On the Pillars of Sustainable Development: A Sustainable Competitiveness Approach

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ABSTRACT

This paper explores and applies Sustainable Competitiveness as a synthetic yet comprehensive metric of Sustainable Development. Such metrics are needed to aid the transition to more inclusive and sustainable economic growth. Greater integration of the pillars of sustainable development is emphasised in both academic and policy spaces in the search for development of *smart* and *green economies* that simultaneously target economic growth, environmental sustainability *and* societal development. However, researchers and policymakers seldom operationalise the concepts on an integrated basis, with the social aspect the least theorized or explored. The paper first operationalises sustainable competitiveness as an index-based approach. It also empirically applies the Arellano Bond dynamic panel data estimator method to a dataset constructed for a sample of 94 countries for the period 2005-2015. The paper presents the empirical results, identifying key competitiveness pillars contributing to sustainable competitiveness, concluding that sustainable competitiveness, as a concept and as an approach, can be used in the current research literature to bridge the current divide. This in turn can help better inform policies for achieving sustainable development goals.

Keywords:
Sustainable Competitiveness, Global Competitiveness Index, Sustainable Development, Environmental Sustainability, Social Sustainability.

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1 Introduction and Objectives

Transition towards a *smart economy*, defined as the combination of elements of the *enterprise* economy and the *innovation* or *ideas economy* presents important opportunities. In the context of this research smart growth concerns inter-related challenges of economic development, climate change and energy security. It involves the transition to a low-carbon economy and recognises the opportunities for investment and employment in clean and green industry.

The concept of sustainable development links to smart economic growth in its embodiment of social, environmental and economic elements of development in one integrated objective. The sustainability narrative is embedded in policy and research spaces where related concepts of the 'circular economy' and 'inclusive growth' identify the need for consumption and production systems that are in harmony with society and the environment (Corrigan et al. 2014; Piketty & Goldhammer, 2014). A trade-off between environmental quality and economic growth no longer dominates research or policy narratives - now simultaneous targets are identified for growth, environmental sustainability and societal development (Ambec et al., 2010; Porter & Van der Linde, 1995). For policy, efforts are directed at decoupling economic growth from environmental degradation while leveraging innovation and skill upgrading to foster prosperity for all, especially the most vulnerable (see e.g. European Commission, 2010).

Effective metrics to measure nations' path to sustainable development are vital to steer the transition to greener and more inclusive economic growth. These metrics would highlight the current status of goals achieved as well as areas for improvement in a synthetic way to better inform policy. In addition, the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz, Sen, & Fitoussi, 2009) identifies that traditional indicators (i.e. GDP, CO^2 emissions,) present a narrow view of sustainable development. More comprehensive, integrated and holistic approaches that can signal pitfalls and opportunities for policy interventions are required.

In this paper the objective is to understand the impact of economic performance on environmental and social sustainability. A set of distinct elements of economic performance, i.e. 'competitiveness pillars' as well as aggregated competitiveness measures are used in the research. Irish economic competitiveness is of interest, set in its international context and with focus on countries within Ireland's development neighbourhood, particularly those (like Ireland) with an innovation focus to their economic development policies.

The focus on competitiveness stems from the understanding that economic performance is steered by a set of basic fundamentals and the relationships between these fundamentals and the enterprise (or micro-economic) environment. The definition of economic competitiveness operationalised in the research is "the set of institutions, policies, and factors that determine the level of productivity of a country" (following World Economic Forum 2012: p. 4). In addition, and following the World Economic Forum, the authors operationalise the concept of *Sustainable Competitiveness* as the set of institutions, policies, and factors that make a nation productive over the longer term while ensuring social and environmental sustainability (Schwab, 2015).

This research is novel in its study of the intersections between economic competitiveness *and* environmental *and* social sustainability. It leverages and extends data produced by the Global Competitiveness Project (GCP) of the World Economic Forum (www.weforum.org) with

environmental and social data for Ireland, and its neighbours, from multiple sources from 2005 to 2015.[1] This paper presents findings across two key aspects:

- measurement of the elements of a competitive economy in its economic, environmental, and social features;
- identification of the most important competitiveness pillars - key strengths and roadblocks to sustainable competitiveness - across countries at different stages of economic development.

The paper makes two key contributions. It first explores how sustainable competitiveness offers a comprehensive assessment of the inter-related dynamics of the social, the environmental and economic building blocks of sustainable development simultaneously. It also applies the method developed by the WEF to empirically identify key pillars and dynamics of sustainable competitiveness across its economic, environmental and social domains.

In *Section 2,* approaches to defining and measuring Sustainable Competitiveness are set out.[2] Despite general agreement on limitations of traditional measures (i.e. GDP, CO^2 emissions) when focusing on sustainability, the literature reveals a substantial diversity of potential additions or replacements. Within the context of potential measures of sustainable competitiveness, the approach selected for measurement and analysis here has the advantage of applicability to a broad range of countries for which reliable and comparable data can be brought together over the recent period i.e. since 2005. The research integrates data from several sources on social and environmental elements of competitiveness with data on economic competitiveness provided by the Global Competitiveness Project of the World Economic Forum.

Section 3 sets out the method followed in the empirical estimations and the model used. The approach to construction of the dataset, in line with the approach developed by the WEF, is outlined.

In *Section 4* the results from our measurement of sustainable competitiveness are provided. Both environmental and social sustainability are considered, in addition to a combination that includes both aspects. Comparisons of Ireland's experience are made relative the overall sample of 94 countries, for which comparable data were available. As one of thirty-seven countries at an advanced level of economic development, Ireland's sustainability experience is also compared to that of the entire group of advanced economies.

Section 5 concludes by providing a discussion of the implications of the findings.

[1] A list of the ninety-four countries included in the analysis are provided in the Appendix.
[2] The project website hosts an extensive review of related literature on which this research is based.

2 Sustainable Competitiveness: Definition, Concepts & Measurement

The *World Economic Forum* in 2015 extended its definition of competitiveness to encompass sustainability, defining sustainable competitiveness as the set of institutions, policies, and factors that make a nation productive over the longer term while ensuring social and environmental sustainability (Schwab, 2015). Within policy and research spaces key related concepts of the 'circular economy' and 'inclusive growth' identify the need for consumption and production systems that are in harmony with society and the environment (Corrigan et al. 2014; Piketty & Goldhammer 2014). A trade-off between environmental quality and economic growth no longer dominates research or policy narratives - now simultaneous targets are identified for growth, sustainability and societal development (Ambec et al., 2010; Porter & Van der Linde, 1995).

Sustainable competitiveness includes several interrelated aspects of the concept of sustainable development. Environmental sustainability has received much attention within sustainability debates and the general understanding is that economic development must be decoupled from intensive use of natural resources to avoid surpassing the carrying capacity of the natural environment (United Nations, 2002). Within economic growth research, increasing emphasis on human development, polarization and inequality impacts prevails (Karabarbounis& Neiman, 2013; Piketty & Goldhammer, 2014). Much of this work focuses on developing nations, where economic growth is expected to significantly reduce poverty (Commission on Growth and Development, 2008). Coming out of deep recession increased focus was also evident on social injustice and inequality in mainstream public policy in more advanced economies (Schwab, 2015).

For policy, efforts are directed at decoupling economic growth from environmental degradation while leveraging innovation and skill upgrading to foster prosperity for all, especially the most vulnerable (see for example European Commission, 2010). Thus, while the sustainability narrative binds the three key elements of sustainable development - economic, environmental and social – the environmental and social elements of sustainable development are often studied entirely separately to economic growth. Sustainable competitiveness as a concept (and as an approach) bridges this gap, and acknowledging that sustainability aspects of the social and the environmental are deeply embedded in each other.

2.1 Measuring Competitiveness

Measuring Sustainable Competitiveness requires focusing on the intersections between the factors that make an economy more productive with measures of environmental and social sustainability. A starting point is to look at what makes a nation competitive, and how this is measured.

A productivity-based approach to competitiveness focuses on the fundamental factors enabling a location-focused generation of wealth and prosperity. Pioneered by Porter (1990), three key themes of research that map different levels of interlocking relationships driving productivity are identified. The first theme is the *macroeconomic environment* that provides a broad context for growth. The second theme includes business sophistication and the quality of the business environment labelled the *'microeconomic environment'* and outlined in Porter's *Diamond Model* (Porter,1990). The third theme considers systemic and feedback relationships between these two themes.

Specific factors highlighted as drivers of productivity are presented in Table 1. They are categorized as traditional drivers, recently identified drivers, and more complex drivers - that have not yet been fully understood (Delgado et al., 2012; Ketels, 2016; Porter et al., 2009).

Three approaches based on these drivers are (i) *The Global Competitiveness Index*[3] (GCI) produced by the World Economic Forum (WEF), (ii) Institute for Management Development's (IMD) *World Competitiveness Ranking*[4](WCR), and (iii) the *European Competitiveness Index*[5](ECI) published on behalf of the European Commission., with European coverage only.

Table 1: Drivers of Competitiveness: A Productivity-Based Approach

Traditional Drivers	Recently Identified Drivers	Complex Drivers
• Rules and regulation	• Company sophistication and firm heterogeneity	• Individuals: Culture and trust
• Financial Markets	• Economic geography: Urbanization and clusters	• Institutions: Quality and capacity
• Physical Infrastructure	• Economic composition: 'Economic Complexity'	• Social capital and linkages
• Macroeconomic Policy	• (Creative) skills and locational attractiveness	
• Institutions and Geography	• Different levels of geography (within a nation)	
• Size of the economy		

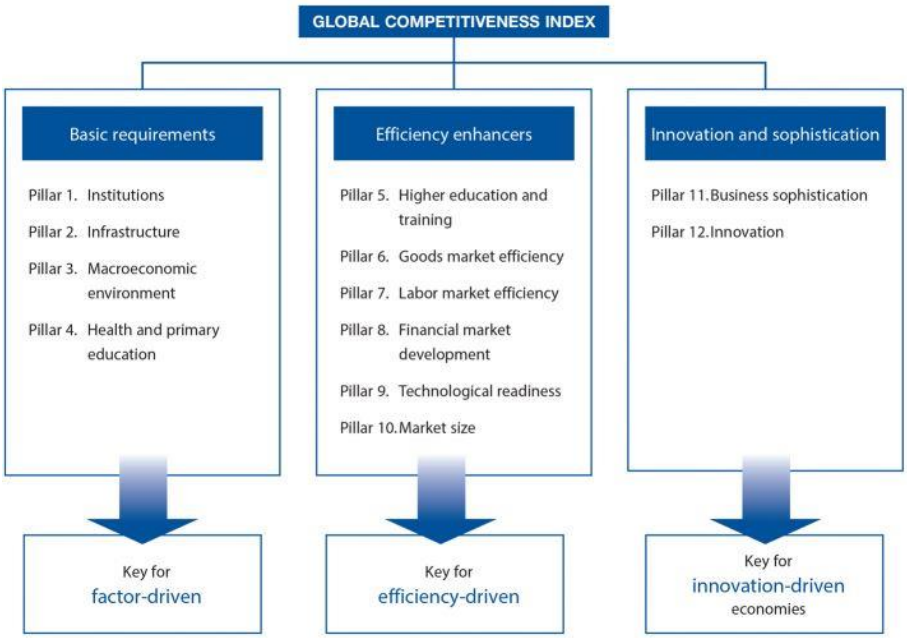
Source: Authors' own, after Ketels (2016).

The GCI first published in 2005 (in a format comparable with annual publications since then), is the most recognized index covering 144 countries in its latest edition. It is devised in collaboration with international experts (e.g. Porter et al., 2009). The GCI identifies *twelve competitiveness pillars* driving productivity, outlined in Figure 1.

The extent to which different pillars (and sub-indexes) contribute to productivity depends on the *stage of development* of an economy. Based on its level of living standards (GDP per capita) Ireland is identified as a country operating in the third, innovation-driven stage of economic development.[6] It is increasingly recognized that at different levels of development, locations face different competitiveness challenges, where the relative importance of different dimensions of microeconomic and macroeconomic competitiveness is changing (Porter, 1990: Porter et al., 2008). Therefore, the approach of the GCI proposes a comprehensive representation of the key levers of productivity and how their relative importance changes over stages of development (Delgado et al., 2012).[7]

[3] http://reports.weforum.org/global-competitiveness-report-2015-2016/
[4] http://www.imd.org/wcc/news-wcy-ranking/
[5] http://www.cforic.org/pages/european-competitiveness.php
[6] Countries included in this stage of development are those with the highest levels of living standards i.e. GDP per capita. The WEF identify 37 countries at this stage, namely, Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Korea Rep., Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Puerto Rico, Qatar, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan (China), Trinidad and Tobago, UK, US.
[7] In measuring the GCI for countries at different stages of development, different weightings of the 3 sub-indexes are applied, with increased weighting towards Sub-Index 3 (innovation-related) for the most advanced countries.

Figure 1: Competitiveness Pillars



Source: World Economic Forum Global Competitiveness Report 2015-2016.[8]

To generate the GCI, both hard statistical data (66%) and microeconomic data gathered through business surveys (34%) are used to measure 114 indicators. These are organized into three sub-indexes, ultimately compiled into a competitiveness score for each country. The approach, while not without criticism (Fougner, 2008; Lall, 2001) is widely used and recognized as the most theoretically grounded approach available.

An advantage of the productivity-based approach to competitiveness is that it evolved from an agreed theoretical background that views productivity as central to the level of prosperity of nations (Delgado et al., 2012; Krugman, 1994; Porter, 1990). The construction of competitiveness scores by pillar, by sub-index (Basic Requirements/Efficiency Enhancers/Innovation Factors) and in aggregate proposed in the GCI allows for the identification of vulnerabilities and strengths in national competitiveness. Thus, the GCI-productivity approach is associated with sound policies like skill upgrading, infrastructure investment, research and innovation investment that are widely-accepted contributions to development. Development debates focus on what *specific* policies are best applied to support productivity growth and to diagnose strategies to close gaps as they develop (Ketels, 2006).[9]

The National Competitiveness Council (NCC) in Ireland has developed a bespoke competitiveness framework, detailed in Ketels (2016). There are advantages and disadvantages of operating a bespoke model. The selection of features can relate to those most pertinent to the specific context and experience. However, the ability to use cross-country data-sets in a more comprehensive manner is possible where more general approaches are adopted. For the purposes of this research, preference is given to using the internationally comparable and theoretically-grounded approach found in the WEF's GCI. Its main features are:

[8] Report available from http://reports.weforum.org/global-competitiveness-report-2015-2016/methodology

[9] It regularly reports on benchmarking aspects of Irish performance relative to peers.

- a productivity-based definition, and measurement, of competitiveness enables identification of potential bottlenecks and potential policy interventions grounded in a business-based perspective;
- benefits from roots in the literature of economic growth and competitiveness and, therefore, includes the most commonly agreed competitiveness pillars;
- allowance for comparisons of nations across different development stages, indicating that as economies develop, different sources of competitiveness play different roles in transition to higher levels of development;
- generation of a national index built up from a set of twelve separate pillars (constructed from 114 variables) permitting international comparisons at both broad and disaggregate levels.

2.2 From Competitiveness to Sustainable Competitiveness

Sustainability binds the three key elements - economic, environmental and social- of sustainable development. Separate research streams focus on the environment and the economy, or on the economy and its social aspects, with *both* the environmental ***and*** social elements of sustainable development rarely studied in tandem with economic growth. 'Sustainable competitiveness' as a concept and as an approach bridges this gap by merging measures of environmental and social sustainability into a synthetic competitiveness framework.

Ecologically speaking, environmental sustainability is defined by focusing on the natural environment´s bio-geo-physical aspects such as maintaining or improving the integrity of the earth's life-supporting systems (Moldan, et. al., 2012). Assessing environmental sustainability should concern *what* is happening to the state of the environment; *Why* is it happening; and *what are we doing* about it? (Hammond et al., 1995). Questions such as *if* and *how* efforts for sustainable development are achieving decoupling, and what are the reciprocal effects between human influence on the natural environment and economic growth have also been high on the research agenda (Patil, 1994).

The social domain is the least theorized and explored pillar of sustainable development and, to date, the most complex to operationalise (Littig & Grießler, 2005; Murphy, 2012). The most significant research challenge for sustainable competitiveness research relates to this element and demanding further research Although a range of analytical approaches to assess socio-economic development exist, they largely failed to align the social domain with sustainability before the 1990s (Omann & Spangenberg, 2002; Colantonio & Lane, 2007; Littig & Grießler, 2005; Magis, 2010).

Colantonio (2009) identifies three overarching categories for social sustainability research. The first views the natural environment as an enabler of social relations and dynamics. The second is environmentally oriented, i.e. focussing on necessary social preconditions to achieving environmental sustainability. The third is people-oriented, focusing on improving wellbeing, including distribution of resources, reducing social exclusion and destructive conflict. Analytical frameworks for social sustainability are seldom applied at the national level with the majority of approaches focussing primarily at regional or community levels (Magee et al., 2012; Omann & Spangenberg, 2002; Woodcraft, 2012). Social sustainability approaches at the national level largely leverage traditional criteria and themes from the literature on social development (i.e. income, inequality, etc.) and new themes emerging from sustainability concerns such as Quality of Life, the environment as socially defining, and health of communities.

Research reveals a plethora of separate environmental and social sustainability approaches that have contributed much to each specific field but make an integrated assessment of sustainability an intricate task. Similarly, the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz et al., 2009) identifies that traditional indicators (i.e. GDP, CO^2 emissions) present a narrow view of what sustainable development should achieve, highlighting the need for more comprehensive, integrated and holistic approaches.

A related development is the redefinition of social progress. The Social Progress Index (SPI),[10] first published in 2013, is produced by a consortium of stakeholders including academics, multilateral organizations and the private sector is leading this research where social progress bridges traditional hard policy issues with soft policy priorities. Social progress is defined as "the capacity of a society to meet the basic human needs of its citizens, establish the building blocks that allow citizens and communities to enhance and sustain the quality of their lives, and create the conditions for all individuals to reach their full potential" (Porter, Stern, & Green, 2016: 4). This definition references three broad dimensions of social progress: Basic Human Needs, Foundations of Wellbeing, and Opportunity. Each dimension is further broken down into four components. In its 2016 edition the SPI included 133 nations.

The SPI emphasises outcome rather than input indicators. The SPI, therefore, allows individual countries to identify specific areas of strength, or weakness, in terms of its social progress performance, and also allows countries to benchmark themselves against peers both at the level of individual indicators and at aggregate level (Fehder & Stern, 2013). The approach has been well received in academic and policy circles with several organizations operationalising findings of the SPI to aid policy making. In Europe the approach has been adapted since late 2016 and applied at sub-national levels.[11]

For this research, we follow the WEF's research-grounded approach to add sustainability adjustments, for both social and environmental elements, to their competitiveness pillars. The adjustments were made by the WEF for 2014-2015 only. This paper applies similar sustainability adjustments for both environmental and social sustainability elements for the ten-year period 2005-2015.

2.2.1 Adjusting for Social Sustainability

Social sustainability is defined as "institutions, policies and factors that enable all members of society to experience best possible health, participation, and security, and to maximise their potential to contribute and benefit from the economic prosperity of the country in which they live" (Bilbao-Osorio et al., 2013. p59). The three elements that comprise the social sustainability adjustment are: access to basic necessities; vulnerability to shocks; and social cohesion. The indicators for each element are provided in Table 2. Due to the lack of appropriate quantitative data, survey data (from the Executive Opinion Survey of the WEF) are used for the following indicators: Access to healthcare services; Extent of informal economy; Social safety net protection; and Social mobility.

[10] http://13i8vn49fibl3go3i12f59gh.wpengine.netdna-cdn.com/wp-content/uploads/2016/07/SPI-2016-Methodological-Report.pdf

[11] http://www.socialprogressimperative.org/custom-indexes-european-union-findings/. Results are available for two Irish regions (2 NUTS 2 regions): Border, Midlands and Western and South and Eastern.

A social sustainability score is obtained using similar methods used in the GCI. That is, data is aggregated into the three elements and then combined to obtain a national Social Sustainability score. Each pillar is weighted equally in generating the Social Sustainability Score.

Table 2: Indicators for Social Sustainability Adjustment

Access to Basic Necessities	Vulnerability to Shocks	Social Cohesion
• Access to sanitation	• Vulnerable employment	• Income Gini index
• Access to improved drinking water	• Extent of informal economy	• Social mobility
• Access to healthcare	• Social safety net protection	• Youth unemployment

Source: Bilbao-Osorio et al. (2013).

2.2.2 Adjusting for Environmental Sustainability

The WEF adjustment for environmental sustainability recognizes that the state of the natural environment affects competitiveness both at national and business (firm) level. Environmental sustainability is defined as a "set of institutions, policies, and factors that ensure an efficient management of resources to enable prosperity for present and future generations" (Bilbao-Osorio et al., 2013 p.58).

The environmental sustainability adjustment of the GCI is composed of three elements namely, environmental policy, use of renewable resources and degradation of the environment. Table 3 lists the indicators included under each element. Due to the lack of appropriate quantitative data, survey data (from the Executive Opinion Survey of the WEF) are used for the following indicators: Stringency of environmental regulations: Quality of the natural environment.

Table 3: Indicators for Environmental Sustainability Adjustment

Environmental Policy	Use of Renewable Resources	Degradation of the Environment
• Environmental regulations (stringency and enforcement)	• Agricultural water intensity	• Level of particulate matter concentration
• Number of ratified international environmental treaties	• Forest cover change	• CO2 intensity
• Terrestrial biome protection	• Fish stocks' overexploitation	• Quality of natural environment

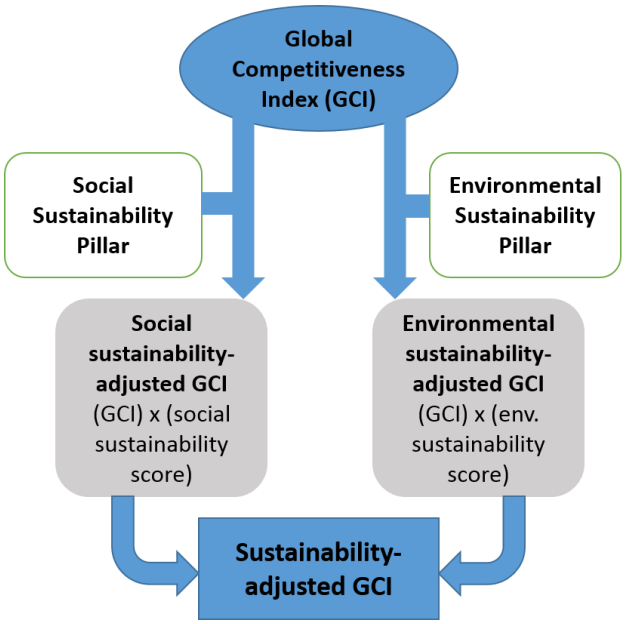
Source: Bilbao-Osorio et al. (2013).

A similar approach of aggregation is carried out to generate a national Environmental Sustainability Score. Each of the three elements is weighted equally in generating each country's Environmental Sustainability Score.

2.2.3 Combined Adjustments for Sustainability (Social and Environmental)

A final sustainability score is obtained for each country from the average of its environmental sustainability and social sustainability adjustment scores (Corrigan et al., 2014). A sustainability-adjusted GCI, or *SGCI*, is constructed combining the economic with sustainability scores. The approach emphasises that economic competitiveness on its own does not necessarily lead to sustainable levels of prosperity, as illustrated in Figure 2.

Figure 2: SGCI Framework



Source: Bilbao-Osorio et al., 2013.

3 Dataset and Estimation Method

Sustainable competitiveness, as defined above, asserts that sustainable competitiveness is determined by the capacity of nations to generate economic prosperity within an efficient economic system, supported by strong institutional foundations, viewed as a set of rules, but also as normative behaviours. Together, these foundations and the resources, both human and capital, available to a nation promote efficient and sustainable patterns of production and consumption both now, and into the future. Thus, understanding (and measuring) sustainable competitiveness requires studying the interconnected past and present relationships between macro-economic and micro-economic factors that drive economic, environmental and socially sustainable competitiveness.

The twelve competitiveness pillars (Figure 1) and the social and environmental sustainability adjustment pillars proposed by the WEF capture these various dynamics. To extend the analysis and

capture past and present dynamics, a panel of 94 countries for the period 2005-2015[12] was constructed with data from the *Global Competitiveness Index* (GCI). Data is publicly available from the WEF website.[13] The WEF approach regularly incorporated adjustments since its first edition in 2005. In 2009 a substantial re-organization of the pillars was carried out to better align it with economic development theory (Porter et. al., 2009).[14,15]

Individual measures for 114 variables are derived from hard statistical data from several sources and perception-based data gathered in an Executive Opinion Survey (EOS) carried out by the WEF.[16] These measures are used to construct Pillars (twelve pillars in total), which are aggregated into three sub-indexes;

(i) *Basic Requirements;*
(ii) *Efficiency Enhancers;* and
(iii) *Innovation and Sophistication Factors.*

The aggregation of these sub-indices generates a final competitiveness score (GCI score). The WEF provides a detailed description of the methodology employed.[17] Here we provide an overview.

1. The WEF dataset includes 114 variables for each country. From these, 84 variables are derived from several international sources and 30 are gathered by the WEF in their EOS.
2. Data derived from the EOS (only) is already normalized in a 1 to 7 scale.[18] A minimum/maximum transformation is carried out to normalize hard-data obtained from several sources in order to match the normalization of the EOS indicators. Indicators for which a larger score represents a better outcome (i.e. percentage of labour force with tertiary education) are normalized according to the following calculation:

   Calculation 1: $$6 * \frac{Country\ Score - Sample\ Minimun}{Sample\ Maximun - Sample\ Minimun} + 1$$

   Indicators for which the score is inversely related to the desirability of the outcome (i.e. Unemployment) are normalized in the following way:

   Calculation 2: $$-6 * \frac{Country\ Score - Sample\ Minimun}{Sample\ Maximun - Sample\ Minimun} + 7$$

   The normalization procedure generates continuous indicators with a minimum of 1 and a maximum of 7.
3. Scores are subsequently aggregated into the 3 sub-pillars. The first sub-pillar, *Basic Requirements,* is obtained by adding scores from pillars 1 to 4, with each pillar weighted equally. The second sub-pillar, *Efficiency Enhancers,* includes pillars 5 to 10, with each pillar equally weighted (17% per cent each). The third sub-pillar, *Innovation and Sophistications Factors,* includes pillars 10 and 11, each weighted at 50 per cent.

[12] The nature of the panel was determined by the availability of data. Since 2005, the WEF has published 10 GCI with some variation in number of countries included in each different year.
[13] Data available at http://reports.weforum.org/global-competitiveness-report-2015-2016/competitiveness-rankings/. Data was retrieved in June 2016.
[14] Most changes after this edition focused on data sources and on the addition of more countries to the index rather than on its approach.
[15] The WEF publishes the Global Competitiveness Report annually. While it has been published since 1979 it is only since 2005 that it appears in its current format, or formats compatible with current editions.
[16] http://reports.weforum.org/global-risks-2015/executive-opinion-survey-2014/
[17] http://reports.weforum.org/global-competitiveness-report-2014-2015/methodology/
[18] As the EOS already presents questions in an scale from 1 to 7 no explicit normalisation is required.

4. A national GCI score is obtained by aggregating the scores from the 3 sub-pillars. The contribution of each sub-pillar is determined by the stage of development of each country, proxied by its level of GDP per capita. These weights are provided in Table 4.

Table 4: Weights Applied According to Stage of Development of Nations in GCR

Factors/Stages	Stage of Development				
	Stage 1 (Factor-Driven)	Transition from Stage 1 to Stage 2	Stage 2 (Efficiency-Driven)	Transition from Stage 2 to Stage 3	Stage 3 (Innovation-Driven)
GDP per Capita (US$) Thresholds	**< 2000**	**2000 - 2999**	**3000 - 8999**	**9000-17000**	**< 17000**
Wight for Basic Requirement	60%	40-60%	40%	20-40%	20%
Weight for Efficiency Enhancer	35%	30-50%	50%	50%	50%
Weight for Innovation and Sophistication factors	15%	5-10%	10%	10-30%	30%

Source: World Economic Forum Global Competitiveness Report 2015-2016. Available at: http://reports.weforum.org/global-competitiveness-report-2015-2016/appendix-methodology-and-computation-of-the-global-competitiveness-index-2015-2016/#view/fn-g

This set of competitiveness variables was extended by the WEF to permit consideration of additional pillars of environmental and social sustainability, *only* since 2014. Each additional pillar, one each for environmental and social sustainability, based on indicators (Tables 2 and 3) feeds into a sustainability adjustment score (as presented in Figure 2). The Sustainability-adjusted GCI, *SGCI*, therefore, contains 14 pillars.

In extending the sustainability indicators to the ten-year period (2005-15) comparable data is generated for social and environmental sustainability pillars to that derived for the GCI dataset in 2014. This was possible for 94 countries only and not for all years. To build the dataset, appropriate and comparable social and environmental sustainability indicators to those provided in the GCI were identified, insofar as possible.

For the purposes of estimation, the aim was to construct a balanced panel with the GCI data from 2005 to 2015 (t=10). Countries that featured in at least 6 editions of the GCR were included in the dataset. For the years 2005-2013, relevant literature was explored to identify appropriate and comparable social and environmental sustainability indicators to those provided in the GCI. However, the Executive Opinion Survey as a perception-based instrument used to generate some variables, a suitable replacement did not exist. In those cases, weightings of the 2014-2015 value of the indicators was applied: weights of 50 per cent of the 2014-5 value was used with the remaining 50 per cent composed using comparable hard data from available sources to assure data consistency.[19] Table 5 provides a list of indicators used for sustainability adjustments, and their sources.

As Table 5 indicates, not all preferred indicators were available for all years for the data panel. The OECD proposes several techniques for handling missing data when constructing composite indexes,

[19] This was done for the following variables: *Access to Health Care Services* and *Social Safety Nets*.

however, these techniques are more relevant when data is missing at random (see OECD, 2008). This was not the case in our dataset since data gaps were systematic (i.e. missing for all countries for specific years). Where data was available for most of the period and had missing data in periods in-between, the research team completed the dataset using the nearest data point in the dataset. The rationale for this decision was that;

i. Most missing data relate to developing countries with GCI scores in the lower 50 percent of the GCI sample distribution. Data for these countries also showed lower social and environmental performance (and variance) in the WEF sustainability-adjusted GCI for the period 2014-2015.
ii. The option of omitting the observation in the composition of the sustainability adjustment for a given year would affect the final score for that specific year, in most cases to the benefit of the countries for which data was missing, as often the missing data was in relation to key social and environmental aspects.
iii. Since data for earlier and later years was available, a range of the value of the missing observation was known;

and

iv. The variables used in the social and environmental adjustment display relatively gradual annual changes. Any bias that may have been introduced in the dataset through adoption of this approach to missing data is regarded as minor.

Table 5: Variables and Sources: Social and Environmental Sustainability Adjustments

A: Social Sustainability Adjustment	**Source**
S01- Gini Index*	World Development Indicators, accessed June 2016
S02- Youth Unemployment*	World Development Indicators, accessed June 2016
S03- Access to Sanitation*	World Development Indicators, accessed June 2016
S04- Access to Improved Drinking Water*	World Development Indicators, accessed on June 2016
S05- Access to Health Care Services**	50% used from 2014-2015 value in WEF dataset. Remaining 50% from the following indicators from the WDI database: Births attended by skilled health staff (% of total), Community health workers (per 1,000 people), and Hospital beds (per 1,000 people).
S06- Social Safety Nets	50% from 2014-5 value in WEF dataset. Remaining 50% from the following indicators from the WDI database: Active contributors to an old age contributory scheme as a percent of labour force, Public Social Protection Expenditure on benefits as a percent of GDP; Share of population above statutory pensionable age receiving an old age pension (%); Share of unemployed receiving regular periodic social security unemployment benefits (%).
S07- Extent of Informal Economy	No Replacement Found-Variable not Included.
S08- Social Mobility	No Replacement Found-Variable not Included.
S09- Vulnerable Employment*	World Development Indicators, accessed June 2016

Table 5 contd.

B: Environmental Sustainability Adjustment	**Source**
S10- Stringency of Environmental Regulation*	In this case the same variable for 2014-2015 was used for all years. Data obtained from World Economic Forum, Executive Opinion Survey, multiple years.
S11- Enforcement of Environmental Regulation*	In this case, the same variable for 2014-2015 was used for all years. Data obtained from World Economic Forum, Executive Opinion Survey, multiple years.
S12- Terrestrial Biome Protection*	Yale Center for Environmental Law & Policy (YCELP) and the Center for International Earth Science Information Network. Available at: http://epi.yale.edu/data
S13- Number of Ratified Environmental Treaties*	The International Union for Conservation of Nature (IUCN), Environmental Law Centre ELIS Treaty Database
S14- Baseline water stress *	Yale Center for Environmental Law & Policy (YCELP) and the Center for International Earth Science Information Network. Available at: http://epi.yale.edu/data
S15- Waste Water Treatment*	Yale Center for Environmental Law & Policy (YCELP) and the Centerfor International Earth Science Information Network. Available at: http://epi.yale.edu/data
S16- C02 intensity*	Yale Center for Environmental Law & Policy (YCELP) and the Center for International Earth Science Information Network. Available at: http://epi.yale.edu/data
S17- Fish Stock Depletion*	Yale Center for Environmental Law & Policy (YCELP) and the Center for International Earth Science Information Network. Available at: http://epi.yale.edu/data
S18- Forest Cover Change*	Yale Center for Environmental Law & Policy (YCELP) and the Center for International Earth Science Information Network. Available at: http://epi.yale.edu/data
S19- Particulate Matter Concentration	World Development Indicators, accessed June 2016
S20- Quality of Natural Environment	No Replacement Found-Variable Not Included.
* The variables used are the same as used by the WEF in the construction of the SGCI. ** These variables include that used by the WEF in the construction of the SGCI weighted at 50 percent. The remaining 50 per cent incorporates variables not used in the SGCI.	

The econometric technique used was the Arellano and Bond (1991) Dynamic Generalised Method of Moments Panel Data Estimator. This technique addresses the dynamism that has been identified in the process of developing the foundations of sustainable competitiveness while efficiently dealing with potential issues such as fixed-effects (idiosyncratic, country-specific factors playing a confounding role in estimations) and endogeneity (factors not accounted for that cannot be estimated without introducing bias).

To examine the related features of interest, we formalize their relationship according to the following model:

1. $y_{it} = \alpha_{it} + \beta Z'_{it} + \beta y_{-1} + \mu_{it}$

In Equation 1, the level of sustainable competitiveness y of country i in year t is determined by the effect of our parameters of interest that represents a group of vectors $\beta\{z_{it} \ldots . z_{in}\}$ and the error term μ_{it}. In this case, the terms Z' correspond to the 12 competitiveness pillars i.e. their component indicators. The parameter α_{it} represents the fixed-effects, or country-specific characteristics that enable nations to develop different foundations for competitiveness.

Developing the foundations for competitiveness, however, is a slow and evolving process where the level of competitiveness a nation achieves today is largely dependent on its previous developments (Delgado et al., 2012). Thus, the competitiveness level of a nation at any one point in time is determined by past (or lagged) moments of y (which is determined by past moments of Z'). This is captured by the term βy_{-1}.

The approach using the AB estimator is to transform the model into its first differences. This eliminates the individual effects from the model as their presence is the cause of the endogeneity problem. Therefore, the transformed model enables the lagged variable y_{it-2} and their predecessors to be used as valid instruments. These instruments can be used in a GMM approach to obtain an asymptotically efficient estimator of β.

4 Results and Discussion

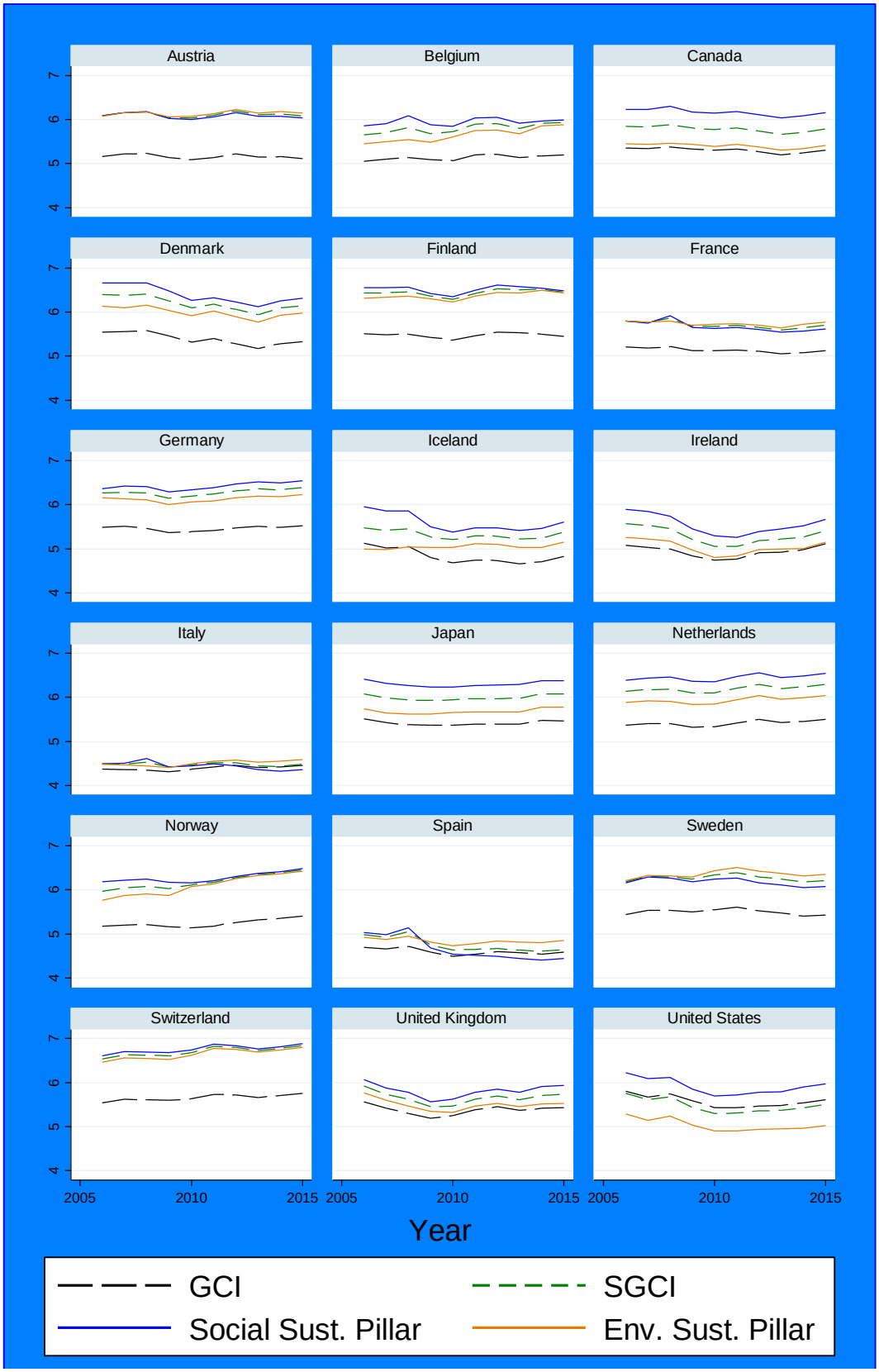
4.1 Adjusting National Competitiveness for Social and Environmental Sustainability

Adjusting competitiveness for social and environmental sustainability enables identification of the best and worst performers in sustainable-competitiveness terms. Some specific examples of the adjustments are provided in Figure 3 relative to the standard competitiveness measure of the GCI.

From the estimates, the mean impact of the aggregate adjustment (i.e. social adjustment plus environmental adjustment) is an increase of 0.1 points, equivalent to 1.7 percent (SD=0.4: 7.4 percent) with important variation across the countries in the sample.

Countries can be classified into three groups according to the level of change the sustainability adjustment yields relative to the GCI. In the first group, there are countries for which the adjustment leads to a significant *reduction* in the competitiveness (SGCI) score. These can be positioned in the lower quartile of the sample distribution when arranged by the magnitude of the change (the worst performers below the 25th percentile) with score changes from -0.27 to -0.7 points (i.e. -14 to -6.5 percentage change). Countries in this group, have a *worse* sustainable competitiveness than *pure* competitiveness score (GCI compared to SGCI).

Figure 3: SGCI for a Sample of Countries

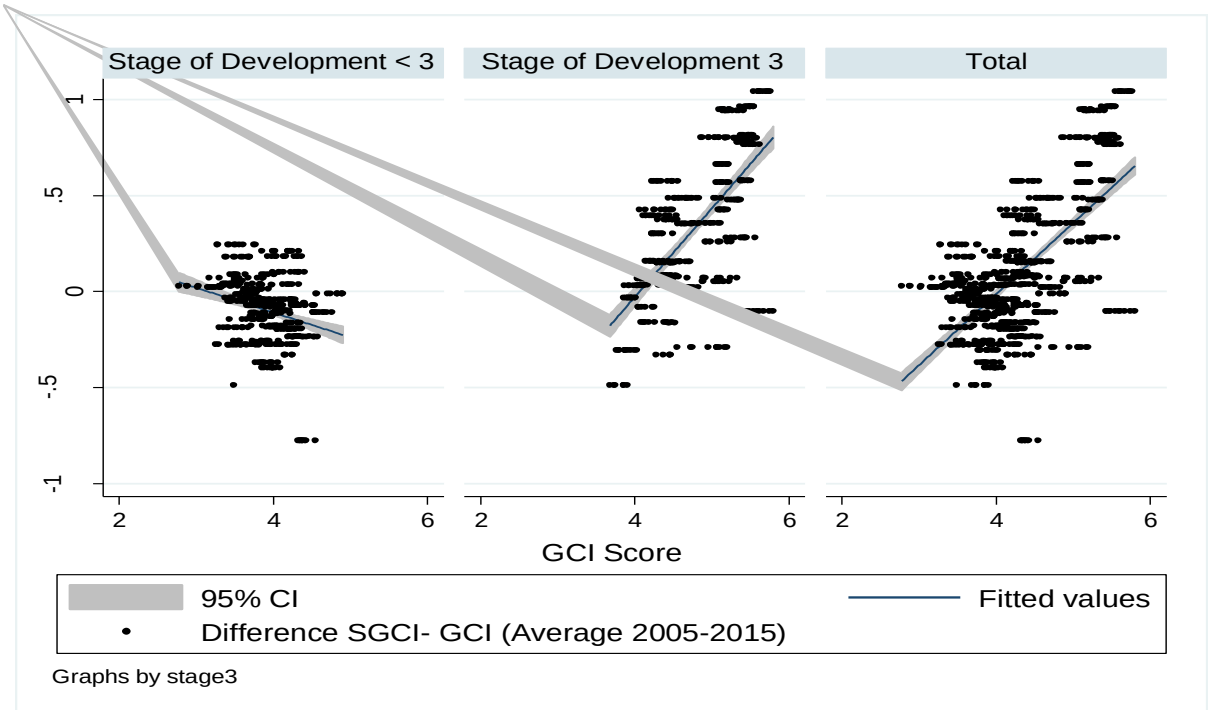


In the second group, the sustainability adjustment produces a change in the range of -0.1 to 0.3 points, equivalent to -3 to 6.5 percentage change. For countries in this group, SGCI scores are similar to GCI scores. Fifty percent of the sample falls in this category. The third group is composed of countries for which the sustainability adjustment produces a positive change in their final competitiveness score of between 0.28 to a maximum of 1 point, equivalent to over 6.5 and up to 19 percent. For countries in this group their sustainability score is significantly higher than the GCI.

The top-ten country group benefitting most from the sustainable competitiveness adjustment is dominated by European countries, particularly Scandinavian countries (Finland ranks second, Norway third, Sweden sixth and Denmark seventh) with Japan in ninth place as the only non-European nation. Switzerland ranks, on average, as the most sustainable competitive country during the period 2005 to 2015. The remaining countries in the top 10 are Germany, Belgium, Luxembourg and Austria. The bottom-ten group of countries for which the adjustment has the largest negative impact is dominated by developing economies. These are in Africa: South Africa, Namibia, Lybia and Algeria; the Middle East: Saudi Arabia and Turkey; Latin America: Argentina; the Caribbean: Guyana and Jamaica, and one South Asian Country, Pakistan.

To further explore the advanced/disadvantaged economy divide, we follow the WEF classification of stages of development. Figure 4 illustrates the relationship between the GCI and the SGCI for two groups. Countries with a per capita GDP of at least US$ 17,000 are considered at the highest (stage 3) level of development. For simplicity, we group all other countries below stage 3.

Figure 4: Relating SGCI and GCI: Country Groups

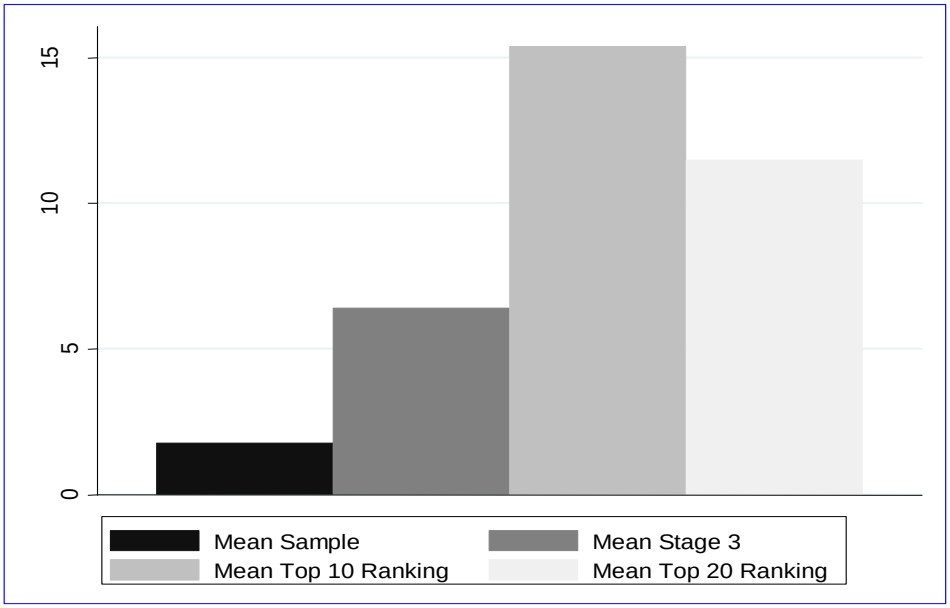


Source: Authors' estimations.

A strong relationship is exhibited between the economic and sustainability adjusted competitiveness score for countries at stage 3. This suggests that most economically competitive countries are also the most sustainably competitive. In contrast, countries below this level display a negative relationship between these two indicators. A simple comparison of means suggests that countries in stage 3 of development benefit on average 0.42 points more (equivalent to 10 percent) from the sustainability adjustment than less advanced economies (Standard Error .018). Thus, results point to more advanced economies also leading the field in sustainable competitiveness.

Figure 5 presents the average gain from the sustainability adjustment for the total sample, for countries in stage 3 of development and countries in the top 10 and to 20 of the SGCI respectively.

Figure 5: Average Impacts of Sustainability Adjustments: Country Groups



Source: Authors' estimations.

Countries in the top 20 gain almost twice as much from adjusting competitiveness for social and environmental sustainability than the broader group of countries at stage 3. Countries in the top 10 gain almost 3 times this amount.

We also explore the contribution of each element of sustainable competitiveness – economic, social and environmental - to the relative competitiveness performance measured through GCI and SGCI.

4.2 Social and Environmental Adjustment

Table 6 presents the estimations of the contribution each of the three sustainable competitiveness pillars to the final SGCI. Column 1 presents the estimations for the overall sample, Column 2 for most competitive economies (stage 3) and Column 3 for less competitive economies (below stage 3). Coefficients are interpreted as the average contribution each element of sustainable competitiveness makes to changes in annual sustainable competitiveness scores.

Table 6: Contributions of Economic and Sustainability Pillars to SGCI

	SGCI (All)	**SGCI** (Stage 3)	**SGCI** (Below Stage 3)
L.SGCI	0.020***	0.011	0.013**
	(0.007)	(0.011)	(0.006)
Economic GCI	1.001***	1.056***	0.981***
	(0.007)	(0.012)	(0.007)
Environmental GCI	0.280***	0.294***	0.253***
	(0.008)	(0.008)	(0.013)
Social GCI	0.319***	0.334***	0.299***
	(0.006)	(0.010)	(0.010)
Observations	744	346	387
arm1	-1.360	-1.687	-1.561
arm2	-2.381	-1.409	-1.004
chi2	24315.407	15931.742	28304.393
N_g	94.000	47.000	51.000
df_m	4.000	4.000	4.0
rss	0.042	0.015	0.012
Robust Standard errors in parentheses * p<0.10 ** p<0.05 *** p<0.01			

The economic element of the SGCI is associated with the largest proportion of the changes in the SGCI score for the whole sample. This remains true when the results are disaggregated by development level. In the latter case, however, the economic element is responsible for a larger share of the change in SGCI for more advanced economies – this is evident in the larger coefficient in column 2 relative to column 3.

The social element is the second most influential element that accounts for the aggregate change in SGCI scores. However, its magnitude is significantly lower than the economic element, at around one third of the former. Again, the influence of the social element is more pronounced for more advanced economies. The environmental element is the least influential pillar. Relatively lower coefficients on social and environmental sustainability may be expected since the time-frame (10 years) is narrow within such slowly changing processes.

A simple comparison of means between the sustainability pillars for countries in the top 10 relative to other countries elucidates positive significant differences in all pillars of the social and environmental sub-indices. Largest differences in the social domain are evident in the Gini Coefficient scores where the top ten group scores 1.3 points more than the rest of the sample; Access to Sanitation (0.8 points);

Extent of the Informal Economy (0.7 points); and Social Mobility (1.6 points) - which displays the largest difference between indicators in the social adjustment pillar.

In the Environmental adjusted pillar, Stringency and Enforcement of Environmental Regulation scores 2.8 points higher than the rest of the sample on average; Number of Ratified International Environmental Treaties (1.8 points) and Waste water treatment - where the score is 3.8 points higher. These differences are less pronounced when the comparison is extended to the top 20 countries relative to the other countries in the sample, however, the existence of significant differences in these pillars remain.

4.3 Key Strengths and Roadblocks to Sustainable Competitiveness

Given the interdependence of social and environmental elements of sustainable competitiveness with the economic element, identifying key strengths and roadblocks to sustainable competitiveness at the economic level provides valuable insights for more sustainable policies. Table 7 reports estimations of the contribution of each economic competitiveness pillar to the overall change (annual average) in the SGCI. Results are reported for the entire sample (Column 1), for most advanced economies (Column 2), and for less advanced economies (Column 3).

Estimations are grouped according to the three sub-indices proposed by the WEF. These are Basic Requirements (Pillars 1 to 4), Efficiency Enhancers (Pillars 5 to 10) and Innovation and Sophistication factors (Pillars 11 and 12). As pillars within the latter group exhibited high co-linearity (Correlation Coefficient 0.92), they remain as one single pillar (Sub_Pillar_3).

For the entire country sample, competitiveness pillars in the Basic Requirements sub-index suggest that macroeconomic stability and the level of education of the population (primary level), are important determinants of sustainable competitiveness. The level of infrastructure and the institutional environment also matter, but effects are less important. Disaggregated analysis of the most advanced economies indicates neither of these two pillars is significant: however, their impact is both significant and more pronounced in the less advanced group relative to the overall sample. The effect of the macroeconomic environment is most pronounced for the least developed group (col. 3). The level of education (primary level) appears to be equally important for both more and less advanced economies. Results, therefore, suggest that adverse macroeconomic, infrastructural and institutional environments are more detrimental for sustainable competitiveness in less advanced economies. As the importance of macro-economic stability has been a long-standing focus of economic research, these results emphasize that more advanced economies enjoy robust macroeconomic environments. This also remains true despite the challenges posed by the recent financial crises. Having developed critical mass in terms of institutions and infrastructure, it appears these factors have no direct impact on SGCI for countries at the highest levels of development.

Pillars in the second sub-index exhibit larger contributions to changes in the SGCI for more advanced nations (where they display statistical significance). The pillars where the difference between most and less advanced is greatest are Technological readiness; Financial market development; Higher education and labour market efficiency. The two remaining pillars, Goods market efficiency and 10 Market size are not significant for advanced economies. Goods market efficiency displays the largest impact for less developed countries (0.10) whereas it displays no statistically significant effect for more advanced economies. Market size appears to have a limited effect when the total sample is considered

and none when the sample is disaggregated. Results indicate that the importance of four of these (six) pillars for sustainable competitiveness increases with economies' competitiveness.

Table 7: Contributions of Economic Pillars to SGCI

	SGCI (All)	SGCI (Stage 3)	SGCI (Below Stage 3)
L.SGCI	-0.126	0.104	0.086
	(0.111)	(0.097)	(0.110)
Basic Requirements Pillars:			
Pillar 1: Institutions	0.050***	0.016	0.083***
	(0.016)	(0.019)	(0.019)
Pillar 2: Infrastructure	0.070***	0.020	0.093***
	(0.013)	(0.023)	(0.013)
Pillar 3: Macroeconomic Environment	0.107***	0.071***	0.134***
	(0.008)	(0.011)	(0.008)
Pillar 4: Health and Primary Education	0.100***	0.120***	0.117***
	(0.016)	(0.040)	(0.013)
Efficiency Enhancing Pillars:			
Pillar 5: Higher Education and Training	0.100***	0.104***	0.082***
	(0.013)	(0.026)	(0.014)
Pillar 6: Goods Market Efficiency	0.107***	0.042	0.096***
	(0.025)	(0.038)	(0.023)
Pillar 7: Labour Market Efficiency	0.070***	0.085***	0.065***
	(0.012)	(0.023)	(0.016)
Pillar 8: Financial Market Development	0.078***	0.082***	0.052***
	(0.015)	(0.022)	(0.016)
Pillar 9: Technological Readiness	0.097***	0.105***	0.062***
	(0.011)	(0.015)	(0.013)
Pillar 10: Market Size	0.056**	-0.026	0.025
	(0.022)	(0.046)	(0.026)
Innovation & Sophistication Pillars:			
Sub_Pillar_3	0.186***	0.331***	0.103***
	(0.024)	(0.037)	(0.028)
Observations	744	346	387
arm1	-0.231	-1.515	-1.988
arm2	-1.182	-0.391	0.144
chi2	2896.637	3524.549	5628.204
N_g	94.000	47.000	51.000
df_m	18.000	18.000	18.000
rss	1.490	0.700	0.659
Standard errors in parentheses * p<0.10 ** p<0.05 *** p<0.01			

Finally, the Innovation and sophistication sub-index features the most important pillars, indicated by the relative size of statistically significant coefficients, driving sustainable competitiveness. This is consistent with the literature on competitiveness and innovation and the literature focussing on sustainability and innovation. Business sophistication and innovation however, appear to have an impact three times larger for more advanced economies. This is also consistent with the understanding

that innovation is not a 'low hanging fruit' and it is largely affected by resources and capabilities at the firm level and also by the external innovation system, including the regional innovation system. Results suggest that less advanced nations are not at a stage where the interaction of multiple elements yields an adequate environment for such innovation systems to develop. In these countries, sustainable competitiveness is more dependent on macro-economic environment, institutions and primary levels of education attainment.

5 Discussion and Conclusions

This paper argues that a greater integration of the economic, the social and the environmental elements of sustainable development has made a significant impact in policy spaces where efforts are directed at decoupling economic growth from environmental degradation while leveraging innovation and skill upgrading. However, such integration has been less pronounced in research, especially in terms of focus on social aspects. While separate research streams focus on the environment and the economy, or the economy and its social aspects, *both* the environmental ***and*** social elements of sustainable development are rarely studied together. A perceived need to define synthetic and effective metrics that integrate the three pillars of sustainable development under an internationally comparable analytical framework is outlined. The need for such framework arises from limitations to inform policymakers in a synthetic manner about the current level of sustainable development of nations and to signal key areas requiring further attention with traditional sets of indicators.

The paper explores whether sustainable competitiveness as proposed by the WEF can contribute to filling this gap. Sustainable competitiveness as a concept (and as an approach) contributes to providing metrics that are synthetic yet comprehensive, acknowledging that sustainability aspects of the social and the environmental are deeply embedded in each other. The paper focuses on two key themes. It first considers measurements of the elements of a competitive economy in its economic, environmental, and social features. This allows for an understanding of the nature of sustainability of nations. It then follows with identification of the most important competitiveness pillars - key strengths and roadblocks to sustainable competitiveness - across countries at different stages of economic development.

Measurement of sustainable competitiveness proves an insightful exercise. Results show that sustainability is not in opposition to economic competitiveness, contributing to the modern paradigm that views economic development and sustainability as mutually reinforcing. We find that more competitive countries in the economic domain also feature strong sustainability characteristics across both the social and environmental domains.

Adjusting competitiveness using weighted sets of social and environmental sustainability indicators yields significant changes in the final SGCI compared to the GCI for some countries, with other countries less affected. At the aggregate level, the adjustment produces an increase of 0.1 points or 1.7 percent of the initial competitiveness scores (GCI). We distinguish three distinctive country groups where adjustments,

a. have significantly negative effects on the national competitiveness score (SGCI<GCI);
b. have moderate effects on the competitiveness score (either positive or negative) and;
c. bring significant improvements to the national GCI score (SGCI>GCI).

A further understanding of what features top performing countries share that differ from the rest of countries provides potential guidelines for other countries that aim to follow their development path. We find that best performers outperform other countries in ranges of indicators. However, it can be highlighted that these countries have generally lower income inequality, and higher social mobility in the social domain. In the Environmental domain, top performers in SGCI have more stringent environmental regulation and enforcement, and signed up to more international environmental treatment suggesting stronger environmental commitment.

Disaggregated contributions of social and environmental elements of sustainability to the final SGCI indicate the various effects of sub-indexes and pillars. We find that the economic domain is the origin for most of the changes in sustainable competitiveness in the ten years of available sample data. The social element is the second most influential pillar while the environmental offers a relatively similar contribution to annual changes in sustainable competitiveness (displaying marginally smaller coefficients). This is not surprising given that social and environmental change might take longer to generate changes than the economic element. In addition, the ten-year time-frame of the study may impede capturing these dynamics more fully. Potential to extend the method over a longer period should enhance understanding of the processes at play between economic, social and environmental aspects of sustainable development.

The structured approach to the construction of competitiveness indexes by the WEF indicates that economic, social and environmental competitiveness may be impacted jointly. As competitiveness and sustainability can work in mutually supporting ways, some policy interventions may serve as generalised mechanisms to generate positive effects for all three aspects, economic, social and environmental. Potential roadblocks and opportunities, therefore, can be elucidated by the analysis at the economic pillar level.

In this case, our findings suggest that business sophistication and innovation capabilities are the most influential competitiveness pillars for sustainable competitiveness for the entire sample. Innovation, results show that more advanced economies are more capable of channelling innovation and business sophistication features into sustainable growth, relative to less advanced nations. In the latter case, other pillars that can aid the development of innovation capacity should be considered for less developed nations such as education and training, the quality of the macro-economic environment and institutions, and efficiency enhancer pillars including market efficiency, both for goods and labour, financial market development and technology readiness. Due to the data-rich nature of how the GCI is constructed, it is possible to identify on a country-by country basis those more granular indicators, within e.g. macro-economic stability of less developed countries, that are most important for sustainable competitiveness.

It is our view that sustainable competitiveness as a concept as an approach has a space in the research community to serve as a synthetic yet comprehensive metric of sustainable development. The framework and the data required for the construction of the index provide a simple methodology to understand if and how efforts for sustainable development are able to achieve economic, social and environmental competitiveness in addition to identify potential roadblocks and threats to sustainability.

Appendix

Countries Included in Analysis:

Albania	Guatemala	Panama
Algeria	Guyana	Paraguay
Argentina	Honduras	Peru
Armenia	Hungary	Philippines
Australia	Iceland	Poland
Austria	India	Portugal
Azerbaijan	Indonesia	Romania
Bangladesh	Ireland	Russian Federation
Belgium	Italy	Saudi Arabia
Bolivia	Jamaica	Senegal
Brazil	Japan	Serbia
Bulgaria	Kazakhstan	Slovak Republic
Cambodia	Kenya	Slovenia
Cameroon	Kyrgyz Republic	South Africa
Canada	Latvia	Spain
Chile	Libya	Sri Lanka
China	Lithuania	Sweden
Colombia	Luxembourg	Switzerland
Costa Rica	Malaysia	Tanzania
Croatia	Mauritius	Thailand
Cyprus	Mexico	Trinidad and Tobago
Czech Republic	Mongolia	Turkey
Denmark	Morocco	Ukraine
Dominican Republic	Mozambique	United Arab Emirates
El Salvador	Namibia	United Kingdom
Estonia	Nepal	United States
Ethiopia	Netherlands	Uruguay
Finland	New Zealand	Vietnam
France	Nicaragua	Zambia
Georgia	Nigeria	Zimbabwe
Germany	Norway	
Greece	Pakistan	

Note: Shading indicates countries at the top stage of development.

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