The 2015 Intellectual Property and Economic Growth Index

Measuring the Impact of Exceptions and Limitations in Copyright on Growth, Jobs and Prosperity

Revised May 2015

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Benjamin Gibert is a non-resident fellow at the Lisbon Council. He graduated from the University of Oxford in 2010 with an MSc in global governance and diplomacy. He is the co-author (with Roya Ghafele) of several papers on intellectual property, including a study on the economic impact of Singapore's decision to switch to a fair-use copyright doctrine. He also serves as managing director and co-founder of e-commerce company Vinyl Revolution.

The opinions expressed in this policy brief are those of the author alone, and do not necessarily reflect the views of the Lisbon Council or any of its associates.

This policy brief, published in May 2015, is a revised version of **The 2015 Intellectual Property and Economic Growth Index**, which initially appeared in March 2015. It includes a small number of changes in the underlying data, including the addition of a universal cut-off date (2002) for introducing IP reforms, which is intended to make the inter-country comparisons more accurate. As a result, there are some minor revisions in country standings in the league table on page 5 (with the Netherlands rising two places to No. 6 and France falling one place to No. 8). The correlations tests have all been re-run to evaluate the effect of these changes on the policy brief's overall conclusions, and no significant variations were found. The text and tables have been updated to reflect the revised data framework. The overall conclusions of the paper do not change.

Innovation Economics is a multidisciplinary centre, managed by the Lisbon Council. It is committed to shedding light on – and providing scientific evidence of – the profound impact of the Internet and digital technologies. It combines a unique mixture of scientific rigour, original research, world-class talent and exacting thought leadership in a format that is broad in outreach, innovative in approach and interdisciplinary in design. Its website is www.innovationeconomics.net.

'The rise of digital technologies has irrevocably transformed the global economy by revolutionising modes of production, distribution and innovation.'

The rise of digital technologies has irrevocably transformed the global economy by revolutionising modes of production, distribution and innovation.[1] We live in an era where successful companies can acquire a million new customers a day without investing a single eurocent in marketing. It's a world where one company with 9,100 employees and 1.2 billion users will pay $19 billion [or €13.9 billion] for another company with 55 employees and 450 million customers – an employee-to-customer ratio of one to eight million and an average value of $345 million [€254.2 million] per employee.[2] The price Facebook paid for WhatsApp, a mobile messaging platform, in 2014 is a stark reminder that some emerging business models are no longer subject to the economic realities of the industrial era.

These days, disruptive innovations are creatively destroying older business models at an increasing rate with little concern for national borders.[3] A growing body of research shows that intangible assets have become the principal driver of growth and productivity in advanced, knowledge-based economies.[4] There is an urgent need to reflect on current understandings of how innovation delivers economic value in this new context.

The so-called "creative industries" are well positioned to grow in markets where investment in knowledge is a priority, where information and communications technology infrastructure enables new types of value and delivery networks, and where e-commerce is widely adopted by consumers.[5] Yet, intellectual property – and copyright in particular – is increasingly seen as restricting innovation in other key areas such as content delivery, collaborative research and decentralised creative processes.[6] These restrictions are important factors in spurring the emergence of a fundamentally new type of innovation system that sees multinational corporations, fledgling start-ups, telecommunications providers, content creators and consumers form increasingly complex value chains that defy and sometimes contradict the economic logic of the industrial era. Ensuring that copyright law stimulates creativity in this new innovation environment is not an esoteric policy concern. Copyright, whether we like it or not, is now at the very heart of economic policy in general and innovation strategy in particular. Today's policy decisions will determine whether we shackle our innovation system, or equip it with the tools it needs to thrive in the unpredictable digital future.

1   This paper is the product of a year-long research effort undertaken on behalf of the Lisbon Council, where the author has the honour of serving as research fellow. The author would particularly like to thank Paul Hofheinz, president of the Lisbon Council, who served as project manager, as well as the anonymous readers from academia and the international institutions, who offered vital feedback and peer review at key points in the research process. Any remaining errors of fact or judgment are the author's sole responsibility. The author would also like to thank Denise Xifara for her contribution to the statistical modelling and methodology.
2   Kristin Burnham, "Facebook's WhatsApp Buy: Ten Staggering Stats," *Information Week*, 21 February 2014. The exchange rate is from February 2014.
3   Clayton Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail* (Boston: Harvard Business Review Press, 2013); Stuart L. Halt and Mark B. Milstein, "Global Sustainability and the Creative Destruction of Industries," *Sloan Management Review,* 41 (1999); Robert Levine, *Free Ride* (London: Random House, 2011); Joseph Schumpeter, *Capitalism, Socialism and Democracy* (New York: Harper, 1942).
4   Baruch Lev and Jürgen Daum, "The Dominance of Intangible Assets: Consequences for Enterprise Management and Corporate Reporting," *Measuring Business Excellence,* 8 (2004).
5   John Howkins, *The Creative Economy: How People Make Money from Ideas* (London: Penguin, 2013); See also European Patent Office (EPO) and Office for Harmonisation in the Internal Market (OHIM), *Intellectual Property Rights Intensive Industries: Contribution to Economic Performance and Employment in the European Union: Industry-Level Analysis Report* (Alicante: OHIM, 2013).
6   Seth Ericsson, "Recorded Music Industry and the Emergence of Online Music Distribution: Innovation in the Absence of Copyright (Reform)," *George Washington Law Review*, 79 (2010); Anders Henten and Alexander Oest, "Copyright: Rights-Holders, Users and Innovators," *Telematics and Informatics,* 22 (2005).

'Few regions are in a stronger position to leverage the digital, knowledge-based economy as a driver of growth than Europe.'

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Unfortunately, much of this debate takes place within an evidence vacuum. This is due to both the inherent problems in measuring the impact of copyright policy as well as the considerable influence that sectional interests exert on the legislative process.[7] A copyright, unlike a patent or a trademark, does not require centralised registration in order to be enforceable. The resulting lack of easily accessible and readily analysable data on copyright makes calculating the impact it has on an increasingly wide range of industries problematic. Despite the obvious need to better understand the role of intellectual property in incentivising innovation and contributing positively to the economy – and the strong emotions on both sides of the intellectual property debate – the evidence base is relatively weak. We set out to address this imbalance, looking to build a system for measuring the impact of exceptions to copyright on economic growth. Do the rules as they exist in specific countries add to or detract from economic growth? Does the system result in broader economic gains for the many, or has it become a bastion for rent seeking by the few? Obviously, intellectual property is an important pillar of the modern economy, incentivising creators, inventors and distributors in important ways. But many countries and economic areas have found different ways of interpreting and enforcing those rights – including the pivotal area of exceptions. Which country has the most advantageous balance? What are the implications for future prosperity? And, most importantly, what does the evidence tell us about the best way to structure the intellectual property regime to ensure the most innovation,

economic growth, job creation and social wellbeing?

Finding answers to these questions is an especially difficult challenge, given the intangible nature of the assets in question and the difficulty of establishing specific causality within the complex economic reality of successfully growing countries. Nonetheless, by examining the relationship between economic growth and intellectual property regimes in some of the world's most innovative economies, we were able to establish some interesting correlations. Specifically, we found that

1. Countries that employ a broadly "flexible" regime of exceptions in copyright also saw higher rates of growth in value-added output throughout their economy.[8]

2. Somewhat more surprisingly, economies that employ a broadly "flexible" regime of exceptions to copyright also saw higher growth rates in the publishing, audiovisual and broadcasting industries – a preliminary finding with deep potential implications given the strong opposition to copyright reform from many incumbent economic interests in these sectors.

3. Economies that employ a broadly "flexible" regime of exceptions in copyright also typically saw faster growth in the wider information technology and services sectors.

4. Countries with broader flexibility in their copyright regimes also saw higher levels of compensation in the overall economy, and specifically in information and communication

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7   See Appendix I on page 15 for a deeper discussion of these issues.
8   We define exceptions to exclusive rights using two components: 1) scope – the types of use of a copyrighted work that are protected from infringement claims by statute; and 2) flexibility – the language adopted in the statute, which defines how broadly the type of use can be interpreted. For further details, see the Scope and Flexibility of Exceptions to Exclusive Rights Index Methodology section in Appendix I on page 15.

'Copyright law, more than ever before, is integral to the creation, dissemination and exchange of information goods and cultural works.'

technology goods and services and consumer manufacturing sectors.[9]

5. Greater scope and flexibility of exceptions to copyright have valuable positive externalities, specifically in the promotion of education, independent research, free-speech, user-generated content and text and data mining.

6. Policymakers often perceive the positive externalities and innovations associated with exceptions to copyright as a trade off with the economic growth driven by strong intellectual property protection. Instead, the evidence suggests that broad and flexible exceptions to copyright embedded within a strong intellectual property framework may be the best way to achieve both simultaneously.

Key findings

Main findings from the econometric analysis:

1) The growth rate of value-added output is positively correlated with greater flexibility of exceptions to copyright law for the following industries in the country sample:
   a) The entire market economy as well as the information and communications technology (ICT) goods and services industry group
   b) More specifically, the publishing, audiovisual and broadcasting industries as well as the information-technology and other information-services industries

2) Greater scope and flexibility of exceptions to exclusive rights is also positively correlated with labour compensation for the following industries in the country sample:
   a) The entire market economy as well as the ICT goods and services industry group
   b) More specifically, the consumer manufacturing industries

3) More evidence-based research is needed to establish the balance between protection of information goods and access to them that will help foster growth of the creative industries in digital economies.

The implications for copyright policy:

1) Digital technologies have fundamentally changed the way we experience, engage with and extract value from information goods.

2) Copyright reform must be informed by detailed policy analysis – not steered by sectional interests – in order to achieve its function in the digital age.

3) Greater scope and flexibility of exceptions to copyright have valuable positive externalities including the promotion of education, independent research, free-speech, user-generated content and text and data mining.

4) Policymakers often perceive the positive externalities associated with exceptions to copyright as a trade off against the economic growth stimulated by strong intellectual property protection. Instead, the evidence suggests broad and flexible exceptions to copyright embedded within a strong intellectual property framework may achieve both simultaneously.

9   Based on feedback from readers, The 2015 Intellectual Property and Economic Growth Index has been revised (May 2015) to include a new cut-off date (2002) for incorporating reforms to intellectual property law in the countries surveyed. The universal cut-off date was included to make inter-country comparisons more robust, but this change has had a knock-on effect in two sector evaluations. The revised analysis now indicates that labour compensation in consumer manufacturing, which was initially thought to show no significant statistical relationship with intellectual property, does display some correlation, while the correlation between labour compensation in the IT sector and flexibility in the intellectual property regime has disappeared. The charts and tables in this revised version have been updated to reflect these changes.

'Copyright today is a complicated lattice of territorial, exclusive and atomised rights among stakeholders with heterogeneous interests.'

The Scope and Flexibility of Exceptions to Exclusive Rights Index

The findings presented here are the result of an analysis of industry-level economic data over a period of 20 years in which we set out to examine the relationship between exceptions and limitations to exclusive rights in copyright law and economic growth in leading, intellectual-property producing countries. Early on, we saw the need to establish a two-step approach:

Table 1. The Scope and Flexibility of Exceptions to Exclusive Rights Country Ranking

Rank	Country	SFEER SCORE
1	US	8.13
2	UK	7.19
3	Germany	5.94
4	Sweden	5.94
5	Spain	5.63
6	Netherlands	5.31
7	Japan	5.31
8	France	4.38

First, we evaluated the intellectual property regimes of eight leading intellectual-property producing (and consuming) countries.[10] Each country was given a score from one to 10 based on the scope and flexibility of exceptions to exclusive rights that exist within them, allowing us to plot the countries on a spectrum from most to least lenient in the field of intellectual property rights exceptions. The measurement included such standard features of exceptions to exclusive rights as the reporting of current events, criticism, personal copying, library and archive use. These scores were then aggregated into the Scope and Flexibility of Exceptions to Exclusive Rights Index, or SFEER Index. The results are summarised in Table 1 on this page.[11] The higher the score, the greater the scope and flexibility of exceptions to copyright within the national copyright system. This approach permitted empirically-verifiable comparison to be made between the different approaches to exceptions and limitations to copyright that exist in France, Germany, the Netherlands, Spain, Sweden, the United Kingdom and the United States.[12]

It is important to emphasise that the scores shown here do not reflect the present scope of copyright exceptions in these countries but rather the scope of exceptions that existed for the majority of the period in question. Several of the countries included in the study have implemented copyright reforms during the period surveyed, particularly with regard to exceptions. While this is a welcome development, these changes are omitted from the SFEER Index because it would be misleading to evaluate the relationship between historical economic performance and copyright law over a given timeframe based on statutes that were only enacted late in the period in question. Only statutes which were in force for over half of the time period were included. Since the economic data surveyed ranged from 1993 to 2010, the cut-off date for legislation was set at 2002. All exceptions and limitations to copyright that were introduced after 2002 are not included in the scores. Consequently, the index is not a judgment of the scope and flexibility of exceptions in copyright that exist in these countries today, but rather a valuable tool for econometric analysis.

10 Due to time constraints and data limitations, analysis was restricted to eight countries: France, Germany, Japan, the Netherlands, Spain, Sweden, the United Kingdom and the United States. These countries were chosen because of their prominence in the global economy, their performance in major innovation indicators, as well as the fact that they all boast extensive – and different – intellectual property regimes, which permits country comparisons on a host of key points. See Appendix I on page 15 for a more detailed description of why these countries were chosen.

11 See Appendix I on page 15 for an overview of the SFEER Index methodology, a comprehensive breakdown of the tabulation of scores and the legislation underpinning the scores as well as a detailed discussion of its assumptions and limitations.

12 Although Japan was included in the original analysis, it was omitted from the final results on the basis of methodological issues. See Appendix I for an overview of how the countries were selected and Appendix II on page 29 for the results including Japan.

'The explosion of user-generated content online exemplifies the decentralisation of creative activity made possible by plummeting production and distribution costs.'

Table 2. Significant Correlation Values for SFEER Index and Economic Output[13]

Metric		Industry-Variable	COR.	SIGN.
Growth Rate	Significant Correlation	Market Economy-LAB	0.87831	0.00625
	Borderline Correlation	ICT Goods and Services-LAB	0.78072	0.01507
		Publishing, Audiovisual and Broadcasting Activities-VA	0.68313	0.03344
		IT and Other Information Services-VA	0.68313	0.03344
		Consumer Manufacturing-LAB	0.68313	0.03344
		ICT Goods and Services-VA	0.68313	0.03344
		Market Economy-VA	0.68313	0.03344

The SFEER Index formed the basis for examining the relationship – if any – between the scope and flexibility of exceptions to copyright and economic growth in the selected countries. To arrive at this calculation, we deployed widely used statistical methods to explore the underlying relationships, disaggregate the role of intellectual property in the economic development of the countries in question and control for exogenous, non-intellectual property-related factors.

Results

The statistical analysis showed significant borderline correlation between the success in the SFEER Index and higher economic output variables in a number of industries. These results were subjected to further robustness checks, which are outlined in Appendix I on page 15. The limited set of combinations that were shown to be correlated with the SFEER Index

for France, Germany, the Netherlands, the UK, the US, Sweden and Spain can be seen in Table 2 on this page.

The correlation values suggest that exceptions to copyright are related to increases in value-added growth and labour compensation in several industries.[14] Of all the industries included in the initial test, the ICT goods and services industry group was perhaps not surprisingly shown to be the most closely correlated with high levels of copyright exception in existing law. These are industries that are directly related to the production of information goods, audiovisual content and complementary products. As such, they are industries that one would naturally hypothesise to be influenced by the scope and flexibility of exceptions to exclusive rights.

But we also found that relatively broad and flexible exceptions to copyright were correlated with higher value-added growth and labour compensation in the market economy as a whole. This is not surprising for two reasons: 1) the market economy is a higher-order industry group that includes the ICT goods and services industry group as a subset; and 2) information goods are widely diffused in the developed economies included in the study and it is likely that more flexible exceptions to copyright have spillover effects into industries that are not directly related to the production and dissemination of content.

Significant borderline correlation was also found between the scope and flexibility of copyright exceptions and higher growth in gross value-added output of several industries. This includes publishing, audiovisual and broadcasting activities, IT and other information services, the ICT goods and services industry group, and the broader market economy industry group. A high level of exceptions to copyright was also positively correlated, though to a

13 Definition of variables: VA = Gross value added at current basic prices (in millions of US dollars); LAB = Labour compensation (in millions of US dollars).
14 The correlation ratios are below the 0.8 threshold, which indicates a measure of caution is still appropriate. Analysis on a larger country sample is recommended in order to validate these preliminary findings.

'A major source of tension in the copyright regime today rests on achieving a balance between protecting the interests of creators and ensuring the effective dissemination of information for the benefit of society.'

lesser degree, with labour compensation in the market economy as a whole, the ICT goods and services sub-set of this group, and the consumer manufacturing subset of this group.[15] For a detailed discussion of the methodology deployed, see Appendix I on page 15.

Discussion

In general, the empirical analysis suggests there is a more complex relationship between copyright protection, economic growth and labour compensation than one might think. It is important to emphasise at this stage that, while a study of seven countries provides a good basis for exploring empirical relationships, further analysis on a much broader set of countries is needed to make conclusive statements regarding the relationship between the scope of exceptions to exclusive rights and economic growth. The model relies on several assumptions. For example, it assumes that uniform levels of copyright enforcement exist across all countries in the sample. There are also significant limits to evaluating the relationship between copyright policy and economic output due to the nature of copyrighted works, which are not centrally registered and influence a broad range of sectors in myriad ways. On top of all this, the inherent problems of linking any policy with economic outcomes persist.

However, with these limitations in mind, the evidence nonetheless calls into question the widespread assumption that stronger copyright protection is the only necessary condition to stimulate growth. Instead, the results suggest there may be instances where broader exceptions to exclusive rights have a positive impact on economic growth and employment as shown by the growth rate in gross value-added volume and labour compensation. Three stylised facts based on these results are presented below.

1. The growth rate of gross value-added output of the publishing, audiovisual and broadcasting

industries is positively correlated with a copyright regime that has greater scope and flexibility of exceptions to exclusive rights.

2. Greater scope and flexibility to exclusive rights is positively correlated with the growth rate of gross value-added output in the IT and other information services industries and labour compensation in the consumer manufacturing industries.

3. Greater scope and flexibility to exclusive rights is positively correlated with gross valued-added output and labour compensation in the ICT goods and services industries generally and the market economy as a whole.

The finding that the growth rate of value-added output of the publishing, audiovisual and broadcasting industries is positively correlated with a copyright regime that has greater scope and flexibility of exceptions to exclusive rights is a particularly interesting one that goes against stated conventional wisdom within those business sectors. Actors in this industry group have consistently pushed for stronger copyright law on the basis that this enables them to extract maximum value from their investments in audiovisual content. This may have been the case 20 years ago. However, the proliferation of digital technologies and social networks has dramatically changed the way people engage with content online. Strong copyright law with few exceptions may have helped promote the growth of these industries in an industrial era where most people were never more than passive consumers of content on analogue devices. In a digital era, access to content and the ability to hyperlink, mix, remix, copy – and particularly to share – is fundamental to the ways in which we interact with content.

In this digital environment, a copyright system with limited exceptions may actually diminish the value of audiovisual content to consumers and

15 Though originally intending to run analysis of variation (ANOVA) and regression analyses on the significant results, this approach was rejected due to the non-linear nature of the relationship between the SFEER Index and economic output.

'With digitalisation transforming social and cultural life, intellectual property is shifting from the sole prerogative of professionals and publishers to a fundamental concern of all citizens.'

Figures 1-6. Gross Value Added at Current Basic Prices for the Audiovisual, Publishing and Broadcasting Industries (in US dollars)

Germany

The Netherlands

Spain

Sweden

United Kingdom

United States
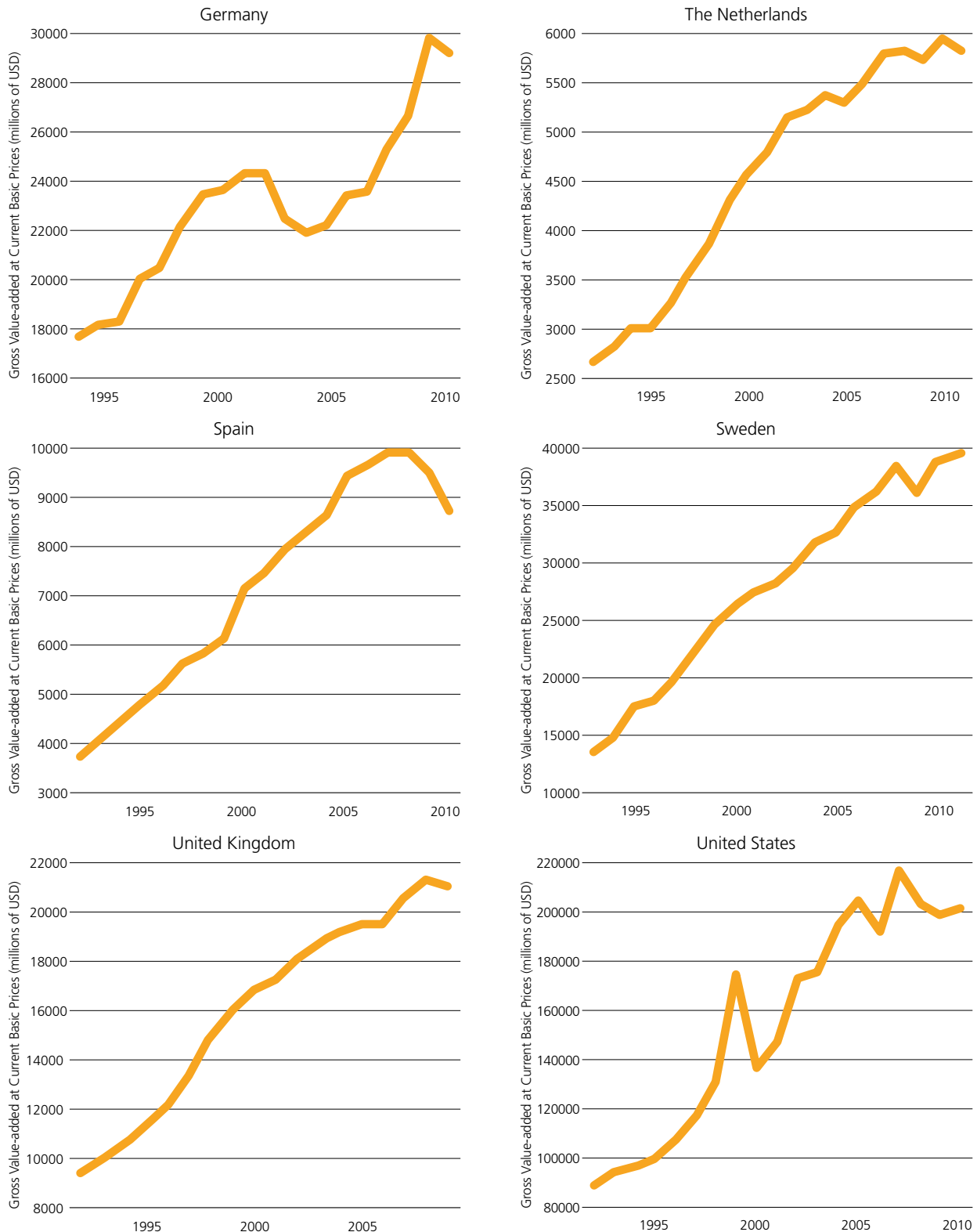
'Perhaps most importantly, greater scope and flexibility to exclusive rights means that the explosion in user-generated content online will continue to develop.'

simultaneously inhibit their ability to promote it within their social networks.[16] The very notion of passive consumers of content is being displaced by notions of co-creation, remix culture and user-generated content in an *attention economy* where awareness of the product is an increasingly important source of value.[17] The International Federation of the Phonographic Industry (IFPI) – one of the largest lobby groups for stronger copyright protection – has itself recognised that sources of value in digital music include awareness of the artist and interaction with content, which creates communities of interest and support. The IFPI's development of new methods to measure *digital interactions* highlights this shift from a purely consumption-based view of the creative economy to one in which attention and engagement are key.[18]

The ability of copyright law to accommodate these new forms of engagement will also result in an enormous increase in data generated from legitimate online engagement with audiovisual content, which enables real-time market research and instantaneous assessment of advertising effectiveness.[19] The time-series plots in Figures 1-6 on page 8 for the publishing, audiovisual and broadcasting industries depict relatively stable growth overall for the period surveyed for all countries. This is particularly interesting when one considers how industry associations have portrayed the industry as one in deep crisis as a result of peer-to-peer file-sharing technologies and increasingly unlicensed uses of copyrighted works online. This is not to say that digital piracy has not affected publishing revenues – it certainly has – but it does raise questions. Is strict control

over the use of copyrighted works the only factor driving growth in these industries? Might adjusted business models within a more flexible copyright regime deliver better financial results for rights owners?

The findings presented here are all the more salient when considering the positive externalities associated with a greater scope and flexibility of exceptions to copyright, which are not included in the model. One key example of this is text and data mining, a relatively new research tool.[20] Already, text and data mining are contributing directly to economic growth through product and service innovations, as well as opening up a space for learning from the vast amounts of data our online activities generate.[21] The ability to mine text and data relies on exceptions to copyright in some form, and the field will remain damagingly underdeveloped in Europe if the legal basis for conducting advanced research with these new tools remains uncertain at best.[22]

Perhaps most importantly, in terms of our every day experience, greater scope and flexibility of exceptions to exclusive rights means that the explosion in user-generated content online can continue to develop. Though exact figures remain elusive, it is widely acknowledged that many people are, either willingly or unknowingly, violating copyright law on a daily basis. The growing divide between what copyright law permits and the reality of consumer behaviour online often spurs resentment towards the copyright system and stifles new forms of creative output in the digital age.

16 Birgitte Andersen, Lucy Montgomery and Benjamin Reid, *Digital Copyright Exchange Feasibility Study: Response to the Hooper Consultation from the Big Innovation Centre* (Brisbane: Queensland University of Technology, 2012).
17 Ibid. See also Don Tapscott and Anthony D. Williams, *Wikinomics: How Mass Collaboration Changes Everything* (London: Atlantic, 2006).
18 International Federation of the Phonographic Industry, *IFPI Digital Music Report 2013: Engine of a Digital World* (Zurich: IFPI, 2012).
19 Ibid.
20 Sergey Filippov, *Mapping Text and Data Mining in Academic and Research Communities in Europe* (Brussels: The Lisbon Council, 2014).
21 Ian Hargreaves, Lucie Gibault, Christian Handke, Peggy Valcke and Bertin Martens, *Standardisation in the Area of Innovation and Technological Development, Notably in the Field of Text and Data Mining: Report from the Expert Group* (Brussels: European Commission, 2014).
22 Ibid.

'The European Union is poised to benefit enormously from the digital revolution.'

Questions awaiting evidence

Disruptive innovators are creating new sources of efficiency and profoundly transforming the economic landscape. Society has little long-term economic interest in protecting incumbent business models from innovators that are responding to shifts in consumer behaviour and establishing new technology at the core of their value proposition. Copyright no longer simply governs creativity and its many applications. It governs all types of copying. As such, it is a critical policy lever for growth and innovation in the technology sector, which relies on different forms of copying in a variety of use cases. A modern copyright policy that promotes innovation and growth in digital economies must be a priority for the European Union. However, care must be taken when charting this new course. Copyright policy must be based on evidence and careful analysis rather than being steered by sectional interests if we are to have any hope of achieving the desired effects on job creation and growth.

Exploring the impact of the scope and flexibility of exceptions to exclusive copyrights on innovation and growth is thus a prerequisite to making Europe's copyright policy fit for the digital age.

In this context, it is important to ask two key questions about copyright that do not have straightforward answers. These are by no means the only questions to ask of the copyright system in the digital age. However, they are a useful starting point for further discussion on the impact of copyright today and what it should aim to achieve in the future:

1. To what extent has Europe's copyright regime been associated with innovation and growth compared to its US and Asian counterparts?

2. In particular, what is the influence on economic output of the scope and flexibility of exceptions to exclusive rights that exist in different copyright regimes?

Regardless, the finding that greater scope and flexibility of exceptions to exclusive rights is positively correlated with value-added growth and labour compensation in several ICT goods and services industries is an important one. Policymakers tend to conceptualise the positive externalities associated with exceptions to copyright as a trade off against the economic growth associated with strong intellectual property protection. Instead, the data presented here suggests that broad and flexible exceptions to copyright embedded within a strong intellectual property protection framework may promote both simultaneously.

A Transatlantic Divide: Coping with the New and Modern

There is little academic consensus regarding the relationship between intellectual property rights, economic growth and innovation.[23] The patent system has been subject to repeated scrutiny because of the rising influence of patent thickets, pools and non-practicing entities on innovation.[24] These issues aside, international efforts in this field have yielded many outcomes such as the formation of the European Patent Office in 1977, the corresponding move towards a unified patent system in Europe, and international agreements such as the Patent Cooperation Treaty. In

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23 Lee G. Branstetter, Raymond Fisman and C. Fritz Foley, "Do Stronger Intellectual Property Rights Increase International Technology Transfer? Empirical Evidence from US Firm-Level Panel Data," *The Quarterly Journal of Economics,* 121 (2006); Valbona Muzaka, "Intellectual Property Protection and European 'competitiveness,'" *Review of International Political Economy,* 20 (2013); Carmen Nadia Ciocoiu, "Considerations about Intellectual Property Rights, Innovation and Economic Growth in the Digital Economy," *Economia. Seria Management,* 14 (2011); Erik Brynjolfsson, "ICT, Innovation and the E-Economy," *EIB Papers,* 16 (2011).

24 Michael Heller and Rebecca Eisenberg, "Can Patents Deter Innovation? The Anticommons in Biomedical Research," Science, 280 (1998); Robert Merges, "Institutions for Intellectual Property Transactions: The Case of Patent Pools," *University of California at Berkeley Working Paper* (1999); Roberto Mazzoleni and Richard Nelson, "The Benefits and Costs of Strong Patent Protection: A Contribution to the Current Debate," *Research Policy,* 27 (1998).

'Many people, either willingly or unknowingly, violate copyright law on a daily basis.'

comparison, copyright law in Europe has witnessed far fewer harmonisation efforts.

Copyright today is a complicated lattice of territorial, exclusive and atomised rights among stakeholders with heterogenous interests. Recent calls for reform in the European Union have been driven by the perception that copyright is poorly equipped to deal with emerging digital goods and services in the single market and that it may hamper new business innovation practices.[25] Despite repeated warnings that there is no economic rationale for extending the terms of copyright, reform so far has focused on expanding the scope of rights and lengthening the terms of protection in response to digital technologies.[26] Analysts have charted the rise of copyright discourse wars as a result.[27] Some have even argued that the delicate balance between the interests of copyright owners and the public – a crucial element of copyright law – has been consistently eroded in favour of rightsholders.[28] This is particularly true in digital environments.

None of this should be construed as a wholesale condemnation of copyright. Far from it. The copyright regime has never been more significant. Digital technologies are continuously offering new opportunities for the creation, dissemination and economic exploitation of content. The explosion of user-generated content online exemplifies the decentralisation of creative activity made possible by plummeting production and distribution costs. The same technologies have enabled widespread copyright infringement online, prompting rightsholders to defend their interests through end-user litigation, high-profile lawsuits, lobbying at all levels and partnerships with internet service providers.[29] Though the relationship between digital piracy and extracting value from copyrights is far from straightforward, rightsholders in the film and music industries have led the charge against revolutionary distribution technologies such as peer-to-peer filesharing.[30] These developments render the call for evidence on the relationship between copyright, innovation and growth all the more salient.

Copyright is a temporary monopoly right granted by state intervention in order to stimulate the creation of original works and maximise the public's access to them.[31] A major source of tension in the copyright regime today rests on achieving a balance between protecting the interests of creators and ensuring the effective dissemination of information for the benefit of society.[32] Creative commons and open source software licenses such as the GNU Public License are both innovative examples of how the existing copyright regime can be exploited to achieve this balance. However, there is a growing body of scholarship which suggests that strengthening the

25 Ruth Towse, "Economics and Copyright Reform: Aspects of the EC Directive," *Telematics and Informatics,* 22, 1 (2005).
26 Andrew Gowers et. al., *Gowers Review of Intellectual Property* (Norwich, England: HMSO, 2006); Ruth Towse, "The Quest for Evidence on the Economic Effects of Copyright Law," *Cambridge Journal of Economics,* 37 (2013).
27 Peter Yu, "Digital Copyright and Confuzzling Rhetoric," *Vanderbilt Journal of Entertainment and Technology Law,* 13 (2011); Lee Edwards, Bethany Klein, David Lee, Giles Moss and Fiona Philip, "Discourse, Justification and Critique: Towards a Legitimate Digital Copyright Regime?," *International Journal of Cultural Policy* (2014).
28 Robin Gross, "Copyright Zealotry in a Digital World: Can Freedom of Speech Survive?" in Thierer and Crews (eds), *Copy Fights: The Future of Intellectual Property in the Information Age* (Washington, DC: CATO Institute, 2002); Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World* (New York: Random House, 2001); Siva Vaidhyanathan, *Copyrights and Copywrongs: The Rise of Intellectual Property and How It Threatens Creativity* (New York: New York University Press, 2001).
29 Robin Mansell and W. Edward Steinmueller, "Copyright Infringement Online: The Case of the Digital Economy Act Judicial Review in the United Kingdom," *New Media & Society,* 15 (2013); Puay Tang, "Digital Copyright and the 'New' Controversy: Is the Law Moulding Technology and Innovation?," *Research Policy,* 34 (2005).
30 Lapo Filistrucchi, Catherine Tucker and Lisa M. George, "The Economics of Digital Media Markets," *Information Economics and Policy,* 24 (2012); Christian Handke, "Digital Copying and the Supply of Sound Recordings," *Information Economics and Policy,* 24 (2012); Johan A. Pouwelse, Pawel Garbacki, Dick Epema and Henk Sips, "Pirates and Samaritans: A Decade of Measurements on Peer Production and Their Implications for Net Neutrality and Copyright," *Telecommunications Policy,* 32 (2008).
31 Armen Boyajian, "The Sound of Money: Securing Copyright, Royalties, and Creative Progress in the Digital Music Revolution," *Federal Communications Law Journal,* Vol. 62, No. 3 (2010).
32 Marshall Leaffer, "The Uncertain Future of Fair Use in a Global Information Marketplace," *Faculty Publications,* Paper 467 (2001).

'The question is not whether copyright remains relevant today, but instead what form the copyright regime should take in order to best promote innovation and growth.'

exceptions and limitations to copyright owner's exclusive rights is a key area where the current imbalances in copyright can be addressed.[33] This is a particularly valuable avenue for copyright reform in the EU because it does not require substantial revision to copyright legislation.

The current debate on reforming the limitations to exclusive rights has inevitably yielded a comparison between Europe's copyright regime and that of the United States – a question which naturally arises given the interest on both sides of the Atlantic in promoting a successful innovation regime and driving jobs and growth. Limits on the exclusive rights of copyright owners have historically been established in European countries via statutes that set out a list of precisely defined limitations and exceptions. These include exceptions for educational and archival use, parody and criticism among others. Rightsholders have also been compensated for private copying through a broad system of levies imposed on copying technologies and blank media.[34] While the US also imposes levies on blank media, it has adopted a much broader limitations and exceptions doctrine known as "fair use." This approach is broadly acknowledged to be more flexible in response to new technologies than the European one.

The fair use doctrine enables US judges to defend an unauthorised use of a copyrighted work as fair on a case-by-case basis by reference to four factors: 1) the purpose and character of the use, including whether such use is of a commercial nature or is for non-profit educational purposes; 2) the nature of the copyrighted work; 3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; 4) the effect of the use upon the potential market for or the value of the copyrighted work. This case-by-case approach has enabled US copyright legislation to adapt to new technologies such as the VCR, digital sampling, MP3 players and TiVo without substantive legislative revision. It has been argued that this flexibility may have also contributed to greater levels of innovation in certain industries, as shown by increased venture capital funding for cloud computing services in the US compared to Europe.[35]

Though flexible, the fair use approach is often criticised as unhelpful in identifying which uses are, or should be, legal until a lengthy and costly litigation procedure has finished.[36] Uncertainty and delay are inevitable corollaries of a changing environment. However, narrow exceptions are more likely to increase legislative error costs compared to "flexible, open-ended standards [that] are better suited to handle responses from technological innovators in response to legal rules."[37] Ultimately the trade-off is between precisely defined exceptions like the explicit exceptions and limitations approach – which increase legal certainty – and flexibility, which enables legislation to adapt to technological change. The introduction of a three-step test in Article 5.5 of the EU Information Society Directive, which reflects the fair use doctrine by creating an open-ended norm for defining limitations to copyright, has been criticised as a worst-case scenario where the national framework of exceptions is further restricted by the three-step test.[38] In this context, "the need for more dynamic, flexible copyright law in the

33 Ole Bronmo, "Copyright Legislation, Fair Use and the Efficient Dissemination of Scientific Knowledge," *IFLA Journal,* 23 (1997); Michael Carroll, "Fixing Fair Use," *North Carolina Law Review*, 85 (2007).
34 Natali Helberger and Bernt Hugenholtz, "No Place like Home for Making a Copy: Private Copying in European Copyright Law and Consumer Law," *Berkeley Technology Law Journal,* 22 (2012).
35 Josh Lerner, "Boom and Bust in the Venture Capital Industry and the Impact on Innovation," *Harvard NOM Working Paper No. 03-13* (2002).
36 Raymond Shih Ray Ku, "Consumers and Creative Destruction: Fair Use Beyond Market Failure," *Berkeley Tech. LJ,* 18 (2003).
37 Ben Depoorter, "Technology and Uncertainty: The Shaping Effect on Copyright Law," *Part of Symposium: The Foundations of Intellectual Property Reform,* 157 (2009).
38 Martin Senftleben, "Comparative Approaches to Fair Use: An Important Impulse for Reforms in EU Copyright Law," *Methods and Perspectives in Intellectual Property* (2014, Forthcoming).

'Making copyright policy relevant to the digital economy requires a better understanding of the complex relationship between economic growth, productivity and limitations and exceptions to copyright.'

information society is almost self-evident," as Bernt Hugenholtz and Martin Senftleben have argued.[39] But what does dynamism in copyright law mean? What exceptions to exclusive rights are most suitable to stimulate growth in the digital world?

Quo Vadis Europa?

As a new European Commission settles into its five-year mandate, intellectual property rights are now at the core of European economic policy. With digitalisation transforming social and cultural life, intellectual property is shifting from the sole prerogative of professionals and publishers to a fundamental concern of all citizens. This has pushed intellectual property rights to the forefront and highlighted the lack of evidence available on which to base sound policy.[40] The harmonisation of intellectual property rights internationally through the ratification of WTO TRIPS has also prompted numerous questions on the role of intellectual property rights in international development and increasingly polarised debates about the degrees of protection necessary. New opportunities to regulate copyright online must be assessed empirically and the full range of policy options available discussed in a transparent manner that includes all stakeholders in the emerging digital environment.[41]

The importance of making sure Europe's copyright framework is "fit for purpose" cannot be overstated. Few regions are in a stronger position to leverage

the digital, knowledge-based economy as a driver of growth. This is evident in a number of ways:

1. **Investment in Knowledge:** The relative performance of EU member states compared to developing nations and BRICS countries places the EU at the forefront of the global economy in terms of education and investment in R&D.[42]

2. **Innovation Performance and ICT Infrastructure:** EU nations consistently rank as strong performers in the Global Innovation Index and the OECD's innovation indicators.[43] The ITU Information Society Index and the World Wide Web Foundation's Web Index highlight Europe's substantial investment in network infrastructure.[44]

3. **E-Commerce Growth:** The Internet economy is a strong component of EU growth, growing seven times faster than other sectors. EU companies have a strong presence in this sector.[45]

Considering its performance in ICT infrastructure rankings, this trend is likely to grow. These factors should contribute to a growing optimism about Europe's prospects in the digital age. Successive reports have highlighted the contribution of the creative industries to national growth in the region.[46] The EU is poised to benefit enormously from the digital revolution. However, it can only do

39 Bernt Hugenholtz and Martin Senftleben, "Fair Use in Europe: In Search of Flexibilities," *Social Sciences Research Network, 1959554* (2011).
40 Ian Hargreaves, *Digital Opportunity: A Review of Intellectual Property and Growth: An Independent Report* (London: Intellectual Property Office, 2011).
41 Richard Hooper and Ros Lynch, *Copyright Works: Streamlining Copyright Licensing for the Digital Age* (London: Intellectual Property Office, 2012); Ian Hargreaves and Paul Hofheinz (eds.), *Intellectual Property and Innovation: A Framework for 21st Century Growth and Jobs* (Brussels: The Lisbon Council, 2012); Ian Hargreaves and Bernt Hugenholtz, *Copyright Reform for Growth and Jobs: Modernising the European Copyright Framework* (Brussels: The Lisbon Council, 2013).
42 Jan-Frederik Kremer and Katharina Below, "Innovative Capabilities and Market Performance: The European Union in International Comparison," *The Jean Monnet/Robert Schuman Paper Series,* 12 (2012).
43 See the rankings of the Global Innovation Index (http://www.globalinnovationindex.org) and the OECD Innovation Indicators (http://stats.oecd.org/Index.aspx?DataSetCode=REG_INNO_TL2).
44 See the rankings of the Information Society Index (http://www.itu.int/ITU-D/ict/publications/idi/) and the Web Index (https://thewebindex.org/).
45 European Commission, *Digital 'To-Do' List: New Digital Priorities for 2013-2014* (Brussels: European Commission, 2012).
46 For an overview, see World Intellectual Property Organisation, *Copyright + Creativity = Jobs and Economic Growth: WIPO Studies on the Economic Contribution of the Copyright Industries* (Geneva: WIPO, 2012).

'Quantitative research offers a rich set of tools to assess the influence of policy on economic activity.'

so if it is supported by a copyright policy that appreciates the new dynamics of innovation and the complex ecosystem in which economic value is embedded online. Copyright law, more than ever before, is integral to the creation, dissemination and exchange of information goods and cultural works. The question is not whether copyright remains relevant today but instead what form the copyright regime should take in order to best promote innovation and growth? In the words of Australians Birgitte Andersen, Lucy Montgomery and Benjamin Reid: "Future intellectual property policies must focus on creating and expanding markets for ideas and creative expression, rather than being bogged down in analogue-era debates about how narrowly defined interests of individual industry sectors, formats, channels or business models can be protected. This is crucial because it is through the growth of these markets that research and development costs will be recovered, innovation incentivised, knowledge spread and competition and entrepreneurship stimulated."[47]

Copyright reform so far has focused on expanding the scope and length of protection. Yet, as Carl Shapiro and Hal Varian have written, "Rightsholders should be concerned with maximising the value of their intellectual property, not maximising the protection of that property."[48] Making copyright policy relevant to the digital economy requires a better understanding of the complex relationship between economic growth, productivity and limitations and exceptions to copyright. Quantitative research offers a rich set of tools to assess the influence of policy on economic activity. By comparing the impact of national differences in the scope and flexibility of exceptions to exclusive rights on productivity and growth, we can start to understand what a copyright policy fit for the digital age might really look like. Our empirical analysis suggests that broad and flexible exceptions to copyright embedded within a strong intellectual property protection framework may strike the delicate balance between incentivising creative output and generating value from creative content. It is our hope that these preliminary findings open the space for further empirical research and debate on copyright in Europe and, most importantly, how copyright policy can support innovation, productivity and growth in the digital age.

Evidence for policy

What constitutes good evidence? The United Kingdom's Intellectual Property Office recently published *Guide to Evidence for Policy*, a paper designed to shed important light on what kind of evidence was most helpful for policymakers. It also looked to provide important guidelines on how the research community could best work to ensure it met those standards in areas where their work impacted most directly on public policy. Specifically, it set a three-point criteria for determining which evidence was most likely to be influential, stating that good evidence is evidence that is 1) clear, 2) verifiable, and 3) peer reviewed. Throughout this paper, we have sought to meet this criteria. As a result, you will find the assumptions used in scoring the SFEER Index and the ensuing economic regressions described in full in the three appendices to this paper. We believe this will allow interested scholars the ability to replicate the findings laid out here, and perhaps help us to perfect the methodology and continue to deliver better evidence in a policymaking area where it is so badly needed. For more, visit http://webarchive.nationalarchives.gov.uk/20140603093549/http://www.ipo.gov.uk/consult-2011-copyright-evidence.pdf.

47 Birgitte Andersen, Lucy Montgomery and Benjamin Reid, *Digital Copyright Exchange Feasibility Study: Response to the Hooper Consultation from the Big Innovation Centre* (Brisbane: Queensland University of Technology, 2012).
48 Carl Shapiro and Hal Varian, *Information Rules* (Cambridge: Harvard Business Press, 1998).

Appendix I
The 2015 Intellectual Property and Economic Growth Index: Methodology and Context

The empirical relationship between copyright and economic growth has been the subject of fierce debate over the last decade. The initial outpouring of research on copyright, digital piracy and creative industry output in response to file-sharing technologies are based on methods and assumptions that have been widely criticised.[49] As the role of the Internet in economic activity continues to grow, there has been growing demand for verifiable empirical work on the role of copyright in incentivising the creation of original works. However, there are numerous challenges in basing copyright policy on econometric analysis. Copyright is a generic term for a broad range of rights that are embodied in a huge variety of products which operate in diverse markets without the need for registration. As a result, hard data on copyright is nearly impossible to obtain in comparison with other intellectual property rights such as patents and trademarks.[50]

What's more, scholars like Ruth Towse, professor of economics of creative industries at Bournemouth University, have argued that objectivity in copyright policy is difficult when there are no standards on data collection, government statistics on cultural economies are "woefully inadequate," and governments are subject to regulatory capture. There is no possibility for truly counterfactual analysis because copyright is ubiquitous. Most significantly, the widespread assumption that the output of the creative industries is attributable to copyright nullifies any chance of discovering a causal role.[51] This assumption is so engrained that we no longer question it. Studies on the economic contribution of copyright are almost without exception a quantification of the growth in creative industries, while the link between copyright and incentivising creation of original works has yet to be proven in any meaningful way.

In an attempt to address the paucity of evidence on the impact of copyright policy, the World Intellectual Property Organisation (WIPO) established guidelines on quantifying the contribution of copyright and related industries to the economy.[52] Multiple reports subsequently

Table 3. Quantitative Approaches to Measuring Economic Contribution of Copyright[53]

Objective	Estimate contribution to economic welfare (public policy perspective)	Estimate value of investment in copyright content and expected return (asset perspective)	Estimate value-added to national economy by copyright-related industries (industry perspective)
Method	Measures level of consumer and producer surplus from a good and deadweight loss Evidence based on 'event-studies' where change in level of copyright occurs and impact on industry revenue and content creation are observed	Measures time spent by authors creating original works and estimates expected return Evidence based on identifying creators, where they work in the economy, estimating the value of their time, and multiplying the number of workers with mean salaries for each occupational group	Classification of industry sectors into core, dependent, partial, and non-dedicated support industries (WIPO) Measures each industry's contribution based on value-added data and recognises that investment made by creators serves as a catalyst for a wide range of economic activities

49 Majid Yar, "The Global 'Epidemic' of Movie 'Piracy:' Crime-Wave or Social Construction?," *Media, Culture & Society*, 27 (2005); Lee Marshall, "The Effects of Piracy Upon the Music Industry: A Case Study of Bootlegging," *Media, Culture & Society,* 26 (2004); Martin Kretschmer, George Michael Klimis and Roger Wallis, "Music in Electronic Markets," *New Media & Society,* 3 (2001).
50 Ruth Towse, "The Quest for Evidence on the Economic Effects of Copyright Law," *Cambridge Journal of Economics,* 37 (2013).
51 Ibid.
52 World Intellectual Property Organisation, "WIPO Guide on Surveying the Economic Contribution of the Copyright-based Industries," *WIPO Publication No 893* (2002).
53 PricewaterhouseCoopers, "An Economic Analysis of Copyright, Secondary Copyright and Collective Licensing" (2011).

adopted this approach in quantifying copyright's economic contribution to national economies (this method will be discussed in greater detail below). Other reports quantified the economic contribution of fair use in copyright, an equally significant research objective plagued with perhaps even more empirical issues.[54] A 2011 PricewaterhouseCoopers report categorised existing approaches to measuring the economic contribution into three major themes (see Table 3 on page 15).

Each of these approaches captures significant facets of copyright's economic value but none are comprehensive. They are primarily static measures that obscure the long-term dynamics of incentivising creative work. They do not incorporate wider impacts such as human capital spill overs – the transfer of valuable tacit knowledge between sectors that occurs as workers that have developed creative skills and competencies change jobs – as well as the impact on value chains in creative industries.[55] As the shift towards decentralised entrepreneurs, micro-multinationals and ever more non-institutionally represented creators accelerates, measuring copyright is likely to become even more complicated.[56] A recent Nesta report titled *A Dynamic Mapping of the UK's Creative Industries* also highlighted the limits to previous UK Department of Culture, Media and Sport mapping documents by emphasising that the classification of copyright-related industries omitted many industries with high creative intensity, such as software development.[57] A corollary to this was the recognition that the creative industries themselves contain numerous administrative and managerial functions that are not particularly creative. Nesta proposed a method for determining which occupations are creative based on a rigorous scoring of each occupation against a grid of five theoretically grounded criteria.

This type of research is a positive step because it moves beyond a narrowly defined creative industries perspective and instead adopts a creative economy approach that emphasises the interplay between creativity, culture, technology and economic activity in all sectors in the digital age. Though the research does not aim to make value judgments about copyright's legislative framework, it is important to note that it too assumes copyright's role in incentivising creativity in the economy. The core assumption in the model thus precludes deeper understanding of the causal relationship between copyright and creative output. This is an unfortunate symptom of the issues related to gathering evidence on copyrighted works.

Any study on the economic impact of copyright will be limited by some, if not all, of these issues. Exploring the impact of the scope and flexibility of exceptions to exclusive rights in copyright law, as we have done in this paper, while still beset by many of the issues in evidence gathering, does not encounter this problem because it does not assess the causal relationship between copyright and creative output. Instead, it investigates the relationship between economic growth indicators and the exceptions and limitations to exclusive rights that exist among nations where levels of copyright enforcement are largely uniform.

There is considerable debate on the relative merits of copyright regimes that list exemptions to exclusive rights exhaustively in statutes and a fair use copyright regime like the US, which employs an open-ended four factor test to counterfactually determine infringement through court proceedings.[58] The approach that lists exceptions and limitations to copyright is widely considered less flexible because it cannot adapt to new technologies without legislative revision: a use of a copyrighted work that does not fall into the explicit categories of exceptions and limitations is highly unlikely to be deemed fair in judicial proceedings. However, approaches that list exceptions and limitations to copyright exhaustively tend to confer more legal certainty regarding which uses

54 Thomas Rogers and Andrew Szamosszegi, "Fair Use in the US Economy: Economic Contribution of Industries Relying on Fair Use," *CCIA Report (*2010).
55 Ibid.
56 Ann Mettler and Anthony Williams, *The Rise of the Micromultinational: How Freelancers and Technology-Savvy Start-Ups are Driving Growth, Jobs and Innovation* (Brussels: Lisbon Council, 2011).
57 Hasan Bakhshi, Alan Freeman and Peter Higgs, *A Dynamic Mapping of the UK Creative Industries* (London: Nesta, 2013).
58 See US Copyright Act of 1976, Section 107.

are not infringing. The three-step test recently introduced in Article 5.5 of the EU Information Society Directive, which adopts a fair use, open-ended norm approach to limitations to copyright, could reduce this certainty because it enables national frameworks of specific exceptions to be expanded or restricted on a case-by-case basis. However, the resulting divergence in national legislation has led to fragmentation in the market by allowing some countries to forge ahead while others held back – impeding the development of a truly digital single market in Europe and leading to a legislative regime that is fully "harmonised" on paper but still effectively split into 28 widely differing legal standards in practice.[59]

Finding the Right Data

Relevant data falls into three broad categories: 1) raw time-series data on economic output and ICT infrastructure indicators at the national level; 2) existing estimates of contributions of creative industries to national economies; 3) weighted indexes on innovation capacity, ICT infrastructure and intellectual property protection. We believe data in categories two and three (i.e., estimates of contributions to creative industries and weighted indexes on innovation capacity, etc.) provide a useful starting point for comparing performance of countries in an effort to finalise a selection of countries for more advanced econometric analysis. By assessing the relative performance of countries in terms of the economic value of their creative industries, it is possible to identify key players in the creative content market in Europe. National comparisons of ICT infrastructure indices and innovation indices illuminate which economies are in the strongest position to benefit from the burgeoning digital economy. This includes the EU Inno Scoreboard, EU Digital Agenda Scoreboard, OECD Innovation Indicators, Global Innovation Index, ITU ICT Development Index, and WEF Global Competitiveness Index. Finally, indicators on the strength of IP protection provide an initial measure to explore the relationship between copyright and innovation. The only known weighted index of this type devoted entirely to intellectual property is the Global Intellectual Property Center's International Intellectual Property Index.

Econometric analysis of the relationship between copyright and economic growth requires reliable, time-series data across all countries of interest. We believe the databases listed in Table 4 below meet these criteria.

The availability of long, time-series data for each country was also important because more data points result in stronger econometric modelling and augment the robustness of results. The EU/World KLEMS database was selected on this basis. It contains data for all relevant countries at an industry-specific scale (based on International Standard Industrial Classification (ISIC) Rev. 4 classification of industries). This data has been systematically aggregated in a reliable, verifiable manner. Data exists for a large number of output indicators including value data (value-added, number of person engaged, total hours worked) and growth accounting (labour compensation, capital compensation, labour services, capital services, growth rate of value-added, contribution of hours to value-added growth, contribution of ICT capital services to value-added growth

Table 4. Database Candidates for Econometric Analysis of Copyright-related Industries

OECD STAN	OECD SBS & TIE	OECD iLIBRARY	EUROSTAT	WORLD BANK	EU/WORLD KLEMS
Value-added Wages and salaries Persons engaged Exports of goods and services	Enterprise birth rates Number of bankruptcies Persons employed Survival rates	Technology BoP Productivity Science and Tech indicators International trade in services Telecoms indicators	Internet penetration Internet affordability Internet users Science and Tech indicators	Charges for use of IP Internet users Mobile subscription High-tech exports ICT goods exports/imports	Output data for all relevant indicators at industry-specific scale

59 Hargreaves and Hugenholtz, op. cit.

and total factor productivity). The data has been compiled all the way back to the 1970s within the new ISIC Rev. 4 classification scheme. All data is publically available on the EU KLEMS website. These factors made it the most valuable source of data for the project.

Selecting Countries for the Survey

The EU/World KLEMS databases include time-series data for all relevant indicators for the following 12 countries: Austria, Belgium, Finland, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, the United Kingdom and the United States. This list was refined in order to accurately calculate a SFEER Index score for each country.

Copyright is widely regarded as a major factor in stimulating the creative output of national economies. Consequently, the 2013 Global Innovation Index's Creative Goods and Services Sub-Index provided a useful measure to refine the initial set of 12 countries.[60] The score is a weighted aggregate of audio-visual and related services exports, national feature films per million of population, paid for dailies in circulation as a percentage of the population, printing and publishing manufacturers as a percentage of GDP, and creative goods exports as a percentage of GDP. The score is sensitive to population and market size differences that might prejudice larger economies. The 2013 scores for the country sample are shown in Table 5 on page 19.

Starting with the winner, the ranking of creative output according to this index is:
1) The Netherlands; 2) UK; 3) US; 4) Japan; 5) Sweden; 6) France; 7) Belgium; 8) Spain; 9) Germany; 10) Austria; 11) Finland; 12) Italy. Eight countries needed to be selected in order to make the calculation of the SFEER Index scores feasible within the project timeframe. By that count, Germany fell just short of the selection. However, as the largest economy in the EU and due to the high-profile role of its collective rights management organisation GEMA in monitoring online rights infringement, Germany was an

obvious choice for understanding the role of copyright on economic growth. It therefore replaced Belgium, which is the smallest market in the top eight countries. The final selection for analysis was therefore France, Germany, Japan, Netherlands, Spain, Sweden, UK and the US.

The Scope and Flexibility of Exceptions to Exclusive Rights Index

In order to explore the economic impact of national differences in the scope and flexibility of exceptions to exclusive rights, this study introduced a novel benchmark index method. The benchmark score was compiled using a set of criteria that differentiate between the copyright regimes along several lines related to the scope and flexibility of exceptions to exclusive rights. These include whether the nation adheres to the Berne Convention three-step test as well as the standard subjects for exemptions both in the public and private sphere. Only exceptions in force for over half of the time period are included. Since the economic data surveyed ranges from 1993 to 2010, the cut-off date for legislation is 2002. All exceptions and limitations to copyright that were introduced after 2002 are not included in the scores. Table 6 on page 20 outlines the criteria and scoring method for the benchmark. Each country in the survey was given a score based on the criteria shown in the table. This gave an aggregate score out of 16. The aggregate score was then transformed onto a scale from 1 to 10. This enabled easy comparison of the scope and flexibility of exceptions to exclusive rights that exist among the countries. The lower the score, the more limited the set of exemptions to exclusive rights. The higher the score, the broader the set of exemptions. Table 9 on page 23 gives the final scores awarded, and Table 7 on page 21 lists the relevant copyright legislation that formed the basis for the scores. Table 8 on page 22 provides the scores for each criteria, the totals for each country and the final, transformed score that form the basis for econometric modelling and comparison using a variety of economic output variables.

60 Cornell, INSEAD and WIPO, *The Global Innovation Index 2013: The Local Dynamics of Innovation* (2013).

Table 5. 2013 Creative Goods and Services Sub-index Scores for Country Set

Austria	Belgium	Germany	Spain	Finland	France	UK	Italy	Japan	Netherlands	Sweden	US
43.6	46.2	44.7	45.1	41.3	46.6	58.4	35.7	49.9	60.5	48.5	55.6

Many of the individual scores for the criteria rely on a tripartite classification that defines the exceptions and limitations as broad (score of 1), narrow (score of 0.5) or non-existent (score of 0). The choice to give a country a score of zero is straightforward. It specifies that no statute exists in national law for that particular exception to exclusive rights. The decision regarding whether a country has a broad set of exceptions and limitations compared to a narrow set is inherently more problematic. This is because "broad" and "narrow" are descriptive terms with indeterminate boundaries. Consequently, the score given in a particular case is by definition a qualitative judgment based on the language adopted in the statute. While this is certainly a limitation of the methodology, it is a necessary one. Without it, the econometric modelling would not be possible. Several steps were taken to ensure the scoring approach was both rigorous and transparent. Firstly, the statute underpinning each score is cited in Table 7 on page 21. This means anyone can cross-check the score given in a particular case with the statute that formed the basis for the score. It also means that the scoring system is easily revised based on input from experts and in the case of legislative reform. Secondly, the scores for a given criteria are based on a comparison of the language used in one country's statute against the language adopted for the corresponding statute in all the other countries in the sample. This comparative approach permitted more accurate judgments regarding whether a particular statute was broad or narrow.[61]

Assumptions and Limitations

The approach relied on several assumptions. Most importantly, levels of copyright enforcement in the country sample are assumed to be uniform. This assumption is reasonable when one considers the relatively high performance of the target countries in all indexes that measure levels of intellectual property protection around the world. Another assumption is that the limitations and exceptions to exclusive rights that exist at the legislative level demonstrate the *de facto* scope of exceptions in the target countries. The model does not take into account the manner in which courts apply the law nor the potential gap between what copyright law permits and what people actually do in practice. It also does not take into account any reforms introduced after 2002. While these reforms are welcome and likely to have a positive long-term influence, they will not have had an impact on economic behaviour for the majority of the period surveyed

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61 For example, the UK was given a score of 1 for the "criticism, comment and review" exception criteria while the Netherlands was given a score of 0.5. In the UK, this exception is covered by paragraph 30 (1) of the Copyright, Designs and Patents Act, which states that "fair dealing with a work for the purpose of criticism or review... does not infringe any copyright in the work provided that it is accompanied by sufficient acknowledgement and provided that the work has been made available to the public." In the Netherlands, this exception is covered by Article 15a (1) of the Copyright Act, which states that "quotations in an announcement, criticism, polemic or scientific treatise shall not be deemed an infringement of copyright in a literary, scientific or artistic work where: 1) the work from which the quotation is taken has been lawfully communicated to the public; 2) the quotation is in conformity with that which may be reasonable accepted in accordance with social custom and the number and length of the quoted passages are justified by the purpose to be achieved; 3) the provisions of article 25 have been taken into account; 4) the source is clearly indicated, together with the indication of the author if it appears in the source... We reserve the right to determine, by order in council, what is to be understood in paragraph 1 sub 2 by 'reasonably accepted in accordance with social custom.'" Comparing the language adopted in both statutes makes it immediately apparent that the Netherlands imposes additional, albeit limited, restrictions on exceptions for the purpose of criticism, comment and review when compared with the UK. As a result, the UK's set of exceptions for this criteria is defined as broad (1) while the Netherlands is defined as narrow (0.5).

and therefore should not be included in the current study.[62] However, a benefit of the matrix scoring methodology introduced here to calculate the SFEER Index is that it can be easily revised in future research to accommodate for reform. All of these assumptions are necessary in order to accurately model the relationship between the calculated score and economic growth in each country as well as compare the relative performance of the different countries.

Given these assumptions, it is important to highlight a number of limitations to the model. Most important is that the index is a

Table 6. Measuring the Scope and Flexibility of Exceptions to Exclusive Rights

	Criteria	Score Type	Score System	Score Range
Berne 3-Step Test	Exclusive right of owner to authorise reproduction	*Binary*	1 = meets criteria; 0 = does not meet criteria	0 – 3
	Reproduction permitted without authorisation in special cases			
	Audio or visual recording defined as reproduction			
Scope of Exceptions and Limitations (for public use)	Criticism, comment and review	*Scale*	1 = Broad set of exceptions and limitations	0 – 9
	Parody			
	Reporting of current events			
	Education (classroom use, non-commercial)		0.5 = Narrow exceptions and limitations	
	Scholarship (research, non-commercial)			
	Libraries and archives			
	Parliamentary or judicial proceedings		0 = No exceptions and limitations	
	Incidental inclusion			
	Temporary copy during transmission			
Scope of Exceptions and Limitations (for private use)	Private copying	*Scale*	1 = Broad set of exceptions and limitations	0 – 3
	Time-shifting		0.5 = Narrow exceptions and limitations	
	Format-shifting		0 = No exceptions and limitations	
Private Copying Compensation (levy system)	Levies on private copying equipment and blank media	*Binary*	0 = levy system in place; 1 = no levy system	0 – 1
			Raw Total	0 – 16
			Transformed Total	0 – 10

62 Several European countries have enacted copyright reforms during the time period surveyed to bring their exceptions in line with those set out by Article 5 of Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society. These include broader exceptions for libraries and archives, education and research, as well as exceptions for incidental inclusion and temporary copies during transmission. See for example Article 18b and 18a of the Copyright Act in the Netherlands, Article 20a and 11a in Sweden, Article L122-5 (3e) in France, and Article 52b in Germany among others. Japan also introduced reforms to carve out exceptions for incidental inclusion and temporary copies during transmission (Article 30bis and Article 47quinquies respectively). More recently, on 01 June 2014, the UK Intellectual Property Office brought into force several reforms based on the findings of the Hargreaves Review of Intellectual Property and Growth published in 2011. These reforms included the removal of copyright barriers to non-commercial text and data-mining, parody, some forms of private copying as well as expanding the scope of exceptions to copyright for charities, museums, archives and people with disabilities among others. These reforms have not been included in the study because it would be misleading to evaluate the historical performance of certain sectors of the British economy against a copyright framework that was only recently reformed. These UK reforms also raise an interesting question. The SFEER Index ranking suggests the expansion of exceptions in light of these reforms would result in the UK having a similar score to the US. This result is intuitively questionable given the open-ended nature of fair use in the US compared to the UK. However, the scores are close for three reasons: 1) no levies exist on private copying equipment in the UK; 2) the UK employs broad language in its statutes with regards to exceptions and limitations; 3) the model cannot account for the application of the law in practice and relies exclusively on the language used in the statute.

static indicator. It does not capture changes in legislation over time or the impact of those reforms. It is therefore a relatively coarse measure of the scope and flexibility of exceptions to copyright law that is not sensitive to policy adjustment. Despite this, we believe it remains a useful indicator both for immediate econometric analysis and as a starting point for developing a toolkit to understand the long-term dynamics of copyright and economic growth. It is also

Table 7. The Scope and Flexibility of Exceptions to Exclusive Rights – Legislative Basis[63]

	CRITERIA	US	UK	DE	JP	FR	NL	ES	SE
Berne 3-step Test	Exclusive right of owner to authorise reproduction	106	II.16	Art. 15	Art. 17	L121-2 / L121-5	Art. 1	Art. 17	Art. 2
	Reproduction permitted without authorisation in special cases	107	II	Section VI	Art. 30 – 47	L1225	Section VI	Ch. II	Art. 11-26
	Audio or visual recording defined as reproduction	106	II.27	Art. 21	Art. 8	L122-3	Art. 14	Art. 114-117	Art. 2
Scope of Exceptions and Limitations (for public use)	Criticism, comment and review	107	III.30	Art. 51	Art. 32	L122-5 (3a)	Art 15a (1)	Art. 32	Art. 22
	Parody	107	-	Art. 24	-	L122-5 (4)	-	Art. 39	Art. 4
	Reporting of current events	107	III.30	Art. 50 / Art. 49	Art. 41	L122-5 (3b)	Art 16a	Art. 35	Art. 25
	Education (teaching, non-commercial)	107	III.32	Art. 47	Art. 33 - 35	L122-5 (3e)	Art 16	-	Art. 14 / Art. 21 / Art. 18
	Scholarship (research, non-commercial)	107	III.29	Art. 53	-	L122-5 (3e)	Art 16b	-	Art. 16
	Libraries and archives	108	III.37 – III. 43	-	Art. 31 / Art. 42ter	L122-5 (8)	Art 15c	Art. 37	Art. 16
	Parliamentary/ judicial/ governmental proceedings	Williams & Wilkins Co. v. United States / Religious Technology Center v. Wollersheim / Jartech v. Clancy	III.45	Art. 45	Art. 42	-	Art. 22	Art. 31	Art. 26
	Incidental inclusion	107	III.31	Art. 57	-	-	-	-	-
	Temporary copy during transmission	111	-	-	-	-	-	-	-
Scope of Exceptions and Limitations (for private use)	Private copying	Sony Corporation of America v. Universal City Studios	III.29	Art. 53	Art 30	L122-5 (2)	Art 16b	Art. 31	Art. 12
	Time-shifting	Sony Corporation of America v. Universal City Studios	III.70	-	-	-	-	-	-
	Format-shifting	RIAA v. Diamond Multimedia	-	-	-	-	-	-	-
Private copying compensation (levy system)	Levies on private copying equipment and blank media	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

63 This is a tabulation of legislation (and case law where applicable in the US) relevant to the scope and flexibility of exceptions to exclusive copyright. Each statute cited in this table forms the basis for the score in Table 8. See the bibliography for a full citation of each country's copyright law.

worth noting that the index does not include statutory limits to copyright, such as the length of term of protection or anti-circumvention laws. Digital rights management technologies, protected against circumvention by statute in many countries, expand copyright in ways that can increase deadweight loss by enabling excessive monopoly pricing and control. The ability of rightsholders to control any type of access (regardless of whether it is fair or not) is a further restriction to exceptions and limitations to copyright that is driven by technological developments. Though an important facet of copyright in its own right, it is beyond the scope of this paper to discuss these issues.[64]

The private copy levy criterion has been included because levies on private copying technology are effectively a compulsory license paid by technology manufacturers to compensate rightsholders for private copying enabled by limitations and exceptions to copyright. While it is not an exception to copyright, a levy system is a tax on innovators of private copying technologies and therefore should be included in any index that tries to gauge the scope and flexibility of copyright exceptions and its impact on growth and productivity. For the purposes of this policy brief, the variation that exists across national levy systems for countries in the sample was reduced to a binary score that indicates only

Table 8. The Scope and Flexibility of Exceptions to Exclusive Rights – Country Scores[65]

	CRITERIA	US	UK	DE	JP	FR	NL	ES	SE
Berne 3-step Test	Exclusive right of owner to authorise reproduction	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Reproduction permitted without authorisation in special cases	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Audio or visual recording defined as reproduction	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Scope of Exceptions and Limitations (for public use)	Criticism, comment and review	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0
	Parody	1.0	0.0	1.0	0.0	1.0	0.0	1.0	1.0
	Reporting of current events	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Education (classroom use, non-commercial)	1.0	0.5	0.5	1.0	0.0	1.0	0.0	0.5
	Scholarship (research, non-commercial)	1.0	1.0	0.5	0.0	0.0	0.5	0.0	0.5
	Libraries and archives	1.0	1.0	0.0	1.0	0.0	0.5	1.0	1.0
	Parliamentary or judicial proceedings	0.5	1.0	1.0	1.0	0.0	1.0	1.0	1.0
	Incidental inclusion	0.5	1.0	1.0	0.0	0.0	0.0	0.0	0.0
	Temporary copy during transmission	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scope of Exceptions and Limitations (for private use)	Private copy	1.0	0.5	0.5	0.5	1.0	1.0	1.0	0.5
	Time-shifting	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
	Format-shifting	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Private copying compensation (levy system)	Levies on private copying equipment and blank media	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTALS	13.0	11.5	9.5	8.5	7.0	8.5	9.0	9.5
	TRANSFORMED	8.13	7.19	5.94	5.31	4.38	5.31	5.63	5.94

64 For more, see for example Irina Baraliuc, Sari Depreeuw and Serge Gutwirth, "Copyright Enforcement in the Digital Age: A Post-ACTA View on the Balancing of Fundamental Rights," *International Journal of Law and Information Technology,* Vol. 21, No 1 (2012); Abbas Foroughi, Marlin Albin and Sharlett Gillard, "Digital Rights Management: A Delicate Balance between Protection and Accessibility," *Journal of Information Science,* Vol. 28 (2002).

65 Tables 6 and 7 have been included in order to make the country scores for each criteria in Table 8 as transparent as possible. This framework is designed to be easily revised in light of feedback from experts and easily adjusted when policy reform is enacted. The idea is to create a toolkit for further empirical investigation.

whether a levy system exists or not. Although national differences in levy rates and reporting requirements will undoubtedly have an impact on growth and productivity in sectors that are targeted by them, evaluating levy systems at this level of detail would have been prohibitively time-consuming for the purposes of this study. There are entire econometric studies devoted exclusively to assessing these differences and the intricacies of private copy levy systems are widely discussed elsewhere.[66]

At this point, it is necessary to discuss some of the wider limitations of linking policy with economic outcomes. First and most importantly, the methods described above do not attribute causality. Given the nature of measuring the impact of policy on economic growth – even more complicated when one considers a policy as nebulous as the scope and flexibility of exceptions that exist in copyright law – attributing causality is inherently problematic. There is a persistent demand for concrete statements about IP-based economic performance. Yet, the methodological issues described above make such statements anything but straightforward. In an ideal world, we would measure the impact of copyright policy on a treatment group of industries using a differences-in-differences methodology with an accurate control group of industries. All other policies that might affect growth in the selected industries would also have to be controlled for.

Table 9. The Scope and Flexibility of Exceptions to Exclusive Rights – Country Ranking

Rank	Country	SFEER SCORE
1	US	8.13
2	UK	7.19
3	Germany	5.94
4	Sweden	5.94
5	Spain	5.63
6	Netherlands	5.31
7	Japan	5.31
8	France	4.38

There are laudable efforts being undertaken to do just this for other forms of intangible assets.[67] However, this is simply not feasible given the nature of copyright policy and the scope of industries it affects. An additional issue is that using an aggregate indicator like the SFEER Index may result in a loss of the very variation across copyright regimes that the study aims to explore. The difficulty of finding empirical links at an aggregate level in the economy in general further complicates the issue.

The transparent manner in which the scores have been calculated is designed to enable easy revision in light of copyright reforms and should any potential issues arise in terms of the scoring. It also enables breaking down of the scores into specific exceptions should the current level of aggregation not yield any interesting results. Finally, it is important to emphasize that there are a host of positive externalities associated with exceptions and limitations to copyright – such as education, free speech, user-generated content and text and data mining – that are not included in the model. It is also worth briefly noting that the model described aims to be a springboard for further research. It would be premature to use research based on such a limited data set to make far-reaching policy recommendations. With these limitations in mind, econometric analysis provides many valuable tools to explore the empirical relationship between the scope and flexibility of exceptions to copyright and economic growth across the eight countries.

Econometric Analysis
Exploratory data analysis methods are used as a starting point for further econometric modelling. Exploratory data analysis entails the visualisation of large data sets before establishing hypotheses in order to qualitatively assess relationships and identify trends without prior bias to what the relationship might be.[68]

66 Stanley Besen and Sheila Kirby, "Private Copying, Appropriability, and Optimal Copying Royalties," *Journal of Law and Economics,* Vol. 32, No 2 (1989); Martin Kretschmer, "Private Copying and Fair Compensation: A Comparative Study of Copyright Levies in Europe," *A Report for the UK Intellectual Property Office* (2011).
67 Dan Andrews and Chiara Criscuolo, "Knowledge-based Capital, Innovation and Resource Allocation," *OECD Economics Department Working Papers,* No. 1046 (2013).
68 John W. Tukey, *Exploratory Data Analysis* (Boston: Addison-Wesley, 1977).

Table 10 on this page lists the economic output variables included in the initial round of data analysis and their definitions. A detailed description of the methodology used to calculate growth accounting indicators is available from the EU KLEMS website.[69]

Several industry groups were included in the analysis. Statistical tests were run on two higher-order industry groups (the market economy and the ICT goods and services sectors) to explore empirical relationships at a higher level of aggregation in the national economy. Several industries – such as the publishing, audiovisual and broadcasting activities and IT and other information services industry groups – were included because they deal directly with information goods, audiovisual content and complementary products. Other industry groups were selected in order to stress-test the indicator, which should have little to no affect on these industries. Each indentation represents a subset of the industry group that precedes it:

- Market economy
  - ICT goods and services
    - Electrical and optical equipment
    - Publishing, audiovisual and broadcasting activities
    - Telecommunications
    - IT and other information services
  - Consumer manufacturing
  - Wood and paper products; printing and reproduction of recorded media

- Investment goods, excluding hightech
- Construction
- Other manufacturing; repair and installation of machinery and equipment

Analysis was run on data for each country since 1992. This starting point was selected due to missing data in certain countries in the years preceding this. The time series data for each country was collapsed into three summary statistics for each industry group and variable (mean, median, and average annual growth rate). Each one was tested for significant correlation with the SFEER Index score using the Kendall tau rank correlation methodology. This non-parametric test was chosen for its

Table 10. Value Data and Growth Accounting Variables

Output Variable	Definition
VA	Gross value added at current basic prices (in millions of US dollars)
EMP	Number of persons engaged (in thousands)
LAB	Labour compensation (in millions of US dollars)
CAP	Capital compensation (in millions of US dollars)
VA_Q	Growth rate of value added volume (in percent per year)
TFPva_I	Total Factor Productivity (value added based) growth, 2005 = 100
VAConH	Contribution of hours worked to value added growth (percentage points)
VAConTFP	Contribution of TFP to value added growth (percentage points)

Table 11. Correlation Values for SFEER Index and Economic Output (All Countries)

Metric		Industry-Variable	COR.	SIGN.
Growth Rate	Significant Correlation	ICT Goods and Services-VACONH	0.815374	0.005702
		Market Economy-LAB	0.815374	0.005702
	Borderline Correlation	Consumer Manufacturing-LAB	0.667124	0.023709
		Electrical and Optical Equipment-VA	0.667124	0.023709
		Electrical and Optical Equipment-VACONH	0.667124	0.023709
		IT and Other Information Services-VA	0.667124	0.023709
		Market Economy-VA	0.667124	0.023709
		Investment Goods, Excluding Hightech-VACONH	0.667124	0.023709

69 Marcel Timmer, Mary O'Mahony and Bart van Ark, *EU KLEMS Growth and Productivity Accounts: An Overview,* (Paris: OECD, 2007).

ability to accurately measure the association between the SFEER Index and economic output in the selected industries without making assumptions about the distribution of the economic data. See the Appendices II and III for all correlation (cor.) and p-value (sign.) scores for each variable and industry group.

The initial results from the Kendall tau rank correlation test showed two significant correlations and six significant borderline correlations across the industries and economic output variables included in the sample. Table 11 on page 24 shows those industries and output variables that exhibited significant correlation with the SFEER Index. However, before drawing any conclusions, the individual country plots of historical economic data for a given industry and output variable must be checked in order to determine whether the summary statistic used has any meaning. All of the historical data plots for the highlighted cases were checked for each country in order to determine this. If a single country plot (out of eight) did not fit the summary statistic, the result was rejected. This visual inspection test removed all but three of the industry group and economic output variable combinations (Market Economy-lab, Consumer Manufacturing-lab,

Market Economy-va). Surprisingly, several of the industries hypothesised to be impacted by the scope and flexibility of exceptions to exclusive rights were not shown to be correlated. These include the IT and other information services group, the publishing, audiovisual and broadcasting activities group, and the ICT goods and services group.

These results suggests two possibilities: 1) output in these industries is not correlated with the Scope and Flexibility of Exceptions to Exclusive Rights Index; or 2) correlation results are being skewed by an outlier in the data. Accounting for possibility two requires looking at the data plots themselves for each summary statistic, industry and output variable (a total of 308 plots as a result of the possible permutations). This enables better understanding of what kind of relationship might link the SFEER Index and the selected industries. Analysis of all the data plots made it quickly apparent that Japan was a consistent outlier along certain output variables – such as value-added and labour compensation – and consequently that the correlation results were being skewed by an outlier. Not only does this skew the correlation results but it obscures better understanding of differences in performance among other countries in the sample.

Table 12. Correlation Values for SFEER Index and Economic Output (excluding Japan)

METRIC		INDUSTRY-VARIABLE	COR.	SIGN.
Growth Rate	Significant Correlation	Market Economy-lab	0.878310	0.006249
	Borderline Correlation	ICT Goods and Services-lab	0.780720	0.015075
		ICT Goods and Services-vaconh	0.780720	0.015075
		Publishing, Audiovisual and Broadcasting Activities-va	0.683130	0.033441
		IT and Other Information Services-va	0.683130	0.033441
		Consumer Manufacturing-lab	0.683130	0.033441
		Electrical and Optical Equipment-va	0.683130	0.033441
		Electrical and Optical Equipment-vaconh	0.683130	0.033441
		ICT Goods and Services-va	0.683130	0.033441
		Market Economy-va	0.683130	0.033441
		Investment Goods, Excluding Hightech-vaconh	0.683130	0.033441
Median		Telecommunications-lab	0.6831	0.0334
		IT and Other Information Services-va_q	0.6831	0.0334

After identifying Japan as an outlier in the dataset, another Kendall tau correlation test was run on the sample of countries. This time Japan was excluded from the analysis. The initial results from this new test demonstrated a more robust correlation between the SFEER Index and economic output variables in a number of industries. These results are shown grouped by summary statistic and sorted by most significance in Table 12 on page 25. Visual inspection of the plots for each summary statistic, industry and economic output variable combination also confirmed that no other relationship was plausible.

The correlation values above suggest that several industry groups were correlated with the SFEER Index score. This also included industries that were not hypothesised to be affected, such as the investment goods, excluding high-tech industry group and the electrical and optical equipment industry group. Again, all of the historical data plots for the highlighted cases were checked for each country in order to determine whether the summary statistic used was suitable. If a single country plot (out of seven) did not fit the summary statistic, the result was rejected.

This visual inspection test removed both industry group and economic output variable combinations for the median summary statistic. The same robustness check was run on the significant results for the growth rate summary statistic. Three industry groups failed this test for the contribution of hours worked to value-added growth (percentage points): 1) ICT goods and services; 2) electrical and optical equipment; 3) investment goods, excluding high-tech. The electrical and optical equipment group also failed this test for gross value-added at current basic prices (in millions of US dollars). The rest of the industry groups passed the test. A sample of the country-specific plots of historical data that passed the test for the growth rate summary statistic are shown in Figures 1-6 on page 8.

These robustness checks rejected several permutations of output variables and industries as significant results. The limited set of combinations that were shown to be correlated with the SFEER Index for France, Germany, the Netherlands, the United Kingdom, the United States, Sweden and Spain can be seen in Table 13 below.

Table 13. Significant Correlation Values for SFEER Index and Economic Output

METRIC	INDUSTRY-VARIABLE	US	UK	DE	FR	NL	ES	SE	COR.	SIGN.
Significant Correlation	Market Economy-lab	153435.17	20213.24	15924.83	39015.44	7084.42	2616.44	7306.56	0.87831	0.00625
Growth Rate — Borderline Correlation	ICT Goods and Services-lab	17700.11	2134.12	2170.00	5125.67	665.05	-1235.56	818.83	0.78072	0.01507
	Publishing, Audiovisual and Broadcasting Activities-va	6284.28	686.82	638.89	1457.28	166.37	463.00	275.61	0.68313	0.03344
	IT and Other Information Services-va	11332.22	1599.76	1240.00	3946.22	487.47	1149.89	568.44	0.68313	0.03344
	Consumer Manufacturing-lab	2021.56	363.76	343.44	1067.50	215.95	143.72	503.39	0.68313	0.03344
	ICT Goods and Services-va	37380.67	3065.35	2328.33	8827.44	891.95	2077.22	1581.72	0.68313	0.03344
	Market Economy-va	294369.89	29182.71	25511.67	64332.39	10937.58	23725.94	15743.89	0.68313	0.03344

The plots for each significant result in the table above are shown in the following pages. Although the relationship is non-linear in most cases, the plots clearly demonstrate a positive relationship between the SFEER Index, gross value-added and labour compensation in the selected industries. For a discussion and interpretation of these results, see the analysis presented earlier in the main section of this paper.

Figures 7-10. SFEER Index Plots for Significant Correlations – Gross Value Added at Current Basic Prices (in millions of US dollars)

ICT Goods and Services

IT and Other Information Services

Market Economy

Publishing, Audiovisual and Broadcasting
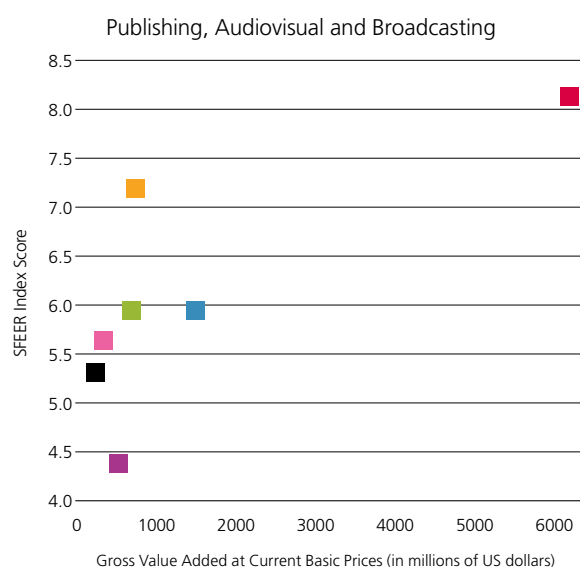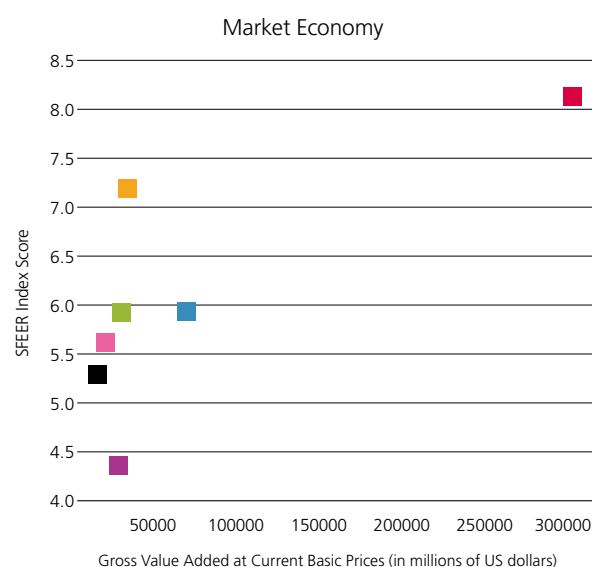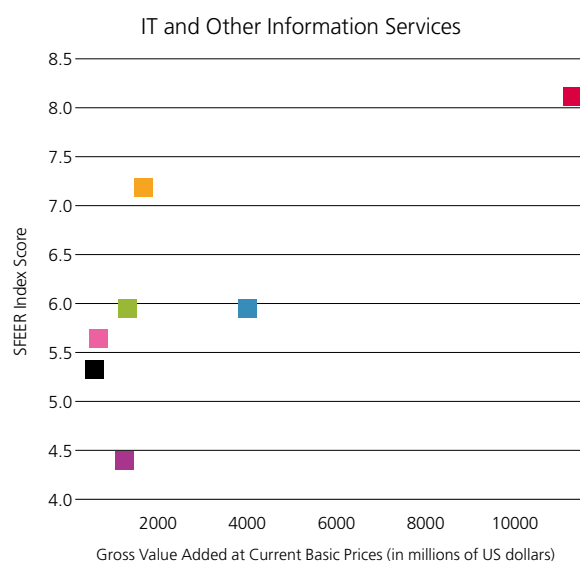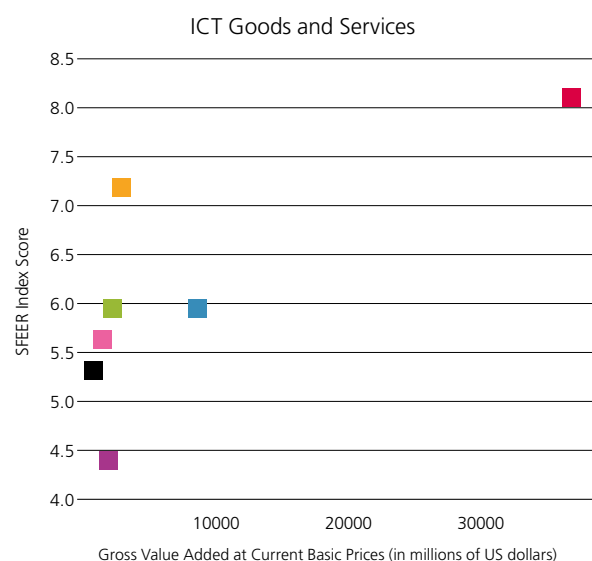
Figures 11-13. SFEER Index Plots for Significant Correlations – Labour Compensation (in millions of US dollars)

ICT Goods and Services

Consumer Manufacturing

Market Economy
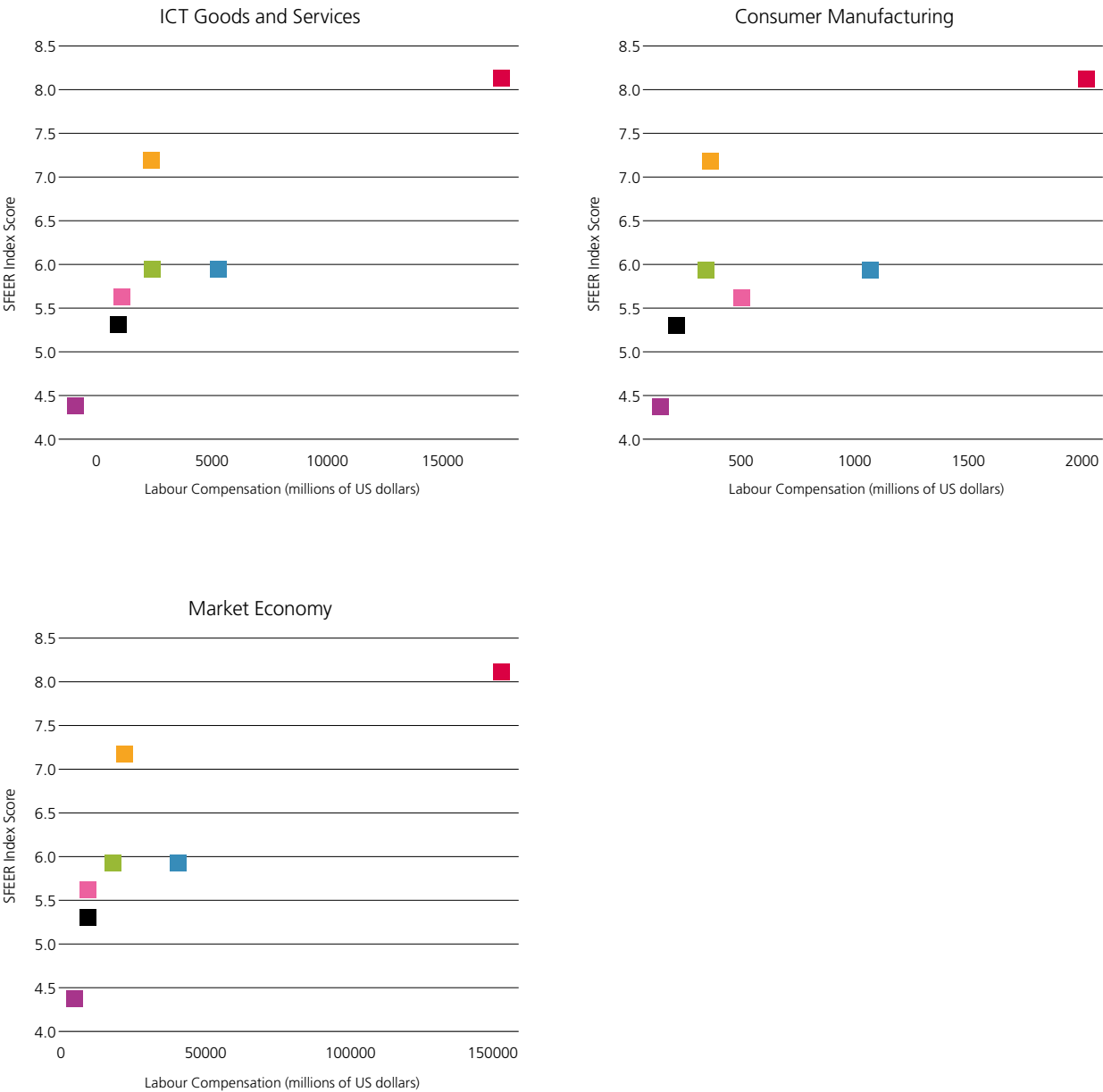
Appendix II
Results (All Countries)

Table 14. Kendall Tau Significant Correlation Results for SFEER Score with Selected Industries

METRIC	INDUSTRY-VARIABLE	US	UK	JP	DE	FR	NL	ES	SE	COR.	SIGN.
Growth Rate / Significant Correlation	ICT Goods and Services-vaconh	-0.02	0.25	-0.14	-0.04	-0.14	-0.14	-0.18	-0.06	0.82	0.01
	Market Economy-lab	153435.17	20213.24	-2016058.88	15924.83	39015.44	7084.42	2616.44	7306.56	0.82	0.01
Borderline Correlation	Consumer Manufacturing-lab	2021.56	363.76	-309408.00	343.44	1067.50	215.95	143.72	503.39	0.67	0.02
	Electrical and Optical Equipment-va	10055.06	67.82	-504870.94	450.00	2199.00	-41.79	-232.61	112.00	0.67	0.02
	Electrical and Optical Equipment-vaconh	0.11	0.04	-0.37	-0.03	-0.31	-0.10	-0.36	-0.22	0.67	0.02
	IT and Other Information Services-va	37380.67	3065.35	-15420.41	2328.33	8827.44	891.95	2077.22	1581.72	0.67	0.02
	Market Economy-va	294369.89	29182.71	-3411562.35	25511.67	64332.39	10937.58	23725.94	15743.89	0.67	0.02
	Investment Goods, Excluding Hightech-vaconh	0.16	0.04	-0.78	-0.27	-0.09	-0.24	-0.39	-0.45	0.67	0.02

Table 15. Kendall Tau Correlation Results for Mean Summary Statistic (SFEER Score with Selected Industries and Variables)

INDUSTRY-VARIABLE	US	UK	JP	DE	SE	NL	FR	ES	COR.	PVAL
Telecommunications-vaconh	-0.75	-0.41	-0.41	-1.33	-0.24	0.48	-0.10	-0.06	-0.52	0.08
Telecommunications-tfpva_i	92.10	72.31	87.62	91.87	93.19	72.08	75.17	89.61	0.44	0.13
IT and Other Information Services-va_q	9.05	7.94	6.12	6.24	6.78	8.50	3.57	9.27	0.44	0.13
Electrical and Optical Equipment-vaconh	-2.16	-3.16	-2.01	-2.21	0.17	-2.04	-1.58	-2.21	-0.42	0.16
Market Economy-va_q	2.77	2.36	0.11	1.02	3.77	2.39	1.69	2.42	0.37	0.21
Market Economy-tfpva_i	94.17	95.19	95.27	97.48	90.54	95.53	96.22	103.73	-0.37	0.21
Market Economy-vacontfp	0.87	0.80	-0.26	0.33	1.86	0.55	0.44	-0.68	0.37	0.21
Telecommunications-emp	NA	218.89	213.83	225.84	NA	40.10	148.21	69.84	0.41	0.25
Publishing, Audiovisual and Broadcasting Activities-lab	88687.63	11644.56	2974883.56	16708.00	18720.21	2896.55	10930.68	5021.26	0.30	0.31
Telecommunications-lab	107130.53	10085.00	1797296.22	10679.16	10939.11	1982.55	7162.78	4425.32	0.30	0.31
IT and Other Information Services-tfpva_i	90.55	95.71	99.02	107.26	96.10	97.53	97.08	107.14	-0.30	0.31
Wood and Paper Products; Printing and Reproduction of Recorded Media-va_q	-1.21	-0.61	-2.31	0.06	1.00	0.36	0.89	0.37	-0.30	0.31
IT and Other Information Services-va_q	7.85	5.31	5.82	3.88	11.17	5.10	4.14	4.22	0.30	0.31
Publishing, Audiovisual and Broadcasting Activities-emp	NA	314.00	352.06	436.47	NA	73.40	205.21	136.79	0.28	0.44
Construction-emp	NA	2049.56	6169.22	2771.58	NA	474.15	1606.00	1856.37	0.28	0.44
Publishing, Audiovisual and Broadcasting Activities-va	155870.32	16109.44	3719877.89	23023.68	28329.16	4613.15	16619.74	7327.53	0.22	0.45
Publishing, Audiovisual and Broadcasting Activities-va_q	2.27	1.72	-0.95	0.76	2.59	1.18	1.89	2.37	0.22	0.45

Table 15 continued...

INDUSTRY-VARIABLE	US	UK	JP	DE	SE	NL	FR	ES	COR.	PVAL
Telecommunications-va	263573.95	18515.44	8331308.78	28558.95	28566.16	6626.05	21995.63	13140.63	0.22	0.45
IT and Other Information Services-vacontfp	3.81	0.51	1.96	0.90	0.35	0.30	0.57	-1.63	0.22	0.45
Wood and Paper Products; Printing and Reproduction of Recorded Media-va	116796.58	10370.94	7545262.39	26820.53	61437.47	4747.90	13084.79	8577.47	0.22	0.45
Wood and Paper Products; Printing and Reproduction of Recorded Media-lab	83516.53	8407.11	5524699.56	21406.63	35341.79	3574.30	9521.05	5595.84	0.22	0.45
Consumer Manufacturing-va	292012.00	34375.89	21000074.39	72526.32	64508.74	18643.25	60089.32	31145.84	0.22	0.45
Consumer Manufacturing-vacontfp	1.45	0.32	-1.60	0.32	2.31	1.46	0.90	-0.43	0.22	0.45
Electrical and Optical Equipment-va	198341.79	14552.61	19717759.06	54987.37	48397.11	3338.30	16976.79	6532.16	0.22	0.45
Electrical and Optical Equipment-lab	139542.63	10432.22	12703771.39	39242.42	31473.47	3269.45	11457.11	4495.58	0.22	0.45
Electrical and Optical Equipment-va_q	15.34	0.31	6.86	3.24	20.35	0.02	3.72	0.13	0.22	0.45
Electrical and Optical Equipment-tfpva_i	68.49	91.84	69.17	82.10	69.54	103.93	79.24	103.14	-0.22	0.45
Electrical and Optical Equipment-vacontfp	15.81	2.48	7.02	3.87	19.07	0.24	4.20	0.73	0.22	0.45
IT and Other Information Services-va	773201.42	67834.94	39086380.28	131196.32	156374.89	21577.25	83851.32	33978.32	0.22	0.45
ICT Goods and Services-lab	466912.42	48007.56	22948974.67	91740.58	99982.74	14268.60	48841.37	19216.89	0.22	0.45
IT and Other Information Services-vacontfp	5.38	2.07	4.37	3.41	7.84	1.78	2.67	0.20	0.22	0.45
Market Economy-va	6999546.63	671026.83	362871715.67	1340104.74	1429305.68	284750.05	895589.89	489487.58	0.22	0.45
Market Economy-lab	4584047.16	478051.33	231176825.78	988944.79	884063.74	195407.85	629902.26	306659.53	0.22	0.45
Investment Goods, Excluding Hightech-va	267605.26	21965.83	22010347.00	120520.53	98064.26	6729.65	28259.79	16657.53	0.22	0.45
Investment Goods, Excluding Hightech-lab	197870.63	19084.56	15294447.67	93834.37	65792.68	5049.30	19927.16	11465.84	0.22	0.45
Investment Goods, Excluding Hightech-vaconh	-1.42	-3.00	-1.08	-1.64	0.20	-0.64	-1.63	-1.24	-0.22	0.45
Construction-lab	390390.74	55852.94	31092159.78	92880.63	84920.74	19250.40	60542.05	45899.42	0.22	0.45
Other Manufacturing; Repair and Installation of Machinery and Equipment-va	88412.89	8916.17	2862207.72	27423.16	25908.58	6550.00	20271.42	7671.16	0.22	0.45
Other Manufacturing; Repair and Installation of Machinery and Equipment-lab	62195.42	6454.89	2189328.78	22785.37	18314.95	5458.70	17398.84	5658.95	0.22	0.45
Other Manufacturing; Repair and Installation of Machinery and Equipment-va_q	2.65	-0.34	-3.91	0.40	2.61	1.78	2.16	2.50	0.22	0.45
Publishing, Audiovisual and Broadcasting Activities-vaconh	-0.93	0.82	-0.17	-0.73	0.74	-0.06	0.45	0.83	-0.15	0.62
Publishing, Audiovisual and Broadcasting Activities-tfpva_i	90.99	118.44	115.13	108.03	97.07	95.10	92.33	106.29	0.15	0.62
Publishing, Audiovisual and Broadcasting Activities-vacontfp	0.40	-2.32	-1.70	0.76	-1.75	0.66	0.30	-0.80	-0.15	0.62
IT and Other Information Services-lab	131551.74	15845.72	5473023.50	25110.84	38850.16	6120.15	21396.72	5274.95	0.15	0.62
Wood and Paper Products; Printing and Reproduction of Recorded Media-tfpva_i	96.20	95.88	93.25	92.21	93.17	93.55	93.38	102.34	0.15	0.62
Wood and Paper Products; Printing and Reproduction of Recorded Media-vacontfp	0.20	1.28	-0.56	1.51	1.79	1.01	1.91	-1.36	-0.15	0.62
Consumer Manufacturing-lab	171571.68	22662.78	10074311.56	56192.32	42950.00	11956.95	43235.63	20315.26	0.15	0.62
Consumer Manufacturing-va_q	1.14	-0.48	-2.04	-0.90	2.01	1.53	0.16	0.49	0.15	0.62
ICT Goods and Services-vaconh	-0.53	0.35	-0.60	-0.68	1.21	1.36	0.33	0.65	-0.15	0.62
ICT Goods and Services-tfpva_i	77.56	90.37	81.13	91.78	78.24	87.91	85.54	98.63	-0.15	0.62

Table 15 continued...

INDUSTRY-VARIABLE	US	UK	JP	DE	SE	NL	FR	ES	COR.	PVAL
Construction-va	455471.42	62708.06	36068105.28	97431.05	104651.37	22211.55	76010.74	75974.16	0.15	0.62
Construction-vacontfp	-2.11	-0.04	-1.83	-0.68	0.49	-1.45	-0.95	-1.13	0.15	0.62
Other Manufacturing; Repair and Installation of Machinery and Equipment-tfpva_i	91.00	99.15	92.42	83.13	94.06	95.03	84.49	93.23	0.15	0.62
IT and Other Information Services-emp	NA	489.67	901.61	490.05	NA	112.10	334.79	159.63	0.14	0.70
Wood and Paper Products; Printing and Reproduction of Recorded Media-emp	NA	398.28	1177.06	634.74	NA	99.00	286.32	239.05	0.14	0.70
Electrical and Optical Equipment-emp	NA	349.11	2360.44	923.26	NA	75.85	291.74	160.68	0.14	0.70
ICT Goods and Services-emp	NA	1371.67	3828.00	2075.63	NA	301.35	979.89	526.95	0.14	0.70
Market Economy-emp	NA	22176.11	54458.39	29827.74	NA	5974.55	17824.16	14032.84	0.14	0.70
Investment Goods, Excluding Hightech-emp	NA	634.89	2454.50	2011.58	NA	121.95	539.58	399.53	0.14	0.70
Other Manufacturing; Repair and Installation of Machinery and Equipment-emp	NA	372.39	573.78	591.74	NA	190.95	421.89	261.53	0.14	0.70
Telecommunications-va_q	4.95	10.54	7.58	5.86	10.58	9.10	6.80	5.85	-0.07	0.80
Telecommunications-vacontfp	3.34	6.96	4.83	6.22	9.83	4.72	5.82	1.49	0.07	0.80
IT and Other Information Services-va	155415.42	18657.56	7317434.39	24626.32	51082.47	6999.75	28259.32	6978.00	0.07	0.80
Wood and Paper Products; Printing and Reproduction of Recorded Media-vaconh	-1.83	-2.56	-2.51	-2.62	-0.90	-1.72	-1.89	-0.39	-0.07	0.80
Consumer Manufacturing-vaconh	-1.23	-1.63	-1.57	-1.84	-0.53	-0.63	-1.60	-0.54	0.07	0.80
Consumer Manufacturing-tfpva_i	95.57	97.26	105.01	92.05	97.14	93.17	91.42	98.77	0.07	0.80
Investment Goods, Excluding Hightech-va_q	0.43	-0.01	-0.20	0.06	4.57	3.45	0.78	1.24	-0.07	0.80
Investment Goods, Excluding Hightech-tfpva_i	89.93	89.81	90.13	92.87	82.34	83.19	87.71	97.04	0.07	0.80
Construction-va_q	-0.56	0.48	-2.68	-1.35	1.14	-0.15	-0.36	2.54	0.07	0.80
Other Manufacturing; Repair and Installation of Machinery and Equipment-vaconh	-0.94	-0.93	-3.24	-1.94	0.32	0.09	-1.85	0.79	0.07	0.80
Other Manufacturing; Repair and Installation of Machinery and Equipment-vacontfp	2.32	-0.57	-1.49	1.95	1.91	0.82	3.24	0.34	0.07	0.80
IT and Other Information Services-vaconh	2.21	4.33	2.44	4.16	3.64	6.59	1.75	6.10	0.00	1.00
Consumer Manufacturing-emp	NA	1134.11	3081.67	1712.05	NA	372.65	1299.58	984.47	0.00	1.00
Market Economy-vaconh	0.11	-0.14	-0.79	-0.61	0.59	0.67	0.05	0.97	0.00	1.00
Investment Goods, Excluding Hightech-vacontfp	0.61	1.95	-0.12	-0.59	3.18	2.00	0.63	0.64	0.00	1.00
Construction-vaconh	0.40	-0.45	-1.65	-1.35	1.01	1.13	0.05	1.41	0.00	1.00
Construction-tfpva_i	110.98	97.82	106.56	99.53	96.23	107.05	101.14	107.69	0.00	1.00

Table 16. Kendall Tau Correlation Results for Growth Rate Summary Statistic (SFEER Score with Selected Industries and Variables)

INDUSTRY-VARIABLE	US	UK	JP	DE	SE	NL	FR	ES	COR.	PVAL
ICT Goods and Services-vaconh	-0.02	0.25	-0.14	-0.04	-0.14	-0.14	-0.18	-0.06	0.82	0.01
Market Economy-lab	153435.17	20213.24	-2016058.88	15924.83	39015.44	7084.42	2616.44	7306.56	0.82	0.01
Consumer Manufacturing-lab	2021.56	363.76	-309408.00	343.44	1067.50	215.95	143.72	503.39	0.67	0.02
Electrical and Optical Equipment-va	10055.06	67.82	-504870.94	450.00	2199.00	-41.79	-232.61	112.00	0.67	0.02
Electrical and Optical Equipment-vaconh	0.11	0.04	-0.37	-0.03	-0.31	-0.10	-0.36	-0.22	0.67	0.02
IT and Other Information Services-va	37380.67	3065.35	-15420.41	2328.33	8827.44	891.95	2077.22	1581.72	0.67	0.02
Market Economy-va	294369.89	29182.71	-3411562.35	25511.67	64332.39	10937.58	23725.94	15743.89	0.67	0.02
Investment Goods, Excluding Hightech-vaconh	0.16	0.04	-0.78	-0.27	-0.09	-0.24	-0.39	-0.45	0.67	0.02
Publishing, Audiovisual and Broadcasting Activities-lab	4405.17	585.29	-19369.82	177.50	752.67	68.47	350.28	219.67	0.52	0.08
Consumer Manufacturing-va	7315.78	423.76	-474986.47	406.67	1839.22	522.16	168.50	932.67	0.52	0.08
Investment Goods, Excluding Hightech-lab	1697.22	142.94	-51114.71	1569.67	1995.56	151.53	-207.28	294.44	0.52	0.08
Publishing, Audiovisual and Broadcasting Activities-va	6284.28	686.82	4380.94	638.89	1457.28	166.37	463.00	275.61	0.44	0.13
Publishing, Audiovisual and Broadcasting Activities-vacontfp	-0.90	-0.85	1.17	0.06	-0.09	0.11	-0.44	-0.35	-0.44	0.13
Telecommunications-lab	777.11	354.82	-21423.06	-152.28	324.11	66.42	193.53	59.83	0.44	0.13
Wood and Paper Products; Printing and Reproduction of Recorded Media-va	902.78	188.47	-169005.82	-162.22	1019.00	24.05	-26.44	226.50	0.44	0.13
Wood and Paper Products; Printing and Reproduction of Recorded Media-lab	748.33	119.35	-158077.29	-246.72	374.22	16.63	18.11	138.78	0.44	0.13
ICT Goods and Services-lab	17700.11	2134.12	39625.29	2170.00	5125.67	665.05	-1235.56	818.83	0.44	0.13
Market Economy-vaconh	-0.01	0.09	-0.18	-0.14	-0.02	-0.17	-0.10	-0.27	0.44	0.13
Investment Goods, Excluding Hightech-va	3345.39	71.53	-291211.82	3002.78	3510.22	345.53	291.50	474.33	0.44	0.13
Investment Goods, Excluding Hightech-vacontfp	0.99	-0.74	-0.95	-1.73	-0.76	-1.40	-1.00	-0.03	0.44	0.13
Construction-va	15174.06	2962.18	-924133.71	-46.67	4783.11	762.42	2379.72	4487.28	0.44	0.13
Construction-lab	12546.28	2518.65	-357127.12	263.56	4429.78	677.16	1985.44	1893.33	0.44	0.13
IT and Other Information Services-va	11332.22	1599.76	296095.76	1240.00	3946.22	487.47	1149.89	568.44	0.37	0.21
Market Economy-tfpva_i	0.74	0.67	-0.16	0.32	1.60	0.63	0.40	-0.72	0.37	0.21
Other Manufacturing; Repair and Installation of Machinery and Equipment-va	3486.11	189.47	-142696.59	415.56	870.28	198.79	408.22	339.11	0.37	0.21
Other Manufacturing; Repair and Installation of Machinery and Equipment-lab	1204.94	163.53	-78650.65	201.22	651.33	131.63	239.78	190.67	0.37	0.21
IT and Other Information Services-emp	NA	22.29	37.06	20.11	NA	6.37	10.11	10.17	0.41	0.25
ICT Goods and Services-emp	NA	18.12	-26.47	-9.44	NA	4.37	3.56	7.61	0.41	0.25
Publishing, Audiovisual and Broadcasting Activities-va_q	0.12	-0.72	0.80	-0.78	-0.20	0.12	0.07	-0.57	-0.30	0.31
IT and Other Information Services-lab	8986.11	1203.41	276030.47	1774.22	2975.50	474.16	1090.00	504.11	0.30	0.31
IT and Other Information Services-vacontfp	1.52	-0.45	-1.53	1.03	-0.64	-0.22	-0.28	-0.51	0.30	0.31
Electrical and Optical Equipment-lab	3531.67	-9.41	-195612.35	370.61	1073.44	55.95	78.59	35.22	0.30	0.31
Electrical and Optical Equipment-tfpva_i	10.73	2.14	5.32	3.22	10.74	0.02	3.12	1.03	0.30	0.31
Electrical and Optical Equipment-vacontfp	0.74	-0.30	-0.37	-1.03	-0.73	-0.91	-0.60	-0.05	0.30	0.31

Table 16 continued...

INDUSTRY-VARIABLE	US	UK	JP	DE	SE	NL	FR	ES	COR.	PVAL
Consumer Manufacturing-emp	NA	-26.88	-99.24	-26.61	NA	-3.05	-19.94	-9.89	-0.28	0.44
Investment Goods, Excluding Hightech-emp	NA	-17.35	-19.82	-22.06	NA	-0.63	-9.89	-5.00	-0.28	0.44
Publishing, Audiovisual and Broadcasting Activities-tfpva_i	0.37	-3.28	-1.42	0.50	-1.56	0.94	0.32	-0.86	-0.22	0.45
IT and Other Information Services-vaconh	-1.33	-0.11	0.05	-0.20	-0.04	-0.44	-0.18	-0.46	-0.22	0.45
IT and Other Information Services-tfpva_i	3.49	0.26	0.78	1.57	0.37	0.24	0.60	-2.06	0.22	0.45
Wood and Paper Products; Printing and Reproduction of Recorded Media-vacontfp	-0.02	0.17	-0.12	-0.53	-0.30	-0.02	0.36	-0.03	-0.22	0.45
Consumer Manufacturing-tfpva_i	1.42	0.18	-1.55	0.42	2.17	1.36	0.93	-0.45	0.22	0.45
ICT Goods and Services-tfpva_i	4.46	1.72	3.64	3.24	5.57	1.71	2.30	0.22	0.22	0.45
Construction-tfpva_i	-2.57	-0.42	-1.92	-0.71	0.43	-1.65	-1.17	-1.15	0.22	0.45
Construction-vacontfp	-0.06	-1.12	0.39	-0.37	-0.56	-0.20	-0.56	0.35	-0.22	0.45
Other Manufacturing; Repair and Installation of Machinery and Equipment-va_q	0.61	-0.25	-1.13	0.38	-0.59	0.06	0.18	-0.27	0.22	0.45
Telecommunications-va	9709.11	710.94	188973.88	-0.56	1224.94	279.89	696.94	625.67	0.15	0.62
Telecommunications-va_q	-0.17	0.14	0.10	-0.25	-0.73	-0.15	0.00	-0.45	-0.15	0.62
Consumer Manufacturing-vacontfp	0.55	-0.28	-0.23	-0.37	-0.48	-0.21	0.11	-0.03	-0.15	0.62
IT and Other Information Services-vacontfp	0.37	-0.47	-0.16	-0.12	-0.55	-0.09	-0.34	-0.13	0.15	0.62
Construction-vaconh	-0.10	0.48	-0.34	-0.38	0.33	-0.18	0.06	-0.57	0.15	0.62
Telecommunications-emp	NA	0.76	-3.35	-8.67	NA	0.16	-1.00	-0.06	0.14	0.70
Electrical and Optical Equipment-emp	NA	-10.06	-61.71	-18.89	NA	-1.47	-7.83	-3.89	-0.14	0.70
Other Manufacturing; Repair and Installation of Machinery and Equipment-emp	NA	-1.18	-20.94	-10.22	NA	0.26	-5.22	1.00	0.14	0.70
Publishing, Audiovisual and Broadcasting Activities-vaconh	-0.64	0.22	-0.17	-0.12	-0.25	-0.23	-0.21	-0.14	0.07	0.80
Telecommunications-vaconh	-0.41	0.54	-0.04	-0.14	-0.06	-0.19	-0.14	-0.08	0.07	0.80
IT and Other Information Services-va_q	-0.35	-0.84	-1.50	0.13	-0.27	-0.56	0.11	-1.15	0.07	0.80
Wood and Paper Products; Printing and Reproduction of Recorded Media-vaconh	-0.10	-0.51	-0.19	-0.36	-0.18	-0.36	-0.29	-0.61	0.07	0.80
Wood and Paper Products; Printing and Reproduction of Recorded Media-va_q	-0.24	-0.43	-0.46	0.23	-0.49	0.04	0.14	-0.70	-0.07	0.80
Wood and Paper Products; Printing and Reproduction of Recorded Media-tfpva_i	0.23	1.34	-0.36	1.30	1.68	1.09	1.92	-1.10	-0.07	0.80
Consumer Manufacturing-va_q	0.22	-0.28	-0.56	0.79	-0.60	-0.05	0.11	-0.36	0.07	0.80
Market Economy-va_q	0.08	-0.45	-0.71	0.29	-0.16	0.01	0.01	-0.34	0.07	0.80
Market Economy-vacontfp	0.16	-0.44	-0.41	-0.41	-0.32	-0.17	-0.29	-0.06	-0.07	0.80
Investment Goods, Excluding Hightech-va_q	1.12	-0.82	-1.93	1.68	-0.92	1.28	0.81	-0.59	0.07	0.80
Investment Goods, Excluding Hightech-tfpva_i	0.53	1.59	0.28	-0.49	2.33	1.55	0.55	0.81	0.07	0.80
Construction-va_q	-0.24	-0.61	0.05	-0.01	-0.15	-0.61	-0.37	-0.20	-0.07	0.80
Other Manufacturing; Repair and Installation of Machinery and Equipment-vaconh	-0.24	0.84	-0.40	-0.06	-0.14	-0.03	0.08	-0.60	-0.07	0.80
Other Manufacturing; Repair and Installation of Machinery and Equipment-vacontfp	0.94	-0.80	-0.58	-0.91	-0.46	-0.21	-0.16	0.37	-0.07	0.80
Publishing, Audiovisual and Broadcasting Activities-emp	NA	5.18	1.47	-2.00	NA	-0.63	2.22	1.50	0.00	1.00

Table 16 continued...

INDUSTRY-VARIABLE	US	UK	JP	DE	SE	NL	FR	ES	COR.	PVAL
Telecommunications-tfpva_i	3.14	4.81	3.92	5.56	8.82	4.02	4.35	1.36	0.00	1.00
Telecommunications-vacontfp	0.37	-0.27	0.25	0.51	-0.52	0.38	-0.16	-0.04	0.00	1.00
Wood and Paper Products; Printing and Reproduction of Recorded Media-emp	NA	-11.06	-34.88	-17.39	NA	-2.63	-5.78	-1.39	0.00	1.00
Consumer Manufacturing-vaconh	-0.26	0.20	-0.10	0.01	-0.15	0.01	-0.08	-0.32	0.00	1.00
Electrical and Optical Equipment-va_q	0.69	-0.47	-0.95	1.19	-1.10	0.71	0.27	-0.29	0.00	1.00
IT and Other Information Services-va_q	0.11	-0.37	-0.46	0.32	-0.62	-0.03	0.10	-0.34	0.00	1.00
Market Economy-emp	NA	99.76	-363.29	30.39	NA	56.21	104.28	-9.00	0.00	1.00
Construction-emp	NA	11.35	-83.94	-37.83	NA	2.74	11.83	16.78	0.00	1.00
Other Manufacturing; Repair and Installation of Machinery and Equipment-tfpva_i	2.39	-0.90	-0.85	1.41	1.72	1.02	2.63	0.76	0.00	1.00

Appendix III
Results (Excluding Japan)

Table 17. Kendall Tau Significant Correlation Results for SFEER Score with Selected Industries

METRIC		INDUSTRY-VARIABLE	US	UK	DE	FR	NL	ES	SE	COR.	SIGN.
Growth Rate	Significant Correlation	Market Economy-lab	153435.17	20213.24	15924.83	39015.44	7084.42	2616.44	7306.56	0.87831	0.00625
	Borderline Correlation	ICT Goods and Services-lab	17700.11	2134.12	2170.00	5125.67	665.05	-1235.56	818.83	0.78072	0.01507
		Publishing, Audiovisual and Broadcasting Activities-va	6284.28	686.82	638.89	1457.28	166.37	463.00	275.61	0.68313	0.03344
		IT and Other Information Services-va	11332.22	1599.76	1240.00	3946.22	487.47	1149.89	568.44	0.68313	0.03344
		Consumer Manufacturing-lab	2021.56	363.76	343.44	1067.50	215.95	143.72	503.39	0.68313	0.03344
		ICT Goods and Services-va	37380.67	3065.35	2328.33	8827.44	891.95	2077.22	1581.72	0.68313	0.03344
		Market Economy-va	294369.89	29182.71	25511.67	64332.39	10937.58	23725.94	15743.89	0.68313	0.03344

Table 18. Kendall Tau Correlation Results for Mean Summary Statistic (SFEER Score with Selected Industries and Variables)

INDUSTRY-VARIABLE	US	UK	DE	SE	NL	FR	ES	COR.	PVAL
Publishing, Audiovisual and Broadcasting Activities-lab	88687.63	11644.56	16708.00	18720.21	2896.55	10930.68	5021.26	0.59	0.07
Telecommunications-lab	107130.53	10085.00	10679.16	10939.11	1982.55	7162.78	4425.32	0.59	0.07
Telecommunications-vaconh	-0.75	-0.41	-1.33	-0.24	0.48	-0.10	-0.06	-0.59	0.07
Wood and Paper Products; Printing and Reproduction of Recorded Media-va_q	-1.21	-0.61	0.06	1.00	0.36	0.89	0.37	-0.59	0.07
Publishing, Audiovisual and Broadcasting Activities-va	155870.32	16109.44	23023.68	28329.16	4613.15	16619.74	7327.53	0.49	0.13
Telecommunications-va	263573.95	18515.44	28558.95	28566.16	6626.05	21995.63	13140.63	0.49	0.13
Wood and Paper Products; Printing and Reproduction of Recorded Media-va	116796.58	10370.94	26820.53	61437.47	4747.90	13084.79	8577.47	0.49	0.13
Wood and Paper Products; Printing and Reproduction of Recorded Media-lab	83516.53	8407.11	21406.63	35341.79	3574.30	9521.05	5595.84	0.49	0.13
Consumer Manufacturing-va	292012.00	34375.89	72526.32	64508.74	18643.25	60089.32	31145.84	0.49	0.13
Electrical and Optical Equipment-va	198341.79	14552.61	54987.37	48397.11	3338.30	16976.79	6532.16	0.49	0.13
Electrical and Optical Equipment-lab	139542.63	10432.22	39242.42	31473.47	3269.45	11457.11	4495.58	0.49	0.13
ICT Goods and Services-va	773201.42	67834.94	131196.32	156374.89	21577.25	83851.32	33978.32	0.49	0.13
ICT Goods and Services-lab	466912.42	48007.56	91740.58	99982.74	14268.60	48841.37	19216.89	0.49	0.13
Market Economy-va	6999546.63	671026.83	1340104.74	1429305.68	284750.05	895589.89	489487.58	0.49	0.13
Market Economy-lab	4584047.16	478051.33	988944.79	884063.74	195407.85	629902.26	306659.53	0.49	0.13
Investment Goods, Excluding Hightech-va	267605.26	21965.83	120520.53	98064.26	6729.65	28259.79	16657.53	0.49	0.13
Investment Goods, Excluding Hightech-lab	197870.63	19084.56	93834.37	65792.68	5049.30	19927.16	11465.84	0.49	0.13
Construction-lab	390390.74	55852.94	92880.63	84920.74	19250.40	60542.05	45899.42	0.49	0.13
Other Manufacturing; Repair and Installation of Machinery and Equipment-va	88412.89	8916.17	27423.16	25908.58	6550.00	20271.42	7671.16	0.49	0.13
Other Manufacturing; Repair and Installation of Machinery and Equipment-lab	62195.42	6454.89	22785.37	18314.95	5458.70	17398.84	5658.95	0.49	0.13
Telecommunications-tfpva_i	92.10	72.31	91.87	93.19	72.08	75.17	89.61	0.39	0.22
IT and Other Information Services-lab	131551.74	15845.72	25110.84	38850.16	6120.15	21396.72	5274.95	0.39	0.22
IT and Other Information Services-tfpva_i	90.55	95.71	107.26	96.10	97.53	97.08	107.14	-0.39	0.22
IT and Other Information Services-vacontfp	3.81	0.51	0.90	0.35	0.30	0.57	-1.63	0.39	0.22
Consumer Manufacturing-lab	171571.68	22662.78	56192.32	42950.00	11956.95	43235.63	20315.26	0.39	0.22
Electrical and Optical Equipment-tfpva_i	68.49	91.84	82.10	69.54	103.93	79.24	103.14	-0.39	0.22
ICT Goods and Services-va_q	7.85	5.31	3.88	11.17	5.10	4.14	4.22	0.39	0.22
Market Economy-tfpva_i	94.17	95.19	97.48	90.54	95.53	96.22	103.73	-0.39	0.22
Market Economy-vacontfp	0.87	0.80	0.33	1.86	0.55	0.44	-0.68	0.39	0.22
Construction-va	455471.42	62708.06	97431.05	104651.37	22211.55	76010.74	75974.16	0.39	0.22
Construction-emp	NA	2049.56	2771.58	NA	474.15	1606.00	1856.37	0.60	0.23
Electrical and Optical Equipment-vaconh	-2.16	-3.16	-2.21	0.17	-2.04	-1.58	-2.21	-0.35	0.28
Publishing, Audiovisual and Broadcasting Activities-tfpva_i	90.99	118.44	108.03	97.07	95.10	92.33	106.29	0.29	0.36
IT and Other Information Services-va	155415.42	18657.56	24626.32	51082.47	6999.75	28259.32	6978.00	0.29	0.36
IT and Other Information Services-va_q	9.05	7.94	6.24	6.78	8.50	3.57	9.27	0.29	0.36
Wood and Paper Products; Printing and Reproduction of Recorded Media-vacontfp	0.20	1.28	1.51	1.79	1.01	1.91	-1.36	-0.29	0.36
Consumer Manufacturing-tfpva_i	95.57	97.26	92.05	97.14	93.17	91.42	98.77	0.29	0.36
Electrical and Optical Equipment-va_q	15.34	0.31	3.24	20.35	0.02	3.72	0.13	0.29	0.36
Electrical and Optical Equipment-vacontfp	15.81	2.48	3.87	19.07	0.24	4.20	0.73	0.29	0.36
ICT Goods and Services-vaconh	-0.53	0.35	-0.68	1.21	1.36	0.33	0.65	-0.29	0.36

Table 18 continued...

INDUSTRY-VARIABLE	US	UK	DE	SE	NL	FR	ES	COR.	PVAL
ICT Goods and Services-vacontfp	5.38	2.07	3.41	7.84	1.78	2.67	0.20	0.29	0.36
Market Economy-va_q	2.77	2.36	1.02	3.77	2.39	1.69	2.42	0.29	0.36
Investment Goods, Excluding Hightech-va_q	0.43	-0.01	0.06	4.57	3.45	0.78	1.24	-0.29	0.36
Publishing, Audiovisual and Broadcasting Activities-emp	NA	314.00	436.47	NA	73.40	205.21	136.79	0.40	0.48
Telecommunications-emp	NA	218.89	225.84	NA	40.10	148.21	69.84	0.40	0.48
IT and Other Information Services-emp	NA	489.67	490.05	NA	112.10	334.79	159.63	0.40	0.48
Wood and Paper Products; Printing and Reproduction of Recorded Media-emp	NA	398.28	634.74	NA	99.00	286.32	239.05	0.40	0.48
Electrical and Optical Equipment-emp	NA	349.11	923.26	NA	75.85	291.74	160.68	0.40	0.48
ICT Goods and Services-emp	NA	1371.67	2075.63	NA	301.35	979.89	526.95	0.40	0.48
Market Economy-emp	NA	22176.11	29827.74	NA	5974.55	17824.16	14032.84	0.40	0.48
Investment Goods, Excluding Hightech-emp	NA	634.89	2011.58	NA	121.95	539.58	399.53	0.40	0.48
Publishing, Audiovisual and Broadcasting Activities-vaconh	-0.93	0.82	-0.73	0.74	-0.06	0.45	0.83	-0.20	0.54
Publishing, Audiovisual and Broadcasting Activities-vacontfp	0.40	-2.32	0.76	-1.75	0.66	0.30	-0.80	-0.20	0.54
IT and Other Information Services-vaconh	2.21	4.33	4.16	3.64	6.59	1.75	6.10	-0.20	0.54
Wood and Paper Products; Printing and Reproduction of Recorded Media-tfpva_i	96.20	95.88	92.21	93.17	93.55	93.38	102.34	0.20	0.54
ICT Goods and Services-tfpva_i	77.56	90.37	91.78	78.24	87.91	85.54	98.63	-0.20	0.54
Market Economy-vaconh	0.11	-0.14	-0.61	0.59	0.67	0.05	0.97	-0.20	0.54
Investment Goods, Excluding Hightech-vaconh	-1.42	-3.00	-1.64	0.20	-0.64	-1.63	-1.24	-0.20	0.54
Construction-vaconh	0.40	-0.45	-1.35	1.01	1.13	0.05	1.41	-0.20	0.54
Publishing, Audiovisual and Broadcasting Activities-va_q	2.27	1.72	0.76	2.59	1.18	1.89	2.37	0.10	0.76
Telecommunications-va_q	4.95	10.54	5.86	10.58	9.10	6.80	5.85	-0.10	0.76
Telecommunications-vacontfp	3.34	6.96	6.22	9.83	4.72	5.82	1.49	0.10	0.76
Wood and Paper Products; Printing and Reproduction of Recorded Media-vaconh	-1.83	-2.56	-2.62	-0.90	-1.72	-1.89	-0.39	-0.10	0.76
Consumer Manufacturing-vacontfp	1.45	0.32	0.32	2.31	1.46	0.90	-0.43	0.10	0.76
Investment Goods, Excluding Hightech-tfpva_i	89.93	89.81	92.87	82.34	83.19	87.71	97.04	0.10	0.76
Investment Goods, Excluding Hightech-vacontfp	0.61	1.95	-0.59	3.18	2.00	0.63	0.64	-0.10	0.76
Construction-va_q	-0.56	0.48	-1.35	1.14	-0.15	-0.36	2.54	-0.10	0.76
Construction-vacontfp	-2.11	-0.04	-0.68	0.49	-1.45	-0.95	-1.13	0.10	0.76
Other Manufacturing; Repair and Installation of Machinery and Equipment-vaconh	-0.94	-0.93	-1.94	0.32	0.09	-1.85	0.79	-0.10	0.76
Other Manufacturing; Repair and Installation of Machinery and Equipment-va_q	2.65	-0.34	0.40	2.61	1.78	2.16	2.50	0.10	0.76
Other Manufacturing; Repair and Installation of Machinery and Equipment-tfpva_i	91.00	99.15	83.13	94.06	95.03	84.49	93.23	0.10	0.76
Other Manufacturing; Repair and Installation of Machinery and Equipment-vacontfp	2.32	-0.57	1.95	1.91	0.82	3.24	0.34	-0.10	0.76
Consumer Manufacturing-emp	NA	1134.11	1712.05	NA	372.65	1299.58	984.47	0.20	0.82
Other Manufacturing; Repair and Installation of Machinery and Equipment-emp	NA	372.39	591.74	NA	190.95	421.89	261.53	0.20	0.82
Consumer Manufacturing-vaconh	-1.23	-1.63	-1.84	-0.53	-0.63	-1.60	-0.54	0.00	1.00
Consumer Manufacturing-va_q	1.14	-0.48	-0.90	2.01	1.53	0.16	0.49	0.00	1.00
Construction-tfpva_i	110.98	97.82	99.53	96.23	107.05	101.14	107.69	0.00	1.00

Table 19. Kendall Tau Correlation Results for Growth Rate Summary Statistic (SFEER Score with Selected Industries and Variables)

INDUSTRY-VARIABLE	US	UK	DE	SE	NL	FR	ES	COR.	PVAL
Market Economy-lab	153435.17	20213.24	15924.83	39015.44	7084.42	2616.44	7306.56	0.88	0.01
ICT Goods and Services-lab	17700.11	2134.12	2170.00	5125.67	665.05	-1235.56	818.83	0.78	0.02
ICT Goods and Services-vaconh	-0.02	0.25	-0.04	-0.14	-0.14	-0.18	-0.06	0.78	0.02
Publishing, Audiovisual and Broadcasting Activities-va	6284.28	686.82	638.89	1457.28	166.37	463.00	275.61	0.68	0.03
IT and Other Information Services-va	11332.22	1599.76	1240.00	3946.22	487.47	1149.89	568.44	0.68	0.03
Consumer Manufacturing-lab	2021.56	363.76	343.44	1067.50	215.95	143.72	503.39	0.68	0.03
Electrical and Optical Equipment-va	10055.06	67.82	450.00	2199.00	-41.79	-232.61	112.00	0.68	0.03
Electrical and Optical Equipment-vaconh	0.11	0.04	-0.03	-0.31	-0.10	-0.36	-0.22	0.68	0.03
ICT Goods and Services-va	37380.67	3065.35	2328.33	8827.44	891.95	2077.22	1581.72	0.68	0.03
Market Economy-va	294369.89	29182.71	25511.67	64332.39	10937.58	23725.94	15743.89	0.68	0.03
Investment Goods, Excluding Hightech-vaconh	0.16	0.04	-0.27	-0.09	-0.24	-0.39	-0.45	0.68	0.03
IT and Other Information Services-lab	8986.11	1203.41	1774.22	2975.50	474.16	1090.00	504.11	0.59	0.07
IT and Other Information Services-emp	NA	22.29	20.11	NA	6.37	10.11	10.17	0.80	0.08
Publishing, Audiovisual and Broadcasting Activities-lab	4405.17	585.29	177.50	752.67	68.47	350.28	219.67	0.49	0.13
Consumer Manufacturing-va	7315.78	423.76	406.67	1839.22	522.16	168.50	932.67	0.49	0.13
Market Economy-vaconh	-0.01	0.09	-0.14	-0.02	-0.17	-0.10	-0.27	0.49	0.13
Investment Goods, Excluding Hightech-lab	1697.22	142.94	1569.67	1995.56	151.53	-207.28	294.44	0.49	0.13
Publishing, Audiovisual and Broadcasting Activities-vacontfp	-0.90	-0.85	0.06	-0.09	0.11	-0.44	-0.35	-0.39	0.22
Telecommunications-va	9709.11	710.94	-0.56	1224.94	279.89	696.94	625.67	0.39	0.22
Telecommunications-lab	777.11	354.82	-152.28	324.11	66.42	193.53	59.83	0.39	0.22
Wood and Paper Products; Printing and Reproduction of Recorded Media-va	902.78	188.47	-162.22	1019.00	24.05	-26.44	226.50	0.39	0.22
Wood and Paper Products; Printing and Reproduction of Recorded Media-lab	748.33	119.35	-246.72	374.22	16.63	18.11	138.78	0.39	0.22
Electrical and Optical Equipment-tfpva_i	10.73	2.14	3.22	10.74	0.02	3.12	1.03	0.39	0.22
Market Economy-tfpva_i	0.74	0.67	0.32	1.60	0.63	0.40	-0.72	0.39	0.22
Investment Goods, Excluding Hightech-va	3345.39	71.53	3002.78	3510.22	345.53	291.50	474.33	0.39	0.22
Investment Goods, Excluding Hightech-vacontfp	0.99	-0.74	-1.73	-0.76	-1.40	-1.00	-0.03	0.39	0.22
Construction-va	15174.06	2962.18	-46.67	4783.11	762.42	2379.72	4487.28	0.39	0.22
Construction-lab	12546.28	2518.65	263.56	4429.78	677.16	1985.44	1893.33	0.39	0.22
Consumer Manufacturing-emp	NA	-26.88	-26.61	NA	-3.05	-19.94	-9.89	-0.60	0.23
Publishing, Audiovisual and Broadcasting Activities-tfpva_i	0.37	-3.28	0.50	-1.56	0.94	0.32	-0.86	-0.29	0.36
IT and Other Information Services-tfpva_i	3.49	0.26	1.57	0.37	0.24	0.60	-2.06	0.29	0.36
Wood and Paper Products; Printing and Reproduction of Recorded Media-vacontfp	-0.02	0.17	-0.53	-0.30	-0.02	0.36	-0.03	-0.29	0.36
Electrical and Optical Equipment-vacontfp	0.74	-0.30	-1.03	-0.73	-0.91	-0.60	-0.05	0.29	0.36
ICT Goods and Services-tfpva_i	4.46	1.72	3.24	5.57	1.71	2.30	0.22	0.29	0.36
Other Manufacturing; Repair and Installation of Machinery and Equipment-va	3486.11	189.47	415.56	870.28	198.79	408.22	339.11	0.29	0.36
Other Manufacturing; Repair and Installation of Machinery and Equipment-lab	1204.94	163.53	201.22	651.33	131.63	239.78	190.67	0.29	0.36
Electrical and Optical Equipment-emp	NA	-10.06	-18.89	NA	-1.47	-7.83	-3.89	-0.40	0.48
ICT Goods and Services-emp	NA	18.12	-9.44	NA	4.37	3.56	7.61	0.40	0.48
Investment Goods, Excluding Hightech-emp	NA	-17.35	-22.06	NA	-0.63	-9.89	-5.00	-0.40	0.48
Publishing, Audiovisual and Broadcasting Activities-va_q	0.12	-0.72	-0.78	-0.20	0.12	0.07	-0.57	-0.20	0.54

Table 19 continued...

INDUSTRY-VARIABLE	US	UK	DE	SE	NL	FR	ES	COR.	PVAL
Telecommunications-vaconh	-0.41	0.54	-0.14	-0.06	-0.19	-0.14	-0.08	0.20	0.54
IT and Other Information Services-vacontfp	1.52	-0.45	1.03	-0.64	-0.22	-0.28	-0.51	0.20	0.54
Wood and Paper Products; Printing and Reproduction of Recorded Media-tfpva_i	0.23	1.34	1.30	1.68	1.09	1.92	-1.10	-0.20	0.54
Electrical and Optical Equipment-lab	3531.67	-9.41	370.61	1073.44	55.95	78.59	35.22	0.20	0.54
Construction-vaconh	-0.10	0.48	-0.38	0.33	-0.18	0.06	-0.57	0.20	0.54
Construction-tfpva_i	-2.57	-0.42	-0.71	0.43	-1.65	-1.17	-1.15	0.20	0.54
Other Manufacturing; Repair and Installation of Machinery and Equipment-vaconh	-0.24	0.84	-0.06	-0.14	-0.03	0.08	-0.60	-0.20	0.54
Telecommunications-va_q	-0.17	0.14	-0.25	-0.73	-0.15	0.00	-0.45	-0.10	0.76
IT and Other Information Services-vaconh	-1.33	-0.11	-0.20	-0.04	-0.44	-0.18	-0.46	-0.10	0.76
IT and Other Information Services-va_q	-0.35	-0.84	0.13	-0.27	-0.56	0.11	-1.15	-0.10	0.76
Wood and Paper Products; Printing and Reproduction of Recorded Media-vaconh	-0.10	-0.51	-0.36	-0.18	-0.36	-0.29	-0.61	0.10	0.76
Wood and Paper Products; Printing and Reproduction of Recorded Media-va_q	-0.24	-0.43	0.23	-0.49	0.04	0.14	-0.70	-0.10	0.76
Consumer Manufacturing-vaconh	-0.26	0.20	0.01	-0.15	0.01	-0.08	-0.32	0.10	0.76
Consumer Manufacturing-tfpva_i	1.42	0.18	0.42	2.17	1.36	0.93	-0.45	0.10	0.76
Consumer Manufacturing-vacontfp	0.55	-0.28	-0.37	-0.48	-0.21	0.11	-0.03	-0.10	0.76
Electrical and Optical Equipment-va_q	0.69	-0.47	1.19	-1.10	0.71	0.27	-0.29	-0.10	0.76
ICT Goods and Services-va_q	0.11	-0.37	0.32	-0.62	-0.03	0.10	-0.34	-0.10	0.76
ICT Goods and Services-vacontfp	0.37	-0.47	-0.12	-0.55	-0.09	-0.34	-0.13	0.10	0.76
Market Economy-va_q	0.08	-0.45	0.29	-0.16	0.01	0.01	-0.34	-0.10	0.76
Market Economy-vacontfp	0.16	-0.44	-0.41	-0.32	-0.17	-0.29	-0.06	-0.10	0.76
Investment Goods, Excluding Hightech-va_q	1.12	-0.82	1.68	-0.92	1.28	0.81	-0.59	-0.10	0.76
Construction-va_q	-0.24	-0.61	-0.01	-0.15	-0.61	-0.37	-0.20	0.10	0.76
Construction-vacontfp	-0.06	-1.12	-0.37	-0.56	-0.20	-0.56	0.35	-0.10	0.76
Other Manufacturing; Repair and Installation of Machinery and Equipment-va_q	0.61	-0.25	0.38	-0.59	0.06	0.18	-0.27	0.10	0.76
Other Manufacturing; Repair and Installation of Machinery and Equipment-tfpva_i	2.39	-0.90	1.41	1.72	1.02	2.63	0.76	-0.10	0.76
Other Manufacturing; Repair and Installation of Machinery and Equipment-vacontfp	0.94	-0.80	-0.91	-0.46	-0.21	-0.16	0.37	-0.10	0.76
Telecommunications-emp	NA	0.76	-8.67	NA	0.16	-1.00	-0.06	0.20	0.82
Wood and Paper Products; Printing and Reproduction of Recorded Media-emp	NA	-11.06	-17.39	NA	-2.63	-5.78	-1.39	-0.20	0.82
Market Economy-emp	NA	99.76	30.39	NA	56.21	104.28	-9.00	-0.20	0.82
Construction-emp	NA	11.35	-37.83	NA	2.74	11.83	16.78	-0.20	0.82
Publishing, Audiovisual and Broadcasting Activities-emp	NA	5.18	-2.00	NA	-0.63	2.22	1.50	0.00	1.00
Publishing, Audiovisual and Broadcasting Activities-vaconh	-0.64	0.22	-0.12	-0.25	-0.23	-0.21	-0.14	0.00	1.00
Telecommunications-tfpva_i	3.14	4.81	5.56	8.82	4.02	4.35	1.36	0.00	1.00
Telecommunications-vacontfp	0.37	-0.27	0.51	-0.52	0.38	-0.16	-0.04	0.00	1.00
Consumer Manufacturing-va_q	0.22	-0.28	0.79	-0.60	-0.05	0.11	-0.36	0.00	1.00
Investment Goods, Excluding Hightech-tfpva_i	0.53	1.59	-0.49	2.33	1.55	0.55	0.81	0.00	1.00
Other Manufacturing; Repair and Installation of Machinery and Equipment-emp	NA	-1.18	-10.22	NA	0.26	-5.22	1.00	0.00	1.00

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think tank for the 21st century

The Lisbon Council asbl
IPC-Résidence Palace
155 rue de la Loi
1040 Brussels, Belgium
twitter @lisboncouncil
info@lisboncouncil.net