 28.60% in rural areas. Thus, overcrowding problems are more prevalent in urban centres with 9.9% of the population.

- **Final consumption of renewable energies and biofuels by households (10% weight in EIARI):** This component aims to obtain an approximate measure of the installed capacity and availability of households to consume renewable energy and biofuels both in their homes and in the rest of the built environment. It is calculated as a ratio the numerator of which is the percentage of consumption of renewable energies and biofuels by households in each country with respect to the total consumption of these energies by the European Union, and the denominator is percentage of the total consumption of all types of energy by households in each country on the data of the total consumption of all types of energy by the European Union.
- If the result is equal to or greater than 1, it is favourable for the EIARI. Because it is a component that can also be influenced by other factors in addition to the architectural practice, we give it a weight of 10% in the EIARI.

- **Greenhouse gas emissions by construction (5% weight in EIARI):** This component establishes a relationship between the economic relevance of the construction sector and its impact on pollution. It is calculated is a ratio the numerator of which is the percentage of the construction sector in each country divided by the gross value added of this sector in the European Union, and the denominator of which is the weight of greenhouse gas emissions of the construction sector in each country over the aggregate figure for this sector in the European Union. The calculation of this component is the ratio obtained as follows: The numerator is the Gross Value Added of the construction sector (millions euro) and the denominator is Greehouse Gas emissions by construction sector in the EU (tonnes)If the result is equal to or greater than 1, it is favourable for the EIARI. As this is a component that is influenced by factors other than architectural practice, we give it a weight of 5% in the EIARI.

- **Pollution, grime and other environmental problems (10% weight in EIARI):** This component captures the percentage of the population in each country that does not consider their housing to be affected by issues such as road dust, vehicle emissions, smoke, dust or unpleasant odours from factories, sewage, or polluted water from pipes, mainly.. It is calculated is a ratio obtained as follows: The Numerator is the percentage of the population who consider their home to be free of pollution, grime and other environmental problems in each country. The denominator is the equivalent number for the European Union. If equal to or greater than 1, it is favourable for the EIARI. As it is a component related to the state of the built environment and is also influenced by other factors in addition to architectural practice, its weight is 10%.

- **Noise from neighbors or from the street. (5% weight in EIARI):** This component captures the percentage of the population in each country that does not consider their dwelling to be affected by outdoor noise problems linked to traffic (street or road, aircraft, railway), linked to businesses, factories, agricultural activities, or yards, etc. Its calculation is a ratio of obtained as follows: The numerator is the percentage of the population described in each country that does not consider their dwelling to be affected by noise problems from neighbours or from the street. The denominator is the equivalent percentage for the EU.. If equal to or greater than 1, it is favourable for the EIARI. As it is a component related to the state of the built environment, but with a smaller dimension than the component of pollution, grime and other environmental problems - and which is also influenced by other factors in addition to architectural practice – its weight is 5%.

Appendix B - Econometric Model: Approach Methodology, Specification and Results

B.1 APPROACH

This section estimates the relationship between regulation of the architectural services in the three countries measured in this study and their economic performance and the proxy indicator of economic and societal (including environmental) benefits we have identified in our Economic Improvements through Architecture Regulation Indicator (EIARI) above.

The relationship —which we find to be positive (namely that architectural regulation has a favourable societal impact)— is established in a 3 step approach described below (the steps are first outlined below and then explained in more detail below):

Step 1: we estimate how regulation —both ex post and ex ante— influences Gross Operating Rate (GOR) or profitability[3].

Step 2: we estimate the relationship between the Gross Operating Rate (GOR) or profitability and the main macroeconomic variables, which may be influenced by regulation and, at the same time, influence the behaviour of the GOR.

Step 3: we estimate the influence of regulation —both ex post and ex ante— on our Economic Improvements through Architecture Regulation Indicator The EIARI.

Step 1: We examine whether there is a direct link between the level of regulation in the Architectural Services market *(Note here that we use as a proxy measure of regulation taking as our proxy the OECD's measures Product Market Regulation (PMR) indicator[4])* and the behaviour or degree of Gross Operating Rate —which we take as a measure of the "health" of the architectural sector in delivering social value—. We find that looking at the relationship between regulation and Gross Operating Rates or profitability it not so direct on its own and that further exploration is needed of the indirect relationships that could create a link between regulation, other macroeconomic variables, and a positive public outcome. This is what we do in the following two steps:

Step 2: Due to the inconclusive or indirect effect of regulation on Gross Operating Rates of profitability, we use macroeconomic variables, which may be influenced by regulation (investment effort, productivity per employed, density of enterprises per 10.000 inhabitants, percentage of self-employed over total employment in the business sector, gross value added, and cost of borrowing-to explain the healthiness of Gross Operating Rates. Key findings in this step are:

(a) This healthiness is positively influenced by investment, which in turn suggests that regulation that fosters long-term stability (incentivising investment in quality also through slightly lower but sufficient turnover of firms) is positive for improving the collective reputation of the profession, and the average market quality level received by society.

(b) Gross Operating Rate as a measure of profitability increases less than proportionality for a given rise in industry productivity, all other things being equal. This means that firms pursue sustainable productivity growth by providing services with the necessary quality and thus share the benefits of their regulation with society.

(c) The atomisation of the market with more architects operating as self-employed may also explain a slight growth of the Gross Operating Rate or profitability in the market. However, this is mainly due to the fact that they do not have to pay remuneration to employees. The margin or profitability available to architects is mainly used to maintain their activity and to provide the necessary quality of service. Consequently, the share of net profit that the architect can make will tend to be minimal in a market that is too fragmented.

Step 3: Here we estimate how regulation —ex post and ex ante— affects some components of the built environment defined by our Economic Improvements through Architecture Regulation Indicator (EIARI). Key findings in this step are:

(a) The level of Ex ante regulation has a strong and positive impact on the built environment according to EIARI. The level of ex post regulation has a positive but more modest and more elongated (over time) effect.

As shown in the illustrative diagram below, the objective of the econometric model is to identify, in an approximate way, the influence of architectural regulation on the economic performance of architectural services and on certain economic improvements that can be reflected in the built environment in the three countries as a whole.

[3] See inset note explaining this term below.

[4] See inset note explaining this term below.

NOTE ON THE "GROSS OPERATING RATE" USED IN THIS STUDY

In this study we use the official Eurostat concept of Gross Operating Rate, which is the ratio between gross operating surplus and turnover. We can interpret this variable as an indicator of profitability according to Eurostat margin that the entrepreneur obtains in order invest in their business practice.

It is important to understand that this this concept does not only include net profits but indicates, also once the labour factor has been remunerated, the income available to the operator to pay suppliers of equity and debt, pay taxes, or finance investment. At the same time, it also captures the net profit and the remuneration that would be granted to the owner.

This variable is commonly used by the European Commission (for example in the mutual evaluation of regulated professions Overview of the regulatory framework in the business services sector by using the example of architects (2014), and in other economic studies such as The European architectural sector (2017) by the European Centre for Liberal Professions (EuZFB) of the University of Cologne).

This variable can be seen as reflecting a social benefit: If the Gross Operating Rate grows at some point, it is most likely, as we see in the model, to be due to a greater increase in investment in means and resources or in their activity to provide higher quality and remain in the market, and not necessarily due to a price increase that translates exclusively into net profit for the professional. In fact net profits may be a very small or insignificant part of a highly atomised market.

In a market with insufficient or inadequate regulation to incentivise good practice and quality supply, competition would tend to be focused only via prices to capture market share. This would imply lower investment, resulting in lower quality supply, and Gross Operating Rates that might be low, but not desirable for the welfare and competitiveness of the economy.

NOTE ON THE OECD "PRODUCT MARKET REGULATION" INDICATOR USED IN THIS STUDY

In our study we use the Product Market Regulation (PMR), developed by the OECD, as a proxy variable for the current level of regulation of the architectural profession in the three countries examined. There are two principal reasons for this: Firstly, this data is available over a longer time span, since 2008, the period of analysis of our econometric model. While it does not offer data for all years, it provides nonetheless sufficient intervals from which a trend can be drawn in relation to the level of regulation in each country over time, thus enabling us to build a model with more depth and draw more solid conclusions about the behaviour of macroeconomic variables.

It is also a more recognised indicator, and is used in more studies such as those carried out by the European Commission, for example the study by Canton, Ciriaci and Solera (2014). This facilitates the building of a model to which to add other variables and indicators can be added to address the idea that a level of regulation which might be considered high ex ante or ex post need not in fact necessarily be negative, but could have positive effects on society and the economy (since regulation is usually aimed at encouraging investment in quality and the collective reputation of the profession).

In relation to other possible indicators, the OECD's Services Trade Restrictiveness Index (SRTI) might have been considered and has relevance in relation to the dynamics of international trade. However limitations. In the availability of data (it only includes data for the period 2014-2020 compared to the 2008-2018 timeframe of our study) and the lack of sufficient continuous data on international trade flows in architectural services in the three countries examined would hamper an ability to assess the impact of this regulatory index on the detailed evolution of this trade in services in the three selected countries. This index would be of use in subsequent studies if and when a more comprehensive and detailed database on international trade in these services becomes available

B.2 OBJECTIVES AND METHODOLOGY

The purpose of this section is to estimate approximately the intensity of the relationships studied and established in the macroeconomic analysis, as well as the influence of the regulation of architectural services in the three countries on their economic performance and on the economic improvement indicator. In this way, we propose a model supported by economic evidence, as we shall see, which invites us to continue and contrast its line in future research.

In our study we apply the econometric technique of panel or longitudinal data with Pooled Ordinary Least Squares and, where appropriate, with fixed-effects. This allows us to aggregate the information from the three countries to obtain more robust conclusions on certain variable behaviours.

Thus, since our observations may present a problem of omitted variables due to unavailability of data, or because they are directly unobservable variables, the use of the fixed-effects technique is recommended to isolate this casuistry. Moreover, with this technique the estimators are usually unbiased and consistent, and therefore more reliable and desirable, rather than applying random effects, which would be preferable if we were working only with sample data from a population.

It should also be noted that we have a so-called balanced panel because we have data for all observations in all three countries. It is also a long panel, as the number of time periods, which amounts to 11 between 2008 and 2018, is larger than the number of cross-sectional observations, our 3 three countries: Germany, Spain and Finland. In sum, the combination of cross-sectional data with time-series data, which form the panel data, improves the goodness of fit of our analysis.

It should be stressed that the design of the following equations of our model has reference and support in those used by the European Commission in some studies that have evaluated the influence of the regulation of some professional services on Gross Operating Rate (GOR) or profitability, on the growth of the number of operators, or on the dynamism of the market through the business churn rate. These variables have been considered in the macroeconomic analysis and also in the following econometric modelling.

Along these lines, the paper[5] by Canton, Ciriaci and Solera (2014) studies the impact of regulation in the architectural, engineering, accounting and legal professions on some macroeconomic variables. Among their conclusions, they found that less regulation in these professions, as measured by the OECD PMR indicator, could improve their allocative efficiency and reduce the level of profitability.

Regarding their econometric technique, they also use panel data with fixed-effects for the four branches of professions covered in the European Union between 2008 and 2011. A shorter time period compared to ours, which includes data from 2008 to 2018 for the architectural profession, albeit only in three EU countries. Moreover, it cannot be ruled out that the conclusions drawn from such different professions imply that the interpretation of their results should be taken with caution.

For its part, another study by the European Commission in 2017, contained in a working document corresponding to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on recommendations for reform of the regulation of professional services, uses another econometric model along the same lines.

Specifically, it uses the Restrictiveness Indicator for Professional Services developed by the European Commission based on the OECD's PMR indicator. This new indicator presented in 2017 does not show a published historical series that would be of greater interest, so it is not possible to use it in our model. In any case, the econometric model presented in 2017 aims to measure the effect of regulation in seven professions (accounting, architecture, civil engineering, law, patent agent, real estate agent, and tour guide) on two dependent variables: Gross Operating Rate or profitability and growth in the number of firms.

As for the technique, it uses Ordinary Least Squares with cross-section data for each profession in the European Union. In other words, it does not consider evolution over time, which can be a limitation for interpretation. However, it also applies fixed-effects in its estimation to improve its results. The balance of his estimation argues that an increase in regulatory restrictions could increase the level of profitability and reduce the growth in the number of firms. An interpretation that would be somewhat rigid and does not take into account the favourable aspects of profitability being at a certain level due to the implementation of other factors such as investment aimed at providing higher quality.

[5] Canton, Ciriaci y Solera (2014). The Economic Impact of Professional Services Liberalisation. European Commission

B.3 MODEL SPECIFICATION AND RESULTS

Overall, in the first equation of our model we seek to estimate the influence of the OECD ex ante and ex post PMR regulation indicators on Gross Operating Rates (GOR) or profitability in the architectural services sector. We thus follow an adaptation of the European Commission's (2017) model to calibrate this relationship between regulation and profitability.

Specifically, we use the following specification:

Log (GOR) = β0 + β1 PMRENTRY + β2 PMRCDUCT + β3 Log (GOS) (-1) + ε

Where Log (GOR) is the dependent variable that captures the evolution of profitability of architectural services; and as explanatory variables we have PMRENTRY captures the ex ante regulation data of architectural services according to OECD data; PMRCDUCT captures the ex post regulation data of architectural services according to OECD data; and Log (GOR) (-1) captures profitability in architectural services with a lag, whose purpose is to estimate how this variable is influenced by its behaviour in the previous year.

The estimation results are as follows:

Equation 1: Pooled OLS, using 30 observations
Included 3 cross-sectional units
Time-series length = 10
Dependent variable: log_GOR

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−0.653710	0.225125	−2.904	0.0074	***
PMRENTRY	0.0440091	0.0175789	2.504	0.0189	**
PMRCDUCT	0.0592754	0.0253123	2.342	0.0271	**
log_GOR_1	0.630869	0.130593	4.831	<0.0001	***

Mean dependent var	−1.333913	S.D. dependent var	0.330654
Sum squared resid	0.127683	S.E. of regression	0.070078
R-squared	**0.959729**	**Adjusted R-squared**	**0.955083**
F(3, 26)	206.5435	P-value(F)	3.01e-18
Log-likelihood	39.32284	Akaike criterion	−70.64567
Schwarz criterion	−65.04088	Hannan-Quinn	−68.85265
rho	0.337346	Durbin-Watson	1.225110

Level of significance: $*$ p < 0.10, $**$ p < 0.05, $***$ p < 0.01

The three explanatory variables considered are significant in explaining the evolution of Gross Operating Rate (GOR) or profitability in architectural services. Thus, we introduce a modification to the model of Canton et al. (2014)[6] in this first equation where we seek to assess whether the indicators of regulation in architectural services have a sufficient impact on the movement of profitability. However, we employ a model more similar to that of the European Commission (2017) when they estimated the relationship between Restrictiveness Indicator for Professional Services and profitabililty in a number of professions.

According to our estimates, both the indicator that captures the level of ex ante, or entry, regulation and the indicator of the level of ex post, or conduct, regulation have a limited influence on the behaviour of this profitability. A situation that invites us to reflect on a more indirect impact of regulation through other macroeconomic variables whose relationship we estimate in the following equation. This would also be related to the variable that would most determine the behaviour of this profitability, which is their trend from the previous year. Basically, if GOR or profitability grow by 1%, they are estimated to grow by 0.63% in the following year.

Consequently, in the following equation, we estimate the influence of the main macroeconomic variables on Gross Operating Rate (GOR) or profitability in architectural services. In this way, we take a closer look at some of the relationships described and studied in the macroeconomic analysis in order to get a more approximate dimension of the impact of the regulation of architecture in the three countries.

Its specification is as follows:

Log (GOR) = β0 + β1 log_INVE + β2 log_PROD + β3 log_DEH (-3) + β4 log_BCR (-1) + β5 log_GVA (-2) + β6 log_COB + ε

Where Log (GOR) is the dependent variable that captures the evolution of profitability of architectural services; log_INVE refers to the percentage of investment in architectural services; log_PROD refers to productivity per person employed in architectural

[6] The Canton et al. (2014) model estimates the relationship between the OECD PMR regulatory indices for four professions on business dynamism as measured by the business churn rate. Similarly, it also estimates the relationship between the business churn rate and profitability, as we consider in the second equation.

services; log_DEH (-3) refers to the density of architectural services firms per 10. 000 inhabitants with a lag of three years; log_WONERS refers to the percentage of self-employed architecture professionals over total employment in the architecture business sector; log_BCR (-1) reflects the business churn rate with a lag of one year; log_GVA (-2) reflects the gross value added of architecture services with a lag of two years; and log_COB reflects the cost of borrowing in the form of interest rate according to the European Central Bank data for each country.

The estimation results are as follows:

Equation 2: Fixed-effects, using 24 observations
Included 3 cross-sectional units
Time-series length = 8
Dependent variable: log_GOR

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−7.13276	1.02383	−6.967	<0.0001	***
log_INVE	0.235425	0.0319237	7.375	<0.0001	***
log_PROD	0.582394	0.0807297	7.214	<0.0001	***
log_DEH_3	−0.196784	0.0913435	−2.154	0.0491	**
log_WONERS	0.274255	0.106931	2.565	0.0225	**
log_BCR_1	−0.0679345	0.0556104	−1.222	0.2420	
log_GVA_2	0.0499430	0.0403640	1.237	0.2363	
log_COB	0.0461886	0.0413727	1.116	0.2830	

Mean dependent var	−1.353273	S.D. dependent var	0.336501
Sum squared resid	0.011182	S.E. of regression	0.028262
LSDV R-squared	**0.995706**	**Within R-squared**	**0.930973**
LSDV F(9, 14)	360.7423	P-value(F)	5.39e-15
Log-likelihood	58.00348	Akaike criterion	−96.00696
Schwarz criterion	−84.22642	Hannan-Quinn	−92.88158
rho	−0.464525	Durbin-Watson	2.280582

Level of significance: $*$ p < 0.10, $**$ p < 0.05, $***$ p < 0.01
In this sense, the explanatory variables of the equation show the expected sign in accordance with the macroeconomic analysis carried out. In other words, the behaviour of profitability would contribute, to a greater extent, to providing more quality in architectural services in line with the purpose of their regulation in each country.

In detail, according to the model, if investment rises by 1%, GOR or profitability would grow by 0.23%, which would support the observation of macroeconomic evidence in the business sector. Under this estimate, we could point out that, a priori, investment is a factor with sufficient weight to explain the evolution of profitability. A situation in line with the argumentation reflected in the macroeconomic analysis and which would encourage the incentive to invest and supply quality with the aim of favouring the collective reputation of the profession. Moreover, this propensity to invest in architectural services would be indicative of lower internal impediments to competition, following the reasoning of Conway et al. (2005).

Furthermore, it should not be forgotten that there is a certain bidirectional relationship that feeds back between investment and productivity levels and that would also explain the behaviour of the latter variable as we will see below.

Similarly, a 1% growth in productivity would imply an increase in GOR or profitability of 0.58%. Thus, we can argue that if the impact of productivity increases may be less than the impact on the rise in profitability, it cannot be ruled out that this may be due to the regulatory framework of the profession in the three countries. In other words, the effect of current regulation would favour the reduction of the inefficiencies of overtreatment, undertreatment and overcharging pointed out by Dulleck and Kerschbamer (2006), which could boost productivity with undesirable increases for the client by reducing the quality he or she would receive.

In any case, it is more likely to argue that productivity growth in architectural services is occurring under the parameters of responsibility introduced by regulation that may favour a productivity path based on greater training and experience according to Nachum (1999), as well as on the efficient and responsible use of technology.

On the other hand, we observe that an increase in the density of architectural services firms per 10,000 inhabitants by 1% would have an impact on profitability with a decrease of 0.19%, although this would only be observed three years later. This is related to the expected behaviour as if the number of operators were to rise, it is a situation that may put downward pressure on GOR or profitability..

However, we see that the downward pressure would be limited, among other things, since GOR or profitability are already quite tight given the level of atomisation of the architectural business sector in each country. In other words, it would also support the argument

that current regulation allows for competition and does not excessively damage profitability so that architecture operators can provide the necessary quality in their services.

Another variable of significant interest in explaining the behaviour of GOR or profitability is the percentage of self-employed architects out of the total employment in the business sector of architectural services. Thus, according to the economic evidence, it is logical that if this percentage increases, for example, by 1%, profitability grow by 0.27% according to the estimate. The reason for this behaviour is that the owners, since they do not have to allocate employee remuneration items, cause their profitability to tend to be higher.

However, this should not be interpreted as a sign that the owner's net rent or profit is higher. In fact, it may be more limited in many cases. It should be recalled that the gross operating rate or profitability takes into account various items including the operator's disposable income to pay equity and debt providers, pay taxes, or finance investment. At the same time, it also includes the net profit and the owner's remuneration, but this part is likely to be minimal in a market that is too fragmented or atomised.

On the other hand, there are a number of other variables that may explain the evolution of profitability for architectural services in the three countries, although they are not significant in our estimation. Among them, an increase in the cost of borrowing, measured as the interest rate, translates into a slight increase in GOR or profitability to avoid borrowing from the financial system and increasing their costs, a behaviour in line with the work of Chevalier and Scharstein (1996).

Similarly, the business churn rate shows that a 1% increase would translate into a 0.06% decrease in profitability one year later. In other words, an increase in business dynamism with more inflows and outflows could lead to this drop in GOR or profitability in architectural services. The same sign in line with the result of Canton et al. (2014) although their estimate was more pronounced.

Meanwhile, we observe that if the Gross Value Added (GVA) generated by the architecture business sector grows by 1%, this may imply a 0.05% growth in profitability two years later. Thus, if we take this GVA as a proxy variable for the income that the economy allocates to consuming architectural services, it could be an indication of the stable maintenance of profitability in architecture, the reasons for which include a high level of competition and a probable difficulty in raising prices without losing market share.

Finally, with the third equation we seek to estimate the influence of ex ante and ex post regulation indicators of architectural services on the economic improvements indicator (EIARI).

Its specification is as follows:

Log (EIARI) = β0 + β1 log_PMRENTRY + β2 Log_PMRCDUCT (-1) + β3 Log_EIARI (-1) + ε

Where Log (EIARI) is the dependent variable that captures the indicator on economic improvements in the practice of architecture due to its regulation; log_PMRENTRY reflects, in percentage, the ex ante regulation of architectural services according to OECD data; log_PMRCDUCT reflects, in percentage, the ex post regulation of architectural services according to OECD data; and log_EIARI (-1) reflects the indicator of one-year lagged economic improvements whose purpose is to see how this variable is influenced by its behaviour in the previous year.

The results of the estimation are as follows:

Equation 3: Fixed-effects, using 15 observations
Included 2 cross-sectional units
Time-series length: minimum 5, maximum 10
Dependent variable: log_EIARI

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−3.40574	1.19722	−2.845	0.0174	**
log_PMRCDUCT_1	0.108345	0.0412523	2.626	0.0253	**
log_PMRENTRY	3.56847	1.22025	2.924	0.0152	**
log_EIARI_1	−0.355327	0.268971	−1.321	0.2159	

Mean dependent var	0.148037	S.D. dependent var	0.154045
Sum squared resid	0.005044	S.E. of regression	0.022459
LSDV R-squared	**0.984817**	**Within R-squared**	**0.578301**
LSDV F(4, 10)	162.1597	P-value(F)	4.78e-09
Log-likelihood	38.69792	Akaike criterion	−67.39584
Schwarz criterion	−63.85559	Hannan-Quinn	−67.43355
rho	−0.265692	Durbin-Watson	2.486544

Level of significance: $*$ p < 0.10, $**$ p < 0.05, $***$ p < 0.01

In this sense, in the estimation exercise on the relationship between the ex ante and ex post regulation indicators on the indicator of economic improvements produced by the architecture due to its regulation (EIARI), we can cautiously point out some issues. First, we see that both indicators would be significant in explaining the evolution of the indicator of economic improvements (EIARI), albeit with some differences.

Among them, we observe that the ex ante regulation indicator has a greater impact on this indicator in percentage terms, while the ex post indicator has a positive, albeit less intense, influence. However, the effect of the latter is felt one year later, as we can see when introducing a time lag in the estimation.

The introduction of a lag is a technique that was also employed by Canton et al. (2014) in their study on the PMR indicator to capture improved correlation over time in macroeconomic variables.

Consequently, future research is especially invited to test this latter estimation in order to corroborate and refine with more data the strength of this relationship between regulation and the Economic Improvements through Architecture Regulation Indicator (EIARI)

ECONOMETRIC MODEL CONTRASTS

1ST EQUATION:

Log (GOS) = β0 + β1 PMRENTRY + β2 PMRCDUCT + β3 Log (GOS) (-1) + ε

Choice between Pooled or fixed effects OLS

Joint significance of differing group means:
F(2, 24) = 2.17039 with p-value 0.136017
(A low p-value counts against the null hypothesis that the pooled OLS model
is adequate, in favor of the fixed effects alternative.)

As the p-value is above 0.05 or 5% (0.136017) it is recommended not to estimate with fixed effects.

Normality of residual

Test for null hypothesis of normal distribution:
Chi-square(2) = 1.337 with p-value 0.51239

As the p-value is greater than 5% (0.51239) we do not reject the null hypothesis and, therefore, there is normality in the model error.

Heteroskedasticity test

Null hypothesis: homoscedasticity
Test statistic: TR^2 = 14.445011,
with p-value = P(Chi-square(8) > 14.445011) = 0.070879

As the p-value is greater than 5% (0.070879) we do not reject the null hypothesis of homoscedasticity and, therefore, we can state that the model does not present a problem of heteroskedasticity.

Autocorrelation test

Wooldridge test for autocorrelation in panel data -
Null hypothesis: No first-order autocorrelation (rho = 0)
Test statistic: t(2) = 1.12499
with p-value = P(|t| > 1.12499) = 0.37746

As the p-value is greater than 5% (0.37746) we do not reject the null hypothesis and therefore consider that the model does not present an autocorrelation problem.

2ND EQUATION:

Log (GOS) = β0 + β1 log_INVE + β2 log_PROD + β3 log_DEH (-3) + β4 log_BCR (-1) + β5 log_GVA (-2) + β6 log_COB + ε

Normality of residual

Test for null hypothesis of normal distribution:
Chi-square(2) = 1.645 with p-value 0.43936

As the p-value is greater than 5% (0.43936) we do not reject the null hypothesis and, therefore, there is normality in the model error, it is unproblematic.

Heteroskedasticity test

Null hypothesis: homoscedasticity
Distribution free Wald test for heteroskedasticity:
Chi-square(3) = 4.46569, with p-value = 0.215371

As the p-value is greater than 5% (0.215371) we do not reject the null hypothesis of homoscedasticity and, therefore, we can state that the model does not present a problem of heteroskedasticity.

Autocorrelation test

Wooldridge test for autocorrelation in panel data -
Null hypothesis: No first-order autocorrelation (rho = -0.5)
Test statistic: F(1, 2) = 0.0490225
with p-value = P(F(1, 2) > 0.0490225) = 0.845323

As the p-value is greater than 5% (0.845323) we do not reject the null hypothesis and therefore consider that the model does not present an autocorrelation problem.

3RD EQUATION

Log (EIARI) = β0 + β1 log_PMRENTRY + β2 Log_PMRCDUCT (-1) + β3 Log_EIARI (-1) + ε
Normality of residual

Test for null hypothesis of normal distribution:
Chi-square(2) = 1.825 with p-value 0.40161

As the p-value is greater than 5% (0.40161) we do not reject the null hypothesis and, therefore, there is normality in the model error, it is unproblematic.

Heteroskedasticity test

Null hypothesis: homoscedasticity
Distribution free Wald test for heteroskedasticity:
Chi-square(2) = 0.945186, with p-value = 0.623384

As the p-value is greater than 5% (0.623384) we do not reject the null hypothesis of homoscedasticity and, therefore, we can state that the model does not present a problem of heteroskedasticity.

Autocorrelation contrast

Wooldridge test for autocorrelation in panel data -
Null hypothesis: No first-order autocorrelation (rho = -0.5)
Test statistic: F(1, 1) = 0.0402604
with p-value = P(F(1, 1) > 0.0402604) = 0.873936

As the p-value is greater than 5% (0.873936) we do not reject the null hypothesis and therefore consider that the model does not present an autocorrelation problem.

MAIN DESCRIPTIVE STATISTICS OF THE VARIABLES IN THE MODEL

Summary Statistics, using the observations 1:01 - 3:11

Variable	Mean	Median	S.D.	Min	Max
GOS	0.283	0.305	0.0884	0.159	0.421
PMRENTRY	1.95	2.38	1.47	0.000	3.50

PMRCDUCT	1.07	0.000	1.31	0.000	3.38
INVE	0.0462	0.0360	0.0234	0.0170	0.0970
PROD	4.40e+004	5.23e+004	1.51e+004	1.55e+004	6.04e+004
DEH	6.06	4.48	3.73	2.42	14.0
WONERS	0.413	0.358	0.217	0.150	0.758
GVA	2.87e+009	1.37e+009	2.85e+009	2.44e+008	8.43e+009
COB	0.0274	0.0248	0.0112	0.0150	0.0570
EIARI	1.29	1.32	0.193	1.02	1.63

The econometric estimations are carried out with the econometric analysis software package Gretl.

Appendix C - Further information on Chapter 4

C.1 EDUCATION AND TRAINING OF ARCHITECTS IN THE EU: COMMON SET OF SUBJECTS

Third Level Architectural training – which is harmonised across Europe and, under Directive 2005/36/EC also recognised across the EU typically covers a common set of subjects for all EU Member States: history and theory of architecture, contextual analysis, spatial design, urban design, aesthetics, symbolism and culture, function of buildings, brief preparation, relationships of people to buildings and buildings to environment, design studio projects of different scales across all sectors and site specific locations (urban , rural) construction technology , materials , structural stability, environmental science , comfort and sustainability, Safety, Accessibility and inclusiveness, social science ,contractual and Planning law , procurement and budgeting processes and project management , design co-ordination , Construction standards , Historic Conservation , research methodologies and dissertation writing , visual presentation , Digital Skills , ethics and the role of the architect in society.

C.2 KEY LEGISLATIVE PILLARS OF ARCHITECTURAL REGULATION

C.2.1 SPAIN

The following are the key legislative pillars of architectural regulation in Spain:

- Decree 1393/2007, of 29 October (regulation of official university studies); agreement of the Council of Ministers of 14 December 2007 (conditions of the programmes to practice the architectural profession).
- Ministerial Order ECI/3856/2007, of 27 December (requirements for verification of official university degrees that enables to practice the architectural profession).
- Ministerial Order EDU/2075/2010, of 29 de July, (requirements for verification of official university degrees that enables to practice the architectural profession).
- Building Act 38/1999, of 5 November, (tasks that correspond to the different agents involved in the construction process)
- Royal Decree 2512/1977, of 17 June, (architects' missions) (paragraphs in force following Act 7/1997, of 14 April).
- Royal Decree 1000/2010, of 5 August, concerning architects' project authorization by Architects' Orders, previous to building permit.
- In July 2021[7] Spanish Government submitted the proposed text of a future law (for public consultation) seeking to declare the quality of architecture and the built environment as being in the public interest.

C.2.2 GERMANY

The following are the key legislative pillars of architectural regulation in Germany:

- Model Building Regulations and the building codes of each federal state ("Land")
- Architect and building order regulations of each federal state
- Civil law ("Bürgerliches Gesetzbuch")

C.2.3 FINLAND

The following are the key legislative pillars of architectural regulation in Finland:

- The National Framework for Qualifications Act 93/2017 - (requirements for architectural education and process for mobility of profession to / from other countries , in conjunction with the Professional Qualifications Directive 2005/36/EC where only university degrees are notified)
- Land Use and Building Act (132/1999)[8] (requirements for Building Permits and Supervising Building Authority validating Building Permits)

[7] https://www.mitma.gob.es/el-ministerio/buscador-participacion-publica/anteproyecto-de-ley-de-arquitectura-y-calidad-del-entorno-construido

8 https://www.finlex.fi/en/laki/kaannokset/1999/en19990132.pdf

- Finnish National Building Code [9](Further provisions , guidelines on Planning and Supervision , new construction standards)
- Ministry of Justice Consumer Protection Act 38/1978 and amendments - Regulation of Consumer Protection in Finland

The Finnish government is currently in the process of reforming the primary Land Use and Building Act. The reforms planned include ***a focus on Design Quality***, ***mandatory registration*** of designers practicing difficult, (very difficult) and exceptionally difficult design tasks and building inspectors.

C.3 CORE COMPETENCES AND OTHER DUTIES OF ARCHITECTS IN SPAIN AND FINLAND

C.3.1 SPAIN

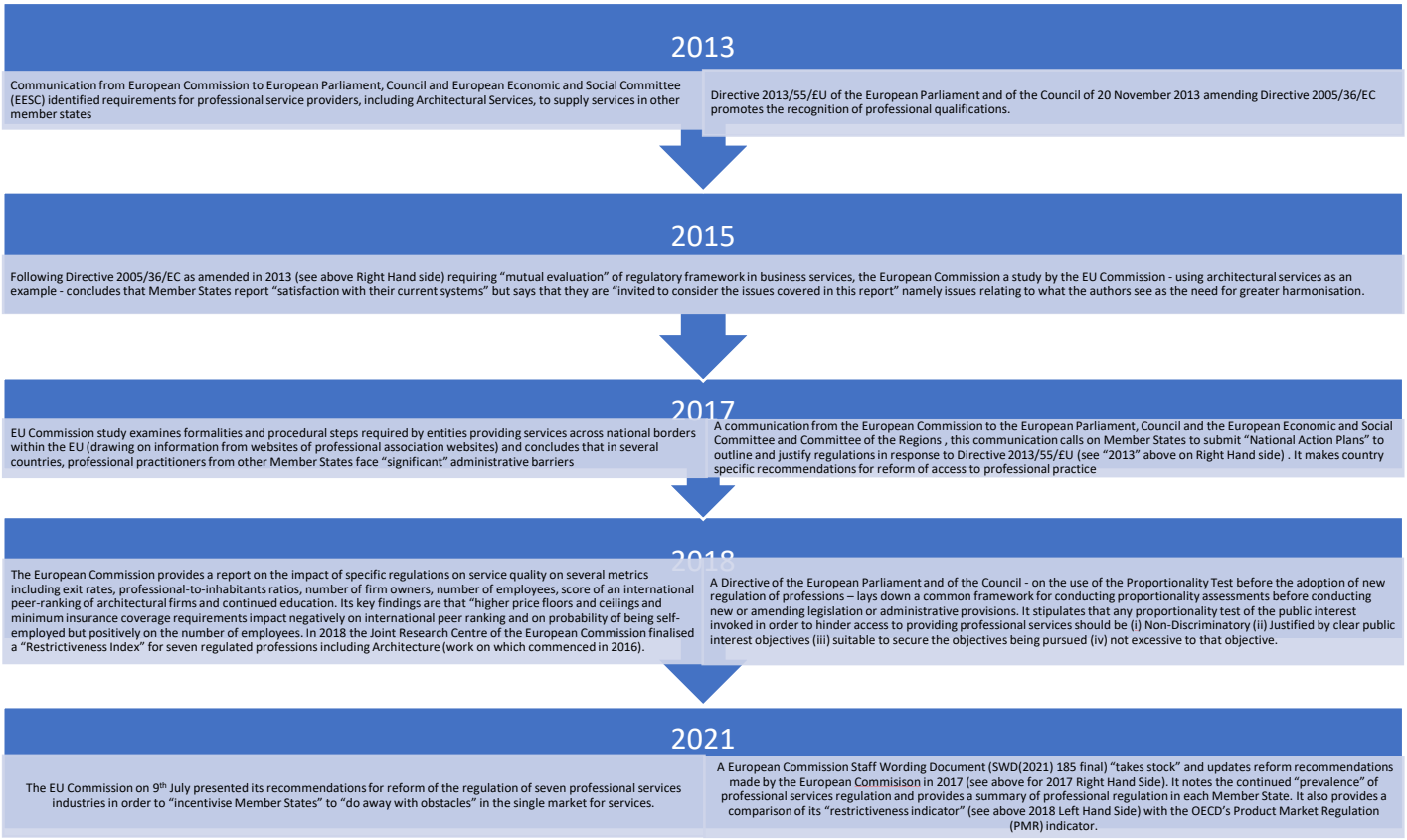
Core competences: These include: Developing conceptual, basic and detailed designs, including the development of all constructive features and design and calculation of facilities, foundations and structures, as required for the complete execution, as well as the building management. Developing the complete Urban planning instruments, including Project execution plan, implementation and control.

Other duties: These include: Environmental Project, landscape Project, Land Survey and demarcation. Valuation of land and buildings, interior and exterior building design, financial Management and budgeting for project development. Building demolition, design and calculation of building facilities, preservation of buildings and monuments and legalization procedures.

C.3.2 FINLAND

Core competences: To develop brief with Client , research of Local Detailed Plan (Planning) , develop conceptual, basic and detailed designs, the design and calculation of facilities, including the development of all constructions details , research and specification of materials and workmanship, co-ordination of the designs by Special Designers .Co-ordination and submission of Building Permit documentation, Contract and cost negotiation, Contract management with team , inspections, Co-ordination of final inspection and commissioning.

Other competences: Historic Conservation, Project Safety Co-ordinator, Urban Design, Building Inspections report, Interior design, Feasibility Studies, Landscape Design, Expert Architect, Sustainability Designer, Maintenance, Product Designer, LEED / WELL building standard Design Co-ordinator (energy and wellbeing), Graphic Design and Presentation.

9 https://ym.fi/en/the-national-building-code-of-finland

Appendix D - Timelines of recent EU Commission studies and decisions