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Estimation of Climate Change Damage Functions for 140 Regions in the GTAP9 Database

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Abstract

Climate change damage (or, more correctly, impact) functions relate variations in temperature (or other climate variables) to economic impacts in various dimensions, and are at the basis of quantitative modeling exercises for the assessment of climate change policies. This document provides a summary of results from a series of meta-analyses aimed at estimating parameters for six specific damage functions, referring to: sea level rise, agricultural productivity, heat effects on labor productivity, human health, tourism flows, and households' energy demand. All parameters of the damage functions are estimated for each of the 140 countries and regions in the Global Trade Analysis Project 9 data set. To illustrate the salient characteristics of the estimates, the change in real gross domestic product is approximated for the different effects, in all regions, corresponding to an increase in average temperature of +3°C. After considering the overall impact, the paper highlights which factor is the most significant one in each country, and elaborates on the distributional consequences of climate change.

Estimation of Climate Change Damage Functions for 140 Regions in the GTAP9 Database

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1. Introduction

Understanding how the ongoing climate change could ultimately affect our society and the well-being of current and future generations requires an evaluation of the complex interplay between human and natural systems.

The human or anthropogenic influence on the earth climate is mainly associated with the emissions of greenhouse gases in the atmosphere, which is in turn related to the level of several economic activities. To forecast the future climate, physical scientists need to know the expected level of GHG emissions, which depend on scenarios of economic growth as well as on the possible implementation of climate mitigation policies. On the other hand, economic growth itself is influenced by the climate change, through its manifold impacts. As Tol (2015) puts it: "There are so many and so different effects: crops hit by worsening drought, crops growing faster because of carbon dioxide fertilization, heat stress increasing, cold stress decreasing, sea levels rising, cooling energy demand going up, heating energy demand going down, infectious disease spreading, and species going extinct. It is hard to make sense of this. Therefore, aggregate indicators are needed to assess whether climate change is, on balance, a good thing or a bad thing and whether the climate problem is small or large relative to the many other problems that we have.".

Damage functions have been introduced to this purpose, that is to "translate" physical impacts in terms of economic variables inside CGE, IAM and other numerical economic models. Therefore, damage functions are one or more relationships between climate variables (typically average temperature, but sometimes also humidity or "heating days") and economic variables (potential income, productivity, resource endowments, etc.). It is generally acknowledged that damage functions constitute a weak link in the economics of climate change (Weitzman, 2010).

Various methodologies have been employed for the estimation of their parameters, from subjective expert assessment (Nordhaus, 1994) to panel methods (Dell, Jones and Olken, 2014) to meta-analyses of non-economic literature (Tol, 2002). Also, the functions may be built by summing up different effects into a single aggregate, or they may retain some sectoral detail. The first approach is typical of earlier models like RICE (Nordhaus and Yang, 1996, Nordhaus and Boyer, 1999), MERGE (Manne, Mendelsohn and Richels, 1995) and CETA (Peck and Teisberg, 1992), where a relationship is posited between loss of potential income (GDP) and temperature. More recent contributions, based on multi-sectoral models like DART (Deke et al., 2001), GTEM (Pant, 2002), ICES (Eboli, Parrado and Roson, 2010) and ENVISAGE (Roson and van der Mensbrugghe, 2012) keep the sectoral detail and attribute the various impacts to different variables and parameters in a disaggregated macroeconomic model, which typically has a general equilibrium structure.

The main advantage of holding distinct the different economic effects of climate change, despite the cost of higher computational complexity, is that it is possible to trace the various mechanisms through which the climate can affect the economic system. Furthermore, in a general equilibrium formulation, it is possible to account for second-order effects linked to variations in relative prices, which are often very relevant.

This document illustrates the methodology and presents some results for the estimation of damage functions parameters, for all 140 countries and regions in the GTAP9 dataset, and for six climate impacts: sea level rise, variation in crop yields, heat effects on labor productivity, human health, tourism and household energy demand. Effects from 1°C up to 5°C average temperature increments are separately considered, as most impacts are non-linear.

The GTAP social accounting matrix has become a de-facto standard for the calibration and implementation of computable general equilibrium models, or integrated assessment models with a CGE core, so our set of estimates can be seen as a "ready-to-use" information source for the realization of climate-related numerical experiments with a general equilibrium structure.

Our parameters are obtained by processing information coming from many diverse studies, based on different approaches and methodologies, as we are undertaking an interdisciplinary assessment of

climate change impacts. This means that, although we are trying to build a standardized data set, the original information remains intrinsically heterogeneous. Consequently, our results have the same strengths and weaknesses as their primary references, which are difficult to judge, except for the fact that most of them are from published sources.

For the same reason, we provide central values (or best estimates) of climate change impacts in the various categories, but we refrain from tackling any analysis of uncertainty, or from evaluating the overall robustness of our findings. Actually, some of the original studies do not supply information like standard errors of the parameters, whereas for those in which such information is available (in some way), converting it to a different spatial and temporal scale would be a rather complicated process.

We understand that assessing uncertainty in climate change impacts is essential from both a scientific and a practical policy perspective, but we leave the issue for further future research. The full impact of climate change is a slowly unfolding event, and data continue to be gathered by experts in great efforts such as the Inter-governmental Panel on Climate Change (IPCC). New evidence will be available, and confidence on data and parameters will improve over time. Nonetheless, climate change impacts are and will remain differentiated among sectors and regions, which requires both a continuous interdisciplinary cooperation and the development of modeling platforms for the simultaneous appraisal of multiple impacts.

The paper is structured as follows. Sections from 2 to 7 are devoted to presenting the methodology and some estimates for the six impact typologies, whereas detailed numerical results are available in the Appendix at the end of the paper. Section 8 provides a synthesis of the findings by showing first-order approximations of the change in national GDPs triggered by the various effects, when the average temperature is assumed to increase by three Celsius degrees. The results are then discussed in a final concluding section.

2. Climate change impact #1: Sea Level Rise

A large number of studies reviewed by the Fifth IPCC Assessment Report (IPCC, 2014) have shown that the increase in global temperature brings about an increase in the level of the sea. Sea level rise (hereafter SLR) affects the land stock through the erosion, inundation or salt intrusion along the coastline. This phenomenon is in turn generated by (i) the thermal expansion of water bodies and (ii) glaciers' melting.

The share of land which may be lost (in terms of economic production factor) depends on several country-specific characteristics, like: (i) the composition of the shoreline (cliffs and rocky coasts are less subject to erosion than sandy coasts and wetlands); (ii) the total length of the country coast; (iii) the share of the coast which is suitable for productive purposes (i.e. in agriculture); (iv) the vertical land movement (VLM). The latter is a generic term for all processes affecting the elevation at a given location (tectonic movements, subsidence, ground water extraction), causing the land to move up or down. This is typically a slow process with values commonly between -10 mm/year (sinking) and +10 mm/year (rising). Local vertical land movement becomes relevant when looking at the local effects of sea level rise. The orders of magnitude are comparable, and VLM can thus either exacerbate or dampen the SLR.

The literature offers several studies dealing with the SLR, but they are mainly local and country-level studies or macro-level studies, where countries are aggregated into large macro-regions. Perhaps the most employed model is DIVA (Vafeidis et al., 2008), which is an integrated model of coastal systems that assesses biophysical and socio-economic consequences of SLR.

2.1 Methodology

The latest IPCC Assessment Report (IPCC AR5) reports the global mean SLR (in meters) associated with the global mean surface temperature change (in °C), at the time intervals [2046-2065] and [2080-

2100]. These estimates, plotted in Figure 1, suggest that there exist a positive relationship between SLR and the increase in global mean surface temperature, but also a time component, related to the substantial inertia of the physical processes involved.
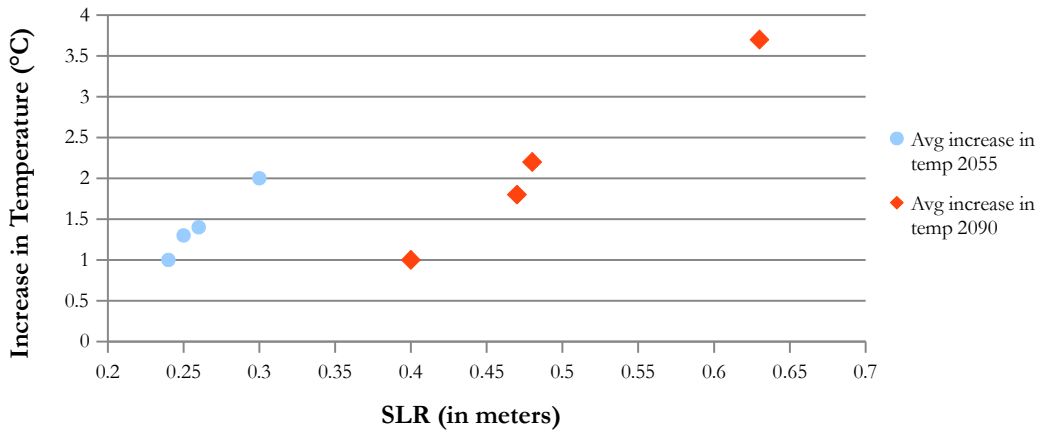

Figure 1. Global mean surface temperature change (°C) and global mean sea level rise (m)

To better understand the nature of the relationship between the global mean SLR, the increase in the mean global temperature and time, we ran a series of regressions, finding that the following equation provides a satisfactory fit for the relationship:

$$SLR = [(\alpha + \beta \Delta t)(T - 2000)] \tag{1}$$

where Δt is the change in average global temperature with respect to the baseline [1985-2005], and T is the year period. A panel estimation of equation (1) gives a value for the α coefficient of 0.000954281, whereas the corresponding value for β is 0.003421296.

To account for the vertical land movement (V), equation (1) can be modified as follows:

$$aSLR = [(\alpha + \beta \Delta t - V)(T - 2000)] \tag{2}$$

where $aSLR$ is the *adjusted* sea level rise. Data on VLM by country have been retrieved from the SONEL database (www.sonel.org).

For example, the adjusted SLR associated with an increase in temperature of +1°C and VLM of +0.001 m/yr (rising) at the year 2050 is:

$$0.16878 = [(0.000954281 + 0.003421296 \, x \, 1 - 0.001)(2050 - 2000)]$$

that is, about 0.17 meters.

Using the DIVA v2.04 model, Arnell et al. (2014) provide estimates of the percentage loss in the coastal wetland for 16 macro-regions and 3 single countries. These estimates, reported in Table 1, are associated with a future global mean SLR of 0.16 m, predicted by the HadCM3 climate model under the A1b SRES scenario.

Table 1. % change in coastal wetland at 0.16 m of SLR by macro-region (from Arnell et al. 2014)

Region/country	% change in coastal	Region/country	% change in coastal

	wetland by 0.16 m of SLR		wetland by 0.16 m of SLR
West Africa	-0.07	Australasia	-0.12
Central Africa	-0.13	North Africa	-0.21
East Africa	-0.12	West Asia	-0.22
South Africa	-0.17	West Europe	-0.17
South Asia	-0.1	Central Europe	-0.2
South-East Asia	-0.12	East Europe	-0.19
East Asia	-0.22	Canada	-0.06
Central Asia	0	USA	-0.24
Meso-America	-0.18	South America	-0.19
Brazil	-0.09	-	-

Each of the 140 GTAP9 database regions has been associated to one macro-region of Table 1. The percentage loss in coastal wetland (Table 1) has been multiplied by the percentage of erodible coast and applied to the whole coast. For the European regions, the shares of erodible coast have been obtained from the Eurosion project (www.eurosion.org), while for the remaining countries we have adopted the 70% value suggested by Bird (1987, 2010). Considering which fraction of total coast is suitable for agricultural and other productive activities we have estimated the fraction of agricultural land which is lost when SLR equals 0.16 meters. Scaling up, we got the share of productive land which is lost for one meter of SLR, labelled L_R. Data on coastline length are provided by the CIA database (www.cia.gov); data on the fraction of coast suitable for agricultural activities have been obtained from UNEP (2005).

The percentage change in the land stock by year and country, L_{RT}, is computed by multiplying the percentage of effective land change by meter of SLR, L_R, and the predicted adjusted SLR, as follows:

$$L_{RT} = L_R [(\alpha + \beta \Delta t - V_R)(T - 2000)] \tag{3}$$

Notice that the impact function (3) has four parameters. Two parameters (α, β) are common across all regions, two other parameters (L_R and V_R) are country/region specific.

Table A1 in the Appendix shows, for each GTAP9 region, the percentage loss of land by meter of SLR, corresponding to the parameter L_R in (3), and the vertical land motion (VLM), corresponding to the parameter V_R.

Table A2 in the Appendix illustrates the percentage losses of productive land endowments for +1, +2, +3, +4 and +5 °C increases in average temperature, at the years 2050 and 2100, for all 140 countries and regions. As one can see, relevant physical effects of SLR are concentrated in a few countries, in particular: small island states of Oceania, Central America and Asia, Hong Kong SAR, China, Japan, Singapore, Jamaica, Puerto Rico, Trinidad and Tobago, Cyprus, Croatia, Bahrain, Kuwait, Qatar, United Arab Emirates and Mauritius.

3. Climate change impact #2: Variation in crop yields (agricultural productivity)

Climate change is expected to bring about higher temperature, higher concentration of carbon dioxide in the atmosphere, and a different regional pattern of precipitation. These are all factors affecting crop yields and agricultural productivity. Not surprisingly, effects of climate change on agricultural production volumes are perhaps the most studied area of sectoral impacts.

Despite the many studies realized and the extensive empirical evidence produced, however, it is still difficult to identify some sort of "consensus" for the most likely impacts of climate change on agricultural productivity, especially for all world regions. This is because the issue is intrinsically complex and the eventual effect depends on several factors, which are difficult to evaluate ex-ante, for example: (i) the role of adaptation behavior by farmers, firms and organizations, including variety selection, crop rotation, sowing times, etc.; (ii) the amount of fertilization due to higher CO_2 concentration; (iii) the actual level of water available for irrigation, and irrigation techniques.

Some studies in this area are based on controlled experiments. Others are based on crop models applied to different crops in different regions and on the basis of different climate scenarios. This heterogenous information is summarized in the latest IPCC Assessment Report (2014), while efforts are under way to standardize the process of agronomic experiments and modeling (AgMIP, 2014).

Because of the heterogeneity of the underlying available information, we follow here two distinct approaches. The first approach, similar to the one adopted by Roson and Sartori (2010), relies on a meta-analysis provided in the Fifth IPCC Assessment Report (2014), providing central estimates for variations in the yields of maize, wheat and rice. We elaborate on these results to get estimates of productivity changes for these three crops, in all 140 regions and for the five levels of temperature increase, from +1°C to +5°C.

The second approach is similar to that of Cline (2007), and brings about an estimate of productivity changes for the whole agricultural sector in the various regions. The decision about which estimates to use in a general equilibrium simulation depends on the level of industrial disaggregation of the model. We suggest to use the first set of parameters if maize, wheat and rice are considered as separate industries, and the second set for the rest, or for the whole agricultural sector if this is regarded as a single aggregate industry.

3.1 Methodology

The IPCC AR5, similarly to the previous one, provides a graphical summary (Figure 7-4 in IPCC (2014)) for estimates of changes in productivity of maize, wheat and rice obtained by several studies. It distinguishes between tropical and temperate regions and identify a kind of non-linear interpolation function for the two cases, with and without simple agronomic adaptation. The figure is reproduced here below (Figure 2).
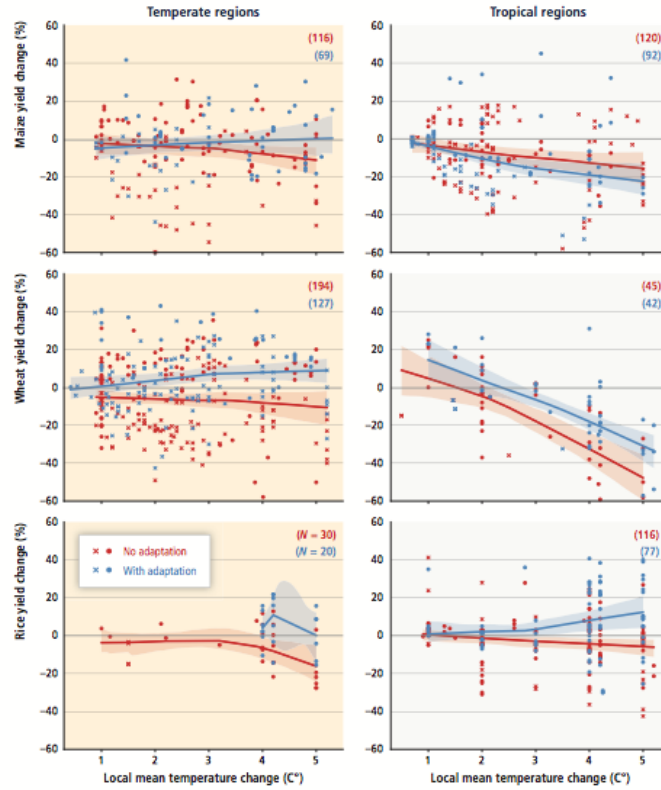
Figure 2. Percentage simulated yield change as a function of local temperature change (from IPCC(2014))

We first express the central values (without adaptation) of Figure 2 as percentage variations in the following table:

Table 2. Central values of the percentage simulated yield change as a function of local temperature change

	Temperate					Tropical				
	+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C
Maize	-1%	-3%	-4%	-7%	-11%	-4%	-8%	-10%	-12%	-14%
Wheat	-5%	-6%	-7%	-8%	-9%	4%	-4%	-20%	-34%	-44%
Rice	-4%	-3%	-2%	-7%	-16%	0%	-2%	-4%	-6%	-8%

We then associate the type of region (temperate or tropical) to its latitude, assuming that the reference tropical region has a central latitude of 0° (the equator) and the reference temperate region has a central latitude of 40° (North or South). We compute the percentage variation VY in the yield of crop C in a region with latitude L as:

$$VY(C,L) = VY(C,0) + (VY(C,40) - VY(C,0)) * L/40 \tag{4}$$

Therefore, we assume that the variation in the crop yield ranges linearly from its baseline value at the equator up (or down) to its value at 40° latitude and beyond. Considering the central latitude of all countries and regions in the GTAP9 dataset, we get the parameters shown in Table A3 of the Appendix.

A second and different methodology is based on the Mendelsohn and Schlesinger (1999) reduced form Agricultural Response Functions in the formulation proposed by Cline (2007), where the variation (DY) in output per hectare is expressed as a function of temperature T, precipitation P and CO2 concentration K:

$$DY = 115.992\,DT - 9.936\,DT^2 + 0.4752\,DP + 7.884\,DK/K \tag{5}$$

We need to link changes in yield to variations in average temperature only. To this purpose, we rely on temperature and precipitation data from the USGS Coupled Model Intercomparison Project Phase 5 (CMIP5) Global Climate Change Viewer (GCCV), averaging results from many Global Circulation Models[1]. We collected information on baseline levels and variation in average annual temperature and annual precipitation, by country, comparing the period 1980-2004 (central year 1992) with the period 2050-2074 (central year 2062) under the RCP 8.5 scenario. We also assume that from 1992 to 2062 (70 years) the concentration of CO2 rises (from a baseline level of 365 ppm) at an annual rate of 2.11 ppm.

We use the variation in temperature as an indicator, expressing how much the climate has changed. By dividing the country-specific variation in precipitation with the one of temperature we get a precipitation to temperature coefficient p. In the same way, we get a CO_2 concentration to temperature coefficient k, so that we can write:

$$DY = (115.992 + 0.4752\,p + 7.884\,k/365)\,DT - 9.936\,DT^2 \tag{6}$$

Finally, we need to transform DY to percentage changes DY/Y, which can be done by dividing DY by the output per hectare Y, in millions of dollars. Cline (2007) uses estimated values for the year 2003 which, unfortunately, vary widely (for example, from 29 in Australia to 8707 in the Republic of Korea), ultimately producing unrealistically volatile percentage changes for agricultural productivity.

Here we follow a different strategy, which is based on the "calibration" of the output per hectare Y. The latter is chosen so that the percentage change for +3°C is "in line" with a simple mathematical average of estimated variations in the yield of the three crops maize, wheat and rice, for the same temperature change. "In line" means in the range +/-1%, but conditional on a minimum level for Y of 500 and a maximum level of 10,000.

After calibrating the output per hectare, the percentage variation of agricultural output for 1, 2, 3, 4 and 5°C increases in temperature can be computed for each of the 140 GTAP9 countries and regions. The results are shown in Table A4 of the Appendix.

The variation in temperature refers to the average annual temperature specific to each country or region, which may differ from the variation in the global average temperature. On the basis of actual global and regional temperature variations, we estimated for each region a correction factor, which can be used to get an approximated regional variation in temperature through multiplication from the global change. These correction factors are displayed in Table A5 of the Appendix. When only information on the change in global temperature is available, one could therefore estimate the corresponding change in regional temperature using the correction factors.

A quick inspection of the table reveals that variations in regional temperature are typically wider at a higher latitude and whenever the region has limited or no access to the sea or ocean.

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1 http://regclim.coas.oregonstate.edu/visualization/gccv/cmip5-global-climate-change-viewer/

4. Climate change impact #3: Heat and labor productivity

Labor productivity is affected by working conditions. Heat stress, determined by high temperature and humidity, implies more frequent pauses, interruptions, lower speed and higher probability of injury (Tawasupa et. al., 2013). Even if acclimatization, on one hand, and protective measures like air conditioning, on the other hand, can help curbing the negative effects of heat stress, the effectiveness and applicability of any adaptation mean is limited and dependent on the context.

Previous work with the ENVISAGE model (Roson and van der Mensbrugghe, 2012), has shown that the impact of increased heat on average labor productivity can be substantial and, furthermore, very much differentiated between developing and developed countries.

To our knowledge, Kjellström et al. (2009) is the only paper investigating the relationship between climate change, heat stress and labor productivity at a global scale. Other works have considered local impacts, or produced regional maps of occupational heat exposure (Hyatt et al., 2010).

In this section we estimate heat damage functions, which are relationships between average temperature and labor productivity. The functions are estimated for three sectors: Agriculture (A), Manufacturing (M) and Services (S) and for 1, 2, 3, 4 and 5 °C increases in average temperature, bringing about a total of 140 x 3 x 5 = 2100 estimated parameter values.

4.1 Methodology

Most quantitative standards to protect workers from heat injury use the "wet bulb globe temperature" (WBGT) to define the percentage of a typical working hour that a person can work assuming the remaining time is rest. The heat exposure index WBGT (unit=°C) is a combination of the natural wet bulb temperature (measured with a wetted thermometer exposed to the wind and heat radiation at the site), the black globe temperature (measured inside a 150 mm diameter black globe), and the air temperature (measured with a "normal" thermometer shaded from direct heat radiation). Lemke and Kjellström (2012) propose a methodology to estimate the WBGT from meteorological data.
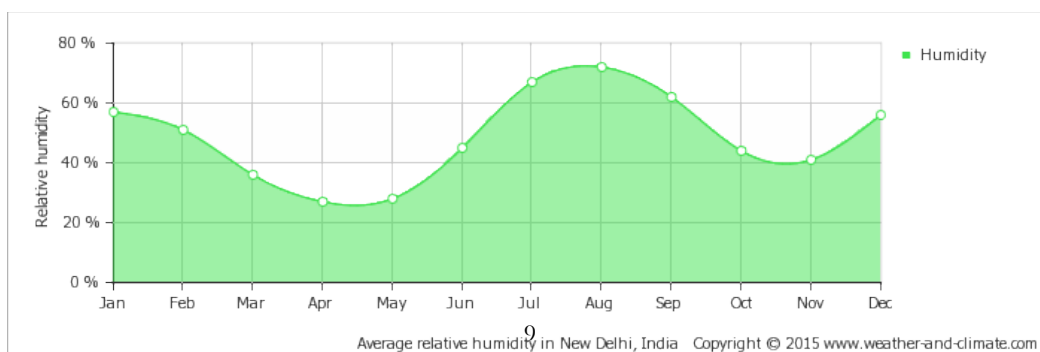
In this study, following Kjellström et al. (2009), we compute average monthly WBGT using average temperature and relative humidity, on the basis of the Australian Bureau of Meteorology equations:

$$WBGT = 0.567\,T + 3.94 + 0.393\,E \qquad (7)$$

$$E = (RH/100) \times 6.105 \times \exp(17.27\,T/(237.7 + T)) \qquad (8)$$

where T is the average air temperature in °C; E is the average absolute humidity (water vapour pressure) in hPa; and RH is the average relative humidity in %.

Monthly average temperature (and precipitation) by country has been obtained from the Weatherbase website (http://www.weatherbase.com/weather/countryall.php3). Unfortunately, data on average relative humidity is not generally available for all countries in our set, but only for specific locations (from http://www.weather-and-climate.com), for example New Delhi (Figure 3).

Average relative humidity in New Delhi, India   Copyright © 2015 www.weather-and-climate.com

In order to approximate the relative humidity from temperature and precipitation data, we ran a series of regressions, finding that the following equation provides a satisfactory estimation:

$$RH = 67.1082 - 0.8438\,T + 0.2305\,P - 0.0005\,P^2 \qquad\qquad (9)$$

where P is precipitation in mm.

Therefore, we have computed monthly WBGT for all countries, using temperature and precipitation, in order to assess labor productivity in the three sectors. Kjellström et al. (2009) produced a graph of "work ability" as the maximum percentage of an hour that a worker should be engaged working (Figure 4). The four curves represent four different work intensities. We assume that 200 W corresponds to office desk work and service industries; 300 W to average manufacturing industry work and 500 W to agricultural work.
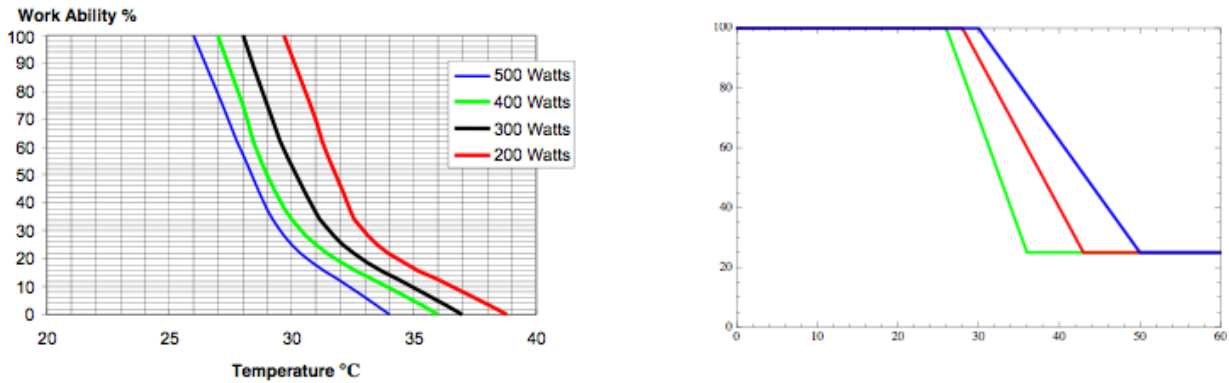
Figure 4. Work ability as a function of WBTG (°C) at four work intensities (Watts), acclimatized (left panel); rescaled (right panel)

We found that curves in Figure 4 (left panel) would give rise to a too rapid and unrealistic decline in productivity at high temperature, especially because we are considering here aggregate averages. We have therefore replaced the relationships depicted in the left panel of Figure 4 with the ones shown in the right panel of Figure 4. These are characterized by: (a) a minimum threshold, below which no heat effects are felt (26°C for Agriculture, 28°C for Manufacturing, 30°C for Services), (b) a minimum level of 25% for productivity, reached at 36°C for Agriculture, 43°C for Manufacturing and 50°C for Services.

We computed the percentage level of productivity for all months, sectors and countries. Monthly values have subsequently been aggregated in a yearly average, since economic flows in many CGE and other numerical models are expressed on an annual basis.

We scaled up temperature levels from 1 to 5 Celsius degrees, assuming that the monthly distribution of temperature will be unaffected and relative humidity stays the same. Finally, we computed the relative percentage change in (annual) productivity with respect to the baseline, for all countries and sectors.

4.2 Results Overview

Table A6 in the Appendix presents our estimates for the 140 countries and regions in the GTAP data base. Column headers refer to the sectors (S, M, A) and to the increment in temperature (1, 2, 3, 4 and 5 °C).

The boxplots in Figure 5 display the distribution of impacts on labor productivity for the three sectors, for the various changes in temperature. In the services, impacts are minimal for a +1°C increase, with a mean of -0.17% (maximum impact -1.67% in Thailand), but no impacts for 108 out of 140 regions. At five degrees, some effects are felt in about half of the regions (73), with a mean of -3.71% and maximum impact -18.16% in Singapore. For the manufacturing industries, the effects are more significant, but the distributions are still very much skewed, with 88 regions with no impacts for +1°C, 47 for +5%. The mean percentage variation in labor productivity ranges from -0.90% to -8.12%. The most significant effects are perceived in Singapore, from -5.96% to -31.46%. Agriculture is the sector most significantly affected by higher heat stress. Some effects are felt by about half of the countries (73) already at +1°C, but at +5°C only those countries located at sufficiently high latitudes (32) do not experience reductions in labor productivity. The mean percentage variation ranges from -2.52% to -17.48%.
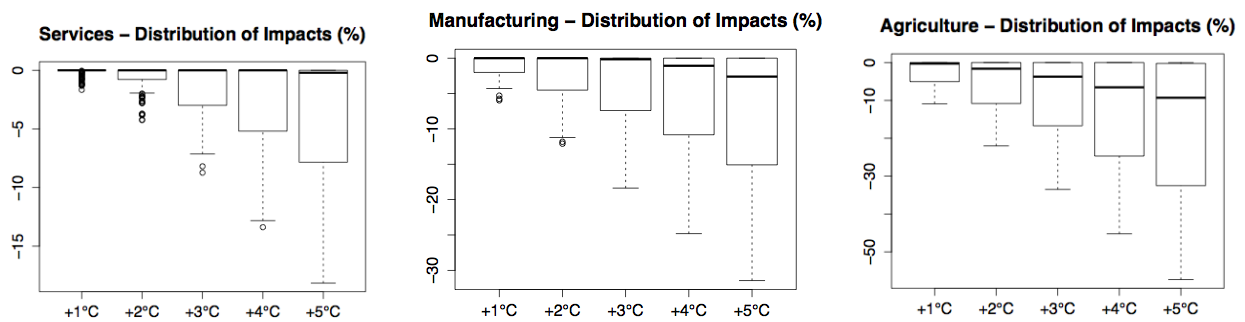
Figure 5. Distribution of impacts on labor productivity in the three sectors, for the various changes in temperature

5. Climate change impact #4: Human Health

This section describes the methodology and presents some estimates of the effects of increases in temperature on labor productivity, due to changes in mortality and morbidity incidence of some diseases.

The approach follows the one in Bosello, Roson and Tol (2006) by considering some vector-borne diseases (malaria, dengue, schistomiasis), heat and cold related diseases, and diarrhea. It does not consider other diseases and impacts mentioned in the IPCC AR5 (2014), like effects of extreme events, heat exposure effects on labor productivity (separately considered), hemorrhagic fever with renal syndrome, plague, chikungunya fever, japanese and tick-borne encephalitis, cholera and other (non-diarrhea) enteric infections, air quality and nutrition related diseases, allergic diseases, mental health.

Because of lack of data, it is not possible to ascertain possible non-linear impacts of temperature, so the results are expressed as changes in average labor productivity for a +1°C increase in temperature (implicitly assuming that the relationship is approximately linear). Also, the focus is on impacts on labor productivity, whereas other impacts, like those on private and public expenditure for health services, or non-market impacts (e.g., value of life for retired persons) are not taken into account.

We consider only the direct effect of temperature on the incidence of the various diseases, despite the fact that other variables (most notably economic development expressed through income levels) are very important (especially for vector-borne and diarrhea illnesses). To this end, the projected income levels at the year 2050 are taken as reference values for determining the degree of vulnerability in each region. This method implies that indirect effects on human health are not taken into account. For instance, climate change could bring about a reduction of income and a worsening of living conditions, making a society more vulnerable to the direct effects on health.

5.1 Methodology

The starting point of the analysis presented in Bosello, Roson and Tol (2006), which is in turn based on Tol (2002), is a survey of the epidemiological, medical and interdisciplinary literature, with the aim of obtaining best estimates for the number of extra cases of mortality and morbidity (for a set of diseases) associated with a given increase in average temperature. These estimates often specify the distribution of cases in the age/sex structure of a population, as well as the length of the illness period (if applicable).

This information can therefore be combined with data on the structure of the working population, to infer the number of lost working days or other variables. For example, Bosello, Roson and Tol (2006), present the following Table 3, expressing the "additional years of life diseased in 2050 by region and disease".

Table 3. Additional years of life diseased in 2050 by region and disease

	Malaria	Schistom.	Dengue	Cardio	Respiratory	Diarrhea	TOT
USA	0	0	0	-167,357	22,257	83,070	-62,030
Europe Un.	0	0	0	-171,908	20,936	25,608	-125,364
E.E.F.S.U.	0	0	0	-259,884	46,884	57,717	-155,283
Japan	0	0	0	-65,353	33,161	912	-31,280
Rest Ann.I	0	0	0	-45,232	11,108	1,361	-32,763
Energy Exp.	7,219	-1,088	29	-66,363	1,706,267	112,633	1,758,697
China India	632	0	0	-1,119,902	770,340	156,271	-192,659
Rest World	232,737	-154,375	203	-194,383	3,683,042	834,294	44,01,518

In this study, we review the most recent literature on health impacts, and in particular some studies mentioned in IPCC (2014), to modify the figures contained in Table 3 above, with the aim of scaling up or down the variation in labor productivity calculated by Roson and Sartori (2010). For example, the change in labor productivity assumed for Japan, for +1°C, was +0.034%, which corresponds to the -31280 decrease in diseased years in Table 3. Our updated estimates for the number of diseased years in Japan point to an *increase* in the number of years (+57894), corresponding to a change in labor productivity of -0.063%.

The procedure is slightly more complicated if several countries are included in the same macro-region, especially if those estimates of changes in productivity showed in Roson and Sartori (2010) have different sign. In this case, the original estimates are still multiplied by a correction factor, but the magnitude of the factor is determined by a mathematical optimization software, ensuring that the average variation in productivity for the whole group is consistent with the updated figures of diseased years.

For malaria, our primary source is Béguin et al. (2011), who suggest that extra cases of malaria, net of the effect due to income growth, should only be found in Africa and China/India. Correspondingly, we set to zero the impact for Energy Exporting Countries, while increasing by 1/3 the number of cases (diseased years) in Africa and China/India.

For schistomiasis, it is unclear why in the original estimates by Tol (2002) an increase in temperature should produce a decrease in the number of cases, if the effect of temperature is considered net of the impact of higher income levels. Actually, some studies highlight that climate change is expected to create the conditions for a potential spreading of the disease in some regions, for example in China (Zhou et al., 2008). Therefore, we decide to disregard any impact for schistomiasis, by putting zeros in the corresponding column.

Dengue is the most rapidly spreading mosquito-borne viral disease, showing a 30-fold increase in global incidence over the past 50 years (WHO, 2013). However, according to Åström et al. (2012) the geographic distribution of dengue is strongly dependent on both climatic and socioeconomic variables. They present a model showing that, under a scenario of constant per capita GDP, global climate change results in a modest but important increase in the global population at risk of dengue. Under scenarios of high GDP growth, this adverse effect of climate change is counteracted by the beneficial effect of socioeconomic development. With higher income sets at projected 2050 levels, the vulnerability to dengue fever is rather low. We accommodate for this information by concentrating all extra cases of dengue in Africa, and by setting the figures of diseased years at 10% of their original levels in the benchmark Table 3.

Among heat-related illnesses we consider, in line with Tol (2002), respiratory and a share of cardiovascular diseases. As the recent literature on heat risks for health (e.g., Honda et al. 2013) does not present very significant changes from earlier estimates, the contribution of heat-related diseases to the overall variation in labor productivity has been kept unchanged. The same reasoning applies to health impacts of changes in diarrhea cases (Kolstad and Johansson, 2011).

On the contrary, our assumptions about cold-related diseases are dramatically different. In Bosello, Roson and Tol (2006), consistently with Table 3, a reduction of cold-related cases brings about a reduction of mortality/morbidity in most countries, and an increase in labor productivity. However, the recent epidemiological literature has questioned the finding of a positive effect of higher temperature levels on winter mortality and morbidity. For example, Ebi and Mills (2013) argue that although there is a physiological basis for increased cardiovascular and respiratory disease mortality during winter months, the limited evidence suggests cardiovascular disease mortality is only weakly associated with temperature. This is because several illnesses have a strong seasonal component, in which relative temperature, not absolute temperature, actually matters. Correspondingly, we disregard any effect of climate change on cold-related diseases. This has very important implications for our estimates, because now all health impacts become negative in all countries.

The estimated percentage variation of labor productivity for 140 regions and for a +1°C increase in temperature is presented in Table A7 of the Appendix. The unweighed average is -0.27%, and the range is from -0.75% (India, Nepal and Sri Lanka) to 0% (Canada).

The variations can be grouped in 32 classes. Figure 6 displays the number of countries in each class. The three most numerous classes are: -0.631% (African countries), -0.034% (Western Europe), -0.135% (Central America).
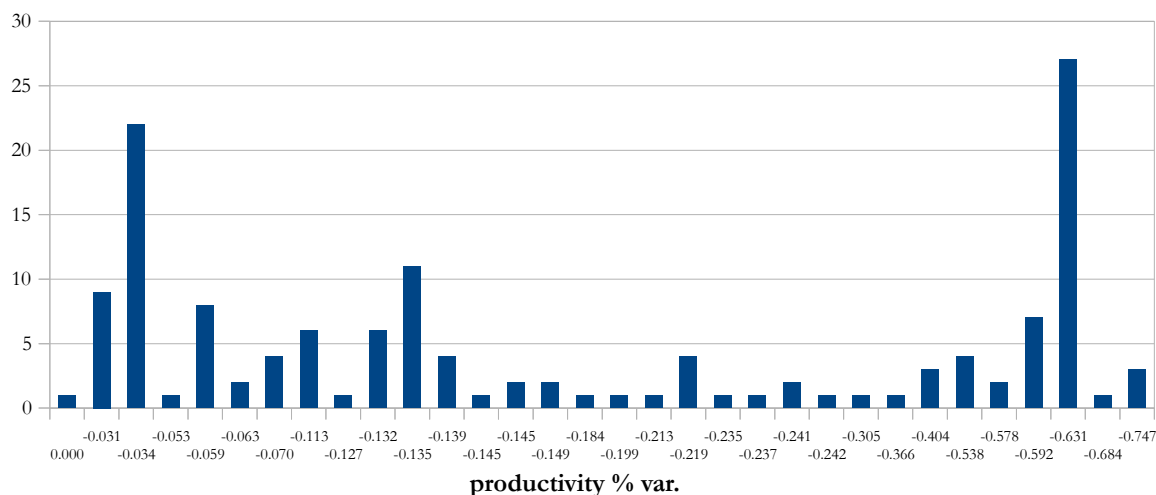

Figure 6. Number of countries in each class

6. Climate change impact #5: Tourism

Climate is one of the main drivers of international tourism, and tourism revenue is a fundamental pillar of the economy in many countries. It is surprising that the tourism literature pays little attention to climate and climatic change and, when it does so, the analysis is typically based on local case studies.

It is equally surprising that the climate change impact literature pays little attention to tourism. Previous work with the ENVISAGE model (Roson and van der Mensbrugghe, 2012) has shown that the impact of changing tourism attractiveness can be substantial, bringing about a sizable redistribution of income among various countries.

Perhaps the only study conducting a quantitative assessment of climate impacts on international tourism flows, at a global scale, is Hamilton, Maddison and Tol (2005). We start from some functions and parameters computed in this study to elaborate data on arrivals, departures, temperature and expenditure. The ultimate goal is estimating a relationship between average temperature changes and net inflow of foreign currency and expenditure of foreign tourists in the hosting country.

6.1 Methodology

Hamilton, Maddison and Tol (2005) have built an econometric model for the estimation of international tourism flows. They used econometric techniques to estimate parameters of two functions. In the first function, the logarithm of yearly arrivals of tourists in a country is expressed as a function of land area, average temperature, length of coastline and per capita income. In a second function, the logarithm of the ratio of departures over population is expressed as a function of temperature, income, land area and number of countries with shared land borders.

We take these two functional relationships to get equations linking arrivals (A) and departures (D) in a region solely to its average temperature (T), in Celsius degrees:

$$A = K_A \times \exp\left(0.22\,T - 0.00791\,T^2\right) \tag{10}$$

$$D = K_D \times \exp\left(-0.18\,T + 0.00438\,T^2\right) \tag{11}$$

where K_A and K_D are country-specific constants, accounting for all other factors different from temperature. We calibrate these parameters on the basis of regional data on yearly arrivals, departures and average temperature.

We can see that both relationships are non-linear. The maximum number of arrivals is obtained at the optimal average temperature of 13.9°C. The minimum number of departures is obtained at 18.6°C. For increases in temperature below the 13.9°C threshold, arrivals increase and departures decrease, therefore a country gets a beneficial net inflow of foreign currency. The opposite is found for increases in temperature above the 18.6°C threshold. For variations between 13.9°C and 18.6°C, effects are ambiguous, not only because arrivals and departures push to different directions, but also because the average expenditure level of an incoming tourist may be different from the expenditure level of an outgoing tourist[2].

We estimated changes in arrivals and departures for 1, 2, 3, 4 and 5 °C increases in average temperature from its baseline level, for all 140 countries and regions. Variations in arrivals multiplied by per capita expenditure minus variations in departures multiplied by per capita expenditure give a first estimate of changes in net foreign currency inflow.

Of course, changes can be be both positive and negative. Furthermore, summing up all changes does not typically gives a zero result. However, as it will be made clearer in Sub-section 6.3, if foreign currency flows are interpreted as international income transfers, we would actually need to impose that all variations sum up to one.

To this end, we scaled up or down all our estimates, by subtracting the average net inflow if positive, or adding it if it turns out to be negative. One possible interpretation of this ex-post rescaling is in terms of relative competitiveness, since flows are not only affected by local conditions, but also by conditions in competing destinations.

6.2 Results overview

Our rescaled estimates of changes in net foreign currency inflows, relative to the 2011 GDP level, are displayed in Table A8 of the Appendix. These variations follows a rather non-linear path. Limited increases of temperature are beneficial but higher levels are detrimental in China, the Republic of Korea, Italy and Turkey. Vice versa, initial negative impacts turn positive at +5°C in Mongolia, Estonia, Lithuania, Slovak Republic, Slovenia, Bulgaria, Belarus, Romania and Kazakhstan.

Benefits are concentrated in a few countries. For example, at +3°C only 26 countries get an increase in tourism revenue, whereas as many as 97 countries experience a relative loss. Benefitted countries include North European and North American countries, Japan and the Russian Federation, which are all rich nations: tourism impacts have adverse distributional consequences.

Furthermore, the dispersion of income flows gets larger as temperature rises. The standard deviation of the distribution of net revenue inflows increases progressively from about 1.48 billions US$ at +1°C up to around 5.36 billions US$ at +5°C.

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2 We estimated per capita expenditure data on the basis of IMF data on tourism revenue (IMF, 2014).

6.3 Inclusion of Tourism Impacts in a CGE Model

Our estimates of net currency inflows are meant to be used as inputs in a CGE model, assessing economic impacts of climate change. The exogenous shock can be inserted as a variation in international income transfers and, possibly, as a shift in the pattern of final consumption.

Most CGE models are based on a "territorial" definition of income. In other words, GDP rather than GNP is taken as the reference value for income and other macroeconomic variables. This implies that there is no distinction between nationals and foreigners when income is spent inside a country boundaries. However, the purchasing power of foreigners comes from income generated abroad. In order to consider this important aspect, Berrittella et al. (2006) and Bigano et al. (2008) simulate the occurrence of some international income transfers, whose magnitude corresponds to the estimated change in net currency inflows.

Since foreign tourists are unlikely to have a structure of consumption similar to that of the representative household in a country, a further step is simulating an exogenous increase (or decrease) in the consumption of tourism (hotels, restaurants, recreation facilities) and domestic transport services, which can be implemented by inserting some shifting parameters in the final demand for these items.

7. Climate change impact #6: Household Energy Demand

Household energy demand is directly affected by variations in temperature. This relationship is rather complex, as the impact on energy consumption depends on the season, the source of energy and the climatic condition of the country.

For instance, an increase in winter temperatures would cause a decrease in energy used for heating purposes, whereas an increase in summer temperatures is likely to cause an increase of energy consumed for cooling purposes, depending on the latitude of the country (i.e., tropical, temperate, cold).

In what follows, the impact of increasing average temperature on energy demand is computed, taking into account all these factors.

7.1 Methodology

Our estimates are based on De Cian, Lanzi and Roson (2013), who computed parameters of a model for household energy demand, by energy source and season, using econometric techniques and a global panel database. Energy demand is expressed as dependent, among other factors, on the (natural logarithm of) seasonal average temperature, expressed in °F.

Seasonal long run temperature elasticities by energy source and by climate region (Table 4) are those estimated by De Cian, Lanzi and Roson (2013.). Since we are interested in the variation of total energy demand, elasticities in Table 4 have been scaled down by considering the share of energy used for heating and cooling purposes (Table 5). The adjusted elasticities are shown in Table 6.

Data on average seasonal temperature by country are obtained from the Weather Database (www.weatherbase.com), whereas each country has been classified as Cold, Mild or Hot, according to its latitude.[3] Applying the model estimated by De Cian, Lanzi and Roson (2013), to the percentage variation in temperature corresponding to 1°C (and 2, 3, 4, 5°C) increase in seasonal average temperature has been multiplied by the elasticities reported in Table 6.

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3 Hot countries: latitude<27°; mild countries: 27°<latitude<63°; cold countries: latitude>63°. For aggregated regions the latitude has been computed as a weighted sum of the latitude of each single country.

7.2 Result overview

Table A9 in the Appendix shows our estimates of the percentage variations in household energy demand corresponding to a +1, +2, +3, +4 and +5°C increase in the average seasonal temperature. Estimates are provided for the 140 GTAP9 regions, but they are available for more countries.

A quick inspection of the table reveals that: (i) household demand for electricity rises, especially in the hot countries, as this source of energy is mainly used for air conditioning. The highest relative growth is expected in the African countries; (ii) household demand for energy from oil products dramatically decreases in all countries, especially in cold countries; (iii) the effect on household demand for energy from gas is positive (negative) in mild and cold (hot) countries.

Table 4. Long run temperature elasticities from De Cian et al. (2013)

Season	Climate	Electr.	Gas	Oil.P.
Winter	*Cold*	-0.085	-0.422	-0.406
	Mild	-0.085	-0.422	-0.406
	Hot	-0.085	-0.422	-0.406
Spring	*Cold*	0.522	0.686	-0.395
	Mild	-0.077	0.686	-0.395
	Hot	0.263	0.686	-0.395
Summer	*Cold*	-0.321	-1.008	-0.912
	Mild	0.2	-1.008	-0.912
	Hot	0.174	-1.008	-0.912
Fall	*Cold*	-	0.685	0.0002
	Mild	-	0.685	0.0002
	Hot	-	0.685	0.0002

Table 5. Share of energy demanded for heating and cooling purposes, by energy source and climate region.
Source: U.S. Residential Energy Demand Database (www.eia.gov)

Climate	Electricity		Gas	Oil P.
	Heating	Cooling	Heating	Heating
Cold	8%	5%	72%	88%
Mild	9%	17%	56%	86%
Hot	7%	28%	48%	86%

Table 6. Adjusted long run temperature elasticities

Season	Climate	Electr.	Gas	Oil.P.
Winter	Cold	-0.0111	-0.3053	-0.3558
	Mild	-0.0221	-0.2345	-0.3496
	Hot	-0.0300	-0.2008	-0.3496
Spring	Cold	0.0682	0.4962	-0.3462
	Mild	-0.0200	0.3812	-0.3401
	Hot	0.0929	0.3264	-0.3401
Summer	Cold	-0.0419	-0.7292	-0.7993
	Mild	0.0519	-0.5602	-0.7853
	Hot	0.0614	-0.4797	-0.7853
Fall	Cold	-	0.4955	0.0002
	Mild	-	0.3807	0.0002
	Hot	-	0.3260	0.0002

8. Aggregation of impacts and first-order effects on GDP

The illustration of our estimates for the different impacts of the climate change has made clear that the impacts are different in sign, magnitude and relevance for the various countries and regions. Therefore, it would be interesting to see what is the net aggregate effect, for example in terms of real income or GDP, of the combined impacts.

A full fledged analysis of this kind would require a global, disaggregated macroeconomic model, in which our estimates would be employed to shock exogenous parameters. For instance, an exogenous reduction in agricultural productivity would reduce the relative competitiveness for the domestic agricultural sector, increasing imports from abroad, inducing a real devaluation, expanding production and exports in manufacturing and services.

Such kind of analysis is beyond the scope of this paper. Nonetheless, we can provide here a first-order approximation of the impact on the real GDP, because most of the impacts affect variables which are components of the Gross Domestic Product, with the exception of the variation in energy demand. Because of that, an approximated impact on the GDP can be readily obtained by multiplying the variation of one GDP component by its share, and in particular:

- impacts of sea level rise on GDP can be gauged by multiplying the estimated changes in available land resources by the share of land rents income on total GDP;
- agricultural productivity variations can be evaluated by multiplying the changes by the share of agricultural value added on total GDP;
- the reduction in labor productivity due to heat stress has an effect on the GDP that can be estimated as the sum of variations in labor productivity in the three sectors (agriculture, manufacturing, services) multiplied by the shares of (sectoral) labor income on total GDP;
- human health effects can be obtained by multiplying the estimated changes by the share of labor income on total GDP;
- the net inflow of foreign currency due to tourism flows can be directly expressed as relative to a baseline GDP level.

Even if the sum of the different impacts on GDP is only limited to first-order effects and does not consider general equilibrium feedbacks, we believe that such an approximation of the composite GDP footprint could reveal important insights about the order of magnitude, relevance, and distribution of

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the various impacts. Tables 7-1 and 7-2 present our estimates, corresponding to an increase in average temperature of +3°C[4] for the five categories above and their total algebraic sum. We highlight with a green background color the positive net variations in GDP, with a yellow background moderate reductions (from -1% to -5%) and with a red background the large reductions (below -5%). In addition, we identify, for each country, which among the three types of impact is the one which contributes the most to the overall effect on GDP.[5]

A quick inspection of Tables 7-1 and 7-2 reveals a number of thought-provoking facts. Only a few countries (Mongolia, Canada, and central-northern European countries, including Russia) are expected to get moderate gains from a +3°C increase in temperature, and these gains are typically due to an increase in tourists' arrivals (and diminished outgoing domestic tourists). Many countries (whose estimates are highlighted in red) are expected to suffer from dramatic reductions in GDP. The most negatively affected countries are Togo in Africa (-18.29%) and Cambodia in South-East Asia (-18.25%), where again Tourism is the most important factor.

In addition to tourism income, variations in agricultural and labor productivity are also very relevant in many countries. Sea level rise, on the other hand, never appears as the primary factor, because of its limited incidence on total land and the relative small share of land income on GDP. Remarkably, Tourism is (possibly with Heat) the least studied effect of climate change, maybe because it causes a redistribution of income and wealth, but it has negligible consequences at the global level.

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4 This refers to changes in the global average temperature. For agricultural productivity, we consider regional variations, which could be larger or smaller than the global one. Furthermore, sea level rise does not depend only on temperature levels, but on time. For this estimation, we set the year 2100 as the one corresponding to the +3°C temperature increment.
5 Therefore, it has the same sign of the total variation.

Table 7-1. Impact on GDP of +3°C by country

N	Code	SLR	AGR	HEAT	HEALTH	TOURISM	Incidence on GDP of +3°C	Dominant impact
1	AUS	0.0000%	-0.1686%	-0.0162%	-0.2370%	-0.5029%	**-0.92%**	TOURISM
2	NZL	-0.0005%	-0.0975%	0.0000%	-0.2073%	0.1806%	**-0.12%**	HEALTH
3	XOC	-0.0095%	-0.3135%	-1.3971%	-0.3030%	0.0000%	-2.02%	HEAT
4	CHN	0.0000%	0.1975%	-0.5449%	-0.8164%	0.0890%	-1.07%	HEALTH
5	HKG	-0.0118%	-0.0480%	-1.6329%	-0.7237%	-5.2541%	-7.67%	TOURISM
6	JPN	-0.0005%	-0.0765%	-0.2334%	-0.0967%	0.0205%	**-0.39%**	HEAT
7	KOR	-0.0006%	-0.1113%	-0.2600%	-0.0843%	0.2123%	**-0.24%**	HEAT
8	MNG	0.0000%	0.5520%	0.0000%	-0.4409%	0.9466%	1.06%	TOURISM
9	TWN	-0.0004%	-0.1019%	-2.4258%	-0.9099%	-2.0929%	-5.53%	HEAT
10	XEA	-0.0010%	-0.3961%	-4.2472%	-0.1915%	0.0000%	-4.84%	HEAT
11	BRN	-0.0001%	-0.0059%	-2.0021%	-0.1206%	-2.6786%	-4.81%	TOURISM
12	KHM	-0.0002%	-2.1774%	-5.2924%	-0.1315%	-10.6492%	-18.25%	TOURISM
13	IDN	-0.0010%	-1.1587%	-4.7511%	-0.1790%	-0.7110%	-6.80%	HEAT
14	LAO	0.0000%	-3.5049%	-4.1597%	-0.1425%	-5.7644%	-13.57%	TOURISM
15	MYS	-0.0005%	-0.7494%	-4.8378%	-0.1816%	-4.4406%	-10.21%	HEAT
16	PHL	-0.0028%	-0.9965%	-4.6830%	-0.1445%	-1.5898%	-7.42%	HEAT
17	SGP	-0.0020%	-0.0200%	-4.4945%	-0.2987%	-5.9202%	-10.74%	TOURISM
18	THA	-0.0001%	-0.7803%	-3.7029%	-0.1419%	-4.5046%	-9.13%	TOURISM
19	VNM	-0.0006%	-1.3580%	-3.3932%	-0.1501%	-2.1889%	-7.09%	HEAT
20	XSE	-0.0010%	-3.2015%	-6.4740%	-0.1549%	0.0000%	-9.83%	HEAT
21	BGD	-0.0001%	-1.2004%	-3.2480%	-0.2020%	-0.3383%	-4.99%	HEAT
22	IND	-0.0001%	-1.3077%	-3.3046%	-1.0484%	-0.5829%	-6.24%	HEAT
23	NPL	0.0000%	-0.0773%	-1.1111%	-0.9108%	-1.8753%	-3.97%	TOURISM
24	PAK	0.0000%	-1.7497%	-1.2167%	-0.0985%	-0.2498%	-3.31%	AGR
25	LKA	-0.0008%	-1.3164%	-2.9340%	-0.8583%	-1.2886%	-6.40%	HEAT
26	XSA	0.0000%	-1.9427%	-2.8045%	-0.1434%	0.0000%	-4.89%	HEAT
27	CAN	-0.0001%	0.1723%	0.0000%	0.0000%	1.1003%	1.27%	TOURISM
28	USA	0.0000%	0.0159%	-0.0048%	-0.2896%	0.1152%	**-0.16%**	HEALTH
29	MEX	0.0000%	-0.3420%	-0.1530%	-0.2326%	-0.4177%	-1.15%	TOURISM
30	XNA	-0.0033%	0.0118%	-0.0037%	-0.3277%	0.0000%	**-0.32%**	HEALTH
31	ARG	0.0000%	-0.2384%	-0.1037%	-0.3114%	-0.2509%	**-0.90%**	HEALTH
32	BOL	0.0000%	-1.3641%	0.0000%	-0.1476%	-1.3293%	-2.84%	AGR
33	BRA	0.0000%	-0.5921%	-0.8644%	-0.3432%	-0.3293%	-2.13%	HEAT
34	CHL	-0.0002%	0.0103%	0.0000%	-0.2737%	0.0007%	**-0.26%**	HEALTH
35	COL	-0.0001%	-0.7781%	-0.9717%	-0.1258%	-0.6461%	-2.52%	HEAT
36	ECU	-0.0004%	-1.0763%	0.0000%	-0.1526%	-0.7002%	-1.93%	AGR
37	PRY	0.0000%	-1.9012%	-2.2562%	-0.1768%	-1.4291%	-5.76%	HEAT
38	PER	-0.0002%	-1.4078%	0.0000%	-0.1868%	-0.3127%	-1.91%	AGR
39	URY	-0.0001%	-0.4524%	-0.0572%	-0.2972%	-1.3583%	-2.17%	TOURISM
40	VEN	-0.0001%	-0.6564%	-0.9783%	-0.1686%	-0.3473%	-2.15%	HEAT
41	XSM	-0.0013%	-0.4069%	-0.0462%	-0.1470%	0.0000%	**-0.60%**	AGR
42	CRI	-0.0011%	-0.8385%	-1.9108%	-0.2989%	-3.1429%	-6.19%	TOURISM
43	GTM	-0.0002%	-1.4468%	-0.3188%	-0.1860%	-1.6208%	-3.57%	TOURISM
44	HND	-0.0005%	-1.3208%	-4.0728%	-0.1931%	-3.5740%	-9.16%	HEAT
45	NIC	-0.0006%	-1.8717%	-5.0354%	-0.1958%	-5.0277%	-12.13%	HEAT
46	SLV	-0.0002%	-0.6504%	-2.7781%	-0.1926%	-1.4962%	-5.12%	HEAT
47	PAN	-0.0019%	-1.2835%	-0.9629%	-0.1481%	-7.1071%	-9.50%	TOURISM
48	XCA	-0.0044%	-1.1027%	-3.3145%	-0.1863%	0.0000%	-4.61%	HEAT
49	DOM	-0.0006%	-0.6860%	-1.8276%	-0.1301%	-4.2142%	-6.86%	TOURISM
50	JAM	-0.0006%	-0.3236%	-2.3722%	-0.1938%	-8.4870%	-11.38%	TOURISM
51	PRI	-0.0006%	-0.1014%	-1.6726%	-0.1793%	-0.7814%	-2.74%	HEAT
52	TTO	-0.0009%	-0.1245%	-2.4513%	-0.1207%	-2.1839%	-4.88%	HEAT
53	XCB	-0.0017%	-0.5995%	-3.3617%	-0.2107%	-3.6624%	-7.84%	TOURISM
54	AUT	0.0000%	0.0197%	0.0000%	-0.0472%	1.9809%	1.95%	TOURISM
55	BEL	0.0000%	0.0062%	0.0000%	-0.0482%	1.2519%	1.21%	TOURISM
56	CYP	-0.0004%	-0.4306%	-0.1406%	-0.0426%	-3.9984%	-4.61%	TOURISM
57	CZE	0.0000%	0.0369%	0.0000%	-0.0383%	1.4414%	1.44%	TOURISM
58	DNK	0.0000%	0.0271%	0.0000%	-0.0506%	1.8480%	1.82%	TOURISM
59	EST	0.0000%	0.1165%	0.0000%	-0.0379%	2.1074%	2.19%	TOURISM
60	FIN	0.0000%	0.1317%	0.0000%	-0.0471%	1.3954%	1.48%	TOURISM
61	FRA	0.0000%	0.0002%	0.0000%	-0.0501%	0.3515%	0.30%	TOURISM
62	DEU	0.0000%	0.0115%	0.0000%	-0.0530%	0.7933%	0.75%	TOURISM
63	GRC	-0.0001%	-0.2039%	-0.0545%	-0.0329%	-1.0597%	-1.35%	TOURISM
64	HUN	0.0000%	0.0191%	0.0000%	-0.0376%	0.9476%	0.93%	TOURISM
65	IRL	0.0000%	0.0116%	0.0000%	-0.0404%	0.7150%	0.69%	TOURISM
66	ITA	0.0000%	-0.1355%	0.0000%	-0.0417%	-0.0005%	**-0.18%**	AGR
67	LVA	0.0000%	0.1817%	0.0000%	-0.0396%	0.8261%	0.97%	TOURISM
68	LTU	0.0000%	0.1642%	0.0000%	-0.0379%	0.9750%	1.10%	TOURISM
69	LUX	0.0000%	0.0057%	0.0000%	-0.0497%	2.8828%	2.84%	TOURISM
70	MLT	-0.0001%	-0.1480%	-0.0711%	-0.0361%	-6.2965%	-6.55%	TOURISM

Table 7-2. Impact on GDP of +3°C by country

N	Code	SLR	AGR	HEAT	HEALTH	TOURISM	Incidence on GDP of +3°C	Dominant impact
71	NLD	0.0000%	0.0103%	0.0000%	-0.0506%	0.7591%	0.72%	TOURISM
72	POL	0.0000%	0.0511%	0.0000%	-0.0405%	0.9494%	0.96%	TOURISM
73	PRT	0.0000%	-0.1230%	0.0000%	-0.0486%	-0.7612%	-0.93%	TOURISM
74	SVK	0.0000%	0.0359%	0.0000%	-0.0392%	1.2305%	1.23%	TOURISM
75	SVN	0.0000%	0.0273%	0.0000%	-0.0523%	1.3031%	1.28%	TOURISM
76	ESP	0.0000%	-0.1623%	0.0000%	-0.0521%	-0.5523%	-0.77%	TOURISM
77	SWE	0.0000%	0.0566%	0.0000%	-0.0516%	1.7159%	1.72%	TOURISM
78	GBR	0.0000%	0.0099%	0.0000%	-0.0551%	0.6373%	0.59%	TOURISM
79	CHE	0.0000%	0.0151%	0.0000%	-0.0665%	1.4678%	1.42%	TOURISM
80	NOR	-0.0001%	0.0756%	0.0000%	-0.0487%	1.4445%	1.47%	TOURISM
81	XEF	0.0000%	0.0364%	0.0000%	-0.0742%	0.0000%	-0.04%	HEALTH
82	ALB	-0.0002%	-0.5880%	-0.0018%	-0.0837%	-1.8545%	-2.53%	TOURISM
83	BGR	0.0000%	-0.2314%	0.0000%	-0.0836%	1.0793%	0.76%	TOURISM
84	BLR	0.0000%	0.1365%	0.0000%	-0.1016%	0.1481%	0.18%	TOURISM
85	HRV	-0.0059%	-0.1818%	0.0000%	-0.0475%	-0.4174%	-0.65%	TOURISM
86	ROU	0.0000%	0.0507%	0.0000%	-0.0406%	0.2620%	0.27%	TOURISM
87	RUS	-0.0001%	0.2438%	0.0000%	-0.0620%	1.2058%	1.39%	TOURISM
88	UKR	0.0000%	0.0614%	0.0000%	-0.0829%	0.9421%	0.92%	TOURISM
89	XEE	0.0000%	0.0685%	0.0000%	-0.0887%	0.0000%	-0.02%	HEALTH
90	XER	0.0000%	0.0479%	0.0000%	-0.0396%	0.0000%	0.01%	AGR
91	KAZ	0.0000%	0.0489%	0.0000%	-0.0843%	0.3404%	0.31%	TOURISM
92	KGZ	0.0000%	0.7822%	0.0000%	-0.0638%	-1.7649%	-1.05%	TOURISM
93	XSU	0.0000%	0.1312%	0.0000%	-0.0568%	0.0000%	0.07%	AGR
94	ARM	0.0000%	0.2216%	0.0000%	-0.0714%	0.0175%	0.17%	AGR
95	AZE	0.0000%	-0.5908%	-0.0988%	-0.0414%	-0.1307%	-0.86%	AGR
96	GEO	-0.0003%	0.1385%	-0.0522%	-0.0843%	-1.9215%	-1.92%	TOURISM
97	BHR	-0.0005%	-0.0683%	-1.1748%	-0.4204%	-3.2314%	-4.90%	TOURISM
98	IRN	0.0000%	-0.4277%	-0.1860%	-0.1181%	-0.0843%	-0.82%	AGR
99	ISR	0.0000%	-0.1655%	-0.0400%	-1.2584%	-0.7563%	-2.22%	HEALTH
100	JOR	0.0000%	-0.3556%	-0.1463%	-0.5373%	-4.0531%	-5.09%	TOURISM
101	KWT	0.0000%	-0.0182%	-0.7005%	-0.2407%	-1.5365%	-2.50%	TOURISM
102	OMN	0.0000%	-0.0558%	-0.7102%	-0.3094%	-1.5583%	-2.63%	TOURISM
103	QAT	-0.0001%	-0.0346%	-1.2702%	-0.3952%	-0.8283%	-2.53%	HEAT
104	SAU	0.0000%	-0.0700%	-1.4904%	-0.5016%	-1.2991%	-3.36%	HEAT
105	TUR	-0.0001%	-0.4687%	0.0000%	-0.3499%	-0.0075%	-0.83%	AGR
106	ARE	-0.0002%	-0.1686%	-1.3851%	-0.4344%	-2.8718%	-4.86%	TOURISM
107	XWS	0.0000%	-0.7620%	-0.2868%	-0.1673%	0.0000%	-1.22%	AGR
108	EGY	-0.0005%	-1.1341%	-0.6905%	-0.4656%	-1.5531%	-3.84%	TOURISM
109	MAR	-0.0001%	-1.1070%	-0.0555%	-0.7353%	-1.8221%	-3.72%	TOURISM
110	TUN	-0.0001%	-0.7579%	-0.2464%	-0.5286%	-1.5935%	-3.13%	TOURISM
111	XNF	0.0000%	-0.3463%	-0.1242%	-0.4551%	0.0000%	-0.93%	HEALTH
112	BEN	0.0000%	-2.2061%	-5.8667%	-0.7895%	-4.7655%	-13.63%	HEAT
113	BFA	0.0000%	-2.3843%	-5.8824%	-0.6710%	-2.9330%	-11.87%	HEAT
114	CMR	0.0000%	-2.4157%	-2.6122%	-1.0351%	-2.0672%	-8.13%	HEAT
115	CIV	0.0000%	-2.6715%	-7.3540%	-1.1743%	-1.8351%	-13.03%	HEAT
116	GHA	0.0000%	-2.5318%	-7.6143%	-1.2015%	-1.8443%	-13.19%	HEAT
117	GIN	0.0000%	-2.2525%	-2.4491%	-0.5128%	-4.9416%	-10.16%	TOURISM
118	NGA	0.0000%	-4.0968%	-8.2096%	-0.9791%	-0.6444%	-13.93%	HEAT
119	SEN	0.0000%	-1.5615%	-3.6766%	-0.6634%	-3.6789%	-9.58%	TOURISM
120	TGO	0.0000%	-2.9926%	-6.7908%	-0.8777%	-7.6318%	-18.29%	TOURISM
121	XWF	0.0000%	-1.5088%	-3.9966%	-0.5685%	0.0000%	-6.07%	HEAT
122	XCF	0.0000%	-0.4709%	-0.8100%	-0.6294%	-0.4675%	-2.38%	HEAT
123	XAC	0.0000%	-0.9863%	-0.0461%	-0.7702%	0.0000%	-1.80%	AGR
124	ETH	0.0000%	-3.4512%	0.0000%	-0.8943%	-1.4763%	-5.82%	AGR
125	KEN	0.0000%	-2.8648%	-0.1698%	-0.9299%	-1.6563%	-5.62%	AGR
126	MDG	-0.0002%	-2.9062%	-2.5131%	-0.9861%	-3.5947%	-10.00%	TOURISM
127	MWI	0.0000%	-2.6408%	-1.5485%	-0.9422%	-4.6332%	-9.76%	TOURISM
128	MUS	-0.0009%	-0.7158%	-2.1495%	-0.8996%	-8.3783%	-12.14%	TOURISM
129	MOZ	-0.0001%	-1.1773%	-2.7128%	-0.9728%	-3.0178%	-7.88%	TOURISM
130	RWA	0.0000%	-3.7427%	0.0000%	-1.0299%	-4.8945%	-9.67%	TOURISM
131	TZA	-0.0001%	-2.5945%	-1.4315%	-1.0207%	-3.7480%	-8.79%	TOURISM
132	UGA	0.0000%	-2.3230%	-0.3320%	-0.8564%	-4.0730%	-7.58%	TOURISM
133	ZMB	0.0000%	-1.1479%	-0.4776%	-1.1182%	-1.5571%	-4.30%	TOURISM
134	ZWE	0.0000%	-0.9073%	-0.1290%	-0.7963%	-2.9613%	-4.79%	TOURISM
135	XEC	0.0000%	-1.2136%	-2.4070%	-0.9955%	0.0000%	-4.62%	HEAT
136	BWA	0.0000%	-0.5257%	-0.3916%	-0.7531%	-1.7062%	-3.38%	TOURISM
137	NAM	0.0000%	-0.9395%	-0.0747%	-0.7110%	-3.3564%	-5.08%	TOURISM
138	ZAF	0.0000%	-0.2159%	-0.0003%	-0.8577%	-0.5198%	-1.59%	HEALTH
139	XSC	0.0000%	-1.0459%	-0.0015%	-0.7656%	0.0000%	-1.81%	AGR
140	XTW	-0.0013%	-0.1252%	0.0000%	-0.7543%	0.0000%	-0.88%	HEALTH

It is also evident that effects are similar among similar countries, that is when they belong to the same region or are characterized by comparable socio-economic conditions. Figure 7 presents a scatter plot of total percentage variations of GDP against per capita income levels. The correlation between these two variables is positive and as large as 0.445, confirming a robust finding from previous studies (e.g. Eboli, Parrado and Roson, 2010, Roson and van der Mensbrugghe, 2012) that climate change impacts act like a highly regressive tax, often making poor countries poorer, and rich countries richer.
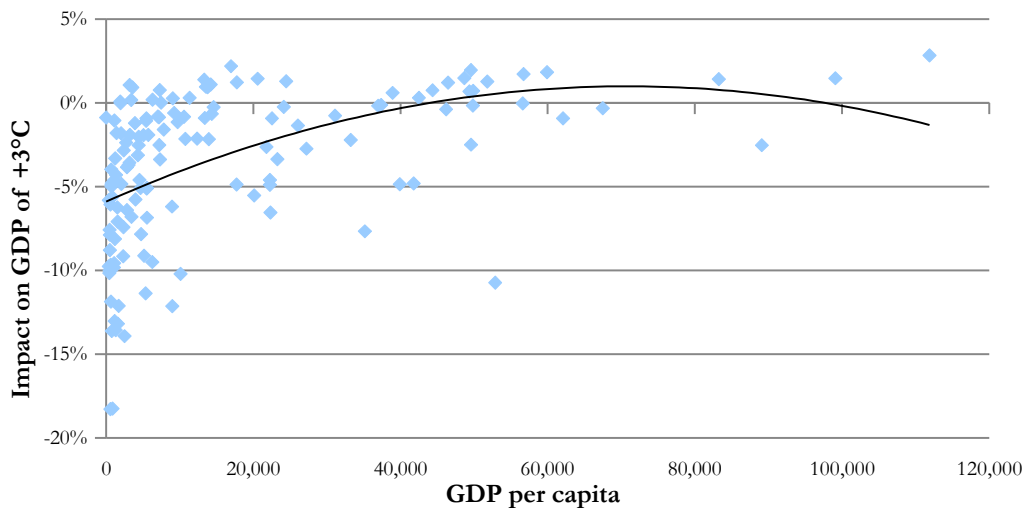
Figure 7. **P**ercentage variation of GDP against per capita income level

It is known that economic development is itself correlated with geographical location and temperature: in contemporary data, national income falls 8.5% per degree Celsius in the world cross-section (Dell, Jones and Olken, 2009). We do not discuss here any causality or interpretation for this correlation. Rather, we show in Figures 8 and 9 another two scatter plots, this time contrasting GDP variations with average temperature and latitude. The corresponding correlation factors are, respectively, -0.785 and 0.732.
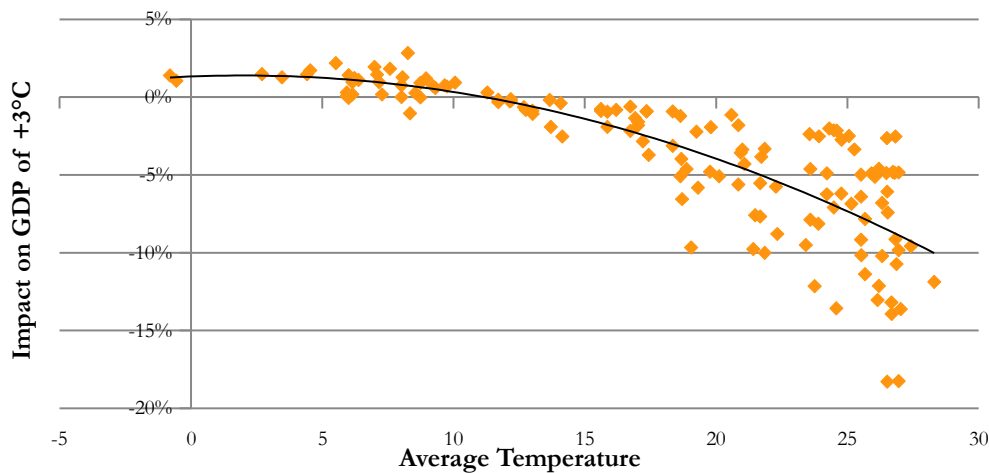
Figure 8. Percentage variation of GDP against average temperature
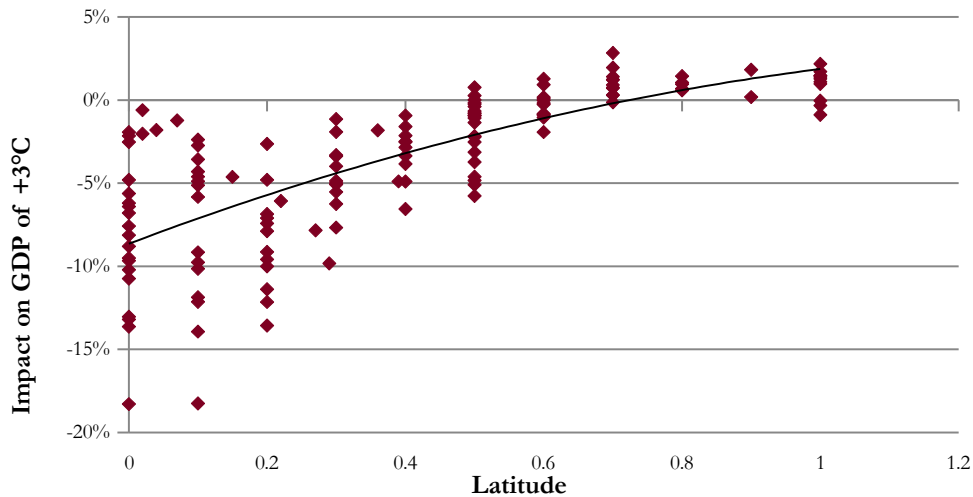
Figure 9. Percentage variation of GDP against latitude

9. Conclusion

In this paper, a new set of climate change damage functions has been presented, improving earlier estimates in several ways. First, functions and parameters are provided with a large regional disaggregation (140 countries) and in a format which, by referring to the latest GTAP social accounting matrix, makes them easily employable in many general equilibrium models. Information from new, recently available studies, mostly from the non economic literature, has been processed in such a way that parameter values for economic variables, like labor productivity, can be estimated. Because of the wealth of primary data utilized in this exercise, it has also been possible to detect non-linearities in many impacts of climate change.

Although our estimates are mostly intended for use in multi-sectoral macroeconomic models, we undertook a simple aggregation procedure to verify the order of magnitude of the various impacts, as well as their distribution. Our findings confirm that the negative effects of climate change will be mainly borne by developing countries, located in tropical regions.

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Appendix

Table A0. Country codes.

Number	Code	Description	Number	Code	Description
1	AUS	Australia	71	NLD	Netherlands
2	NZL	New Zealand	72	POL	Poland
3	XOC	Rest of Oceania	73	PRT	Portugal
4	CHN	China	74	SVK	Slovak Republic
5	HKG	Hong Kong SAR, China	75	SVN	Slovenia
6	JPN	Japan	76	ESP	Spain
7	KOR	South Korea	77	SWE	Sweden
8	MNG	Mongolia	78	GBR	United Kingdom
9	TWN	Taiwan, China	79	CHE	Switzerland
10	XEA	Rest of East Asia	80	NOR	Norway
11	BRN	Brunei Darassalam	81	XEF	Rest of EFTA
12	KHM	Cambodia	82	ALB	Albania
13	IDN	Indonesia	83	BGR	Bulgaria
14	LAO	Lao People's Democratic Republic	84	BLR	Belarus
15	MYS	Malaysia	85	HRV	Croatia
16	PHL	Philippines	86	ROU	Romania
17	SGP	Singapore	87	RUS	Russian Federation
18	THA	Thailand	88	UKR	Ukraine
19	VNM	Vietnam	89	XEE	Rest of Eastern Europe
20	XSE	Rest of Southest Asia	90	XER	Rest of Europe
21	BGD	Bangladesh	91	KAZ	Kazakhstan
22	IND	India	92	KGZ	Kyrgyzstan
23	NPL	Nepal	93	XSU	Rest of Former Soviet Union
24	PAK	Pakistan	94	ARM	Armenia
25	LKA	Sri Lanka	95	AZE	Azerbaijan
26	XSA	Rest of South Asia	96	GEO	Georgia
27	CAN	Canada	97	BHR	Bahrain
28	USA	United States	98	IRN	Iran, Islamic Republic of
29	MEX	Mexico	99	ISR	Israel
30	XNA	Rest of North America	100	JOR	Jordan
31	ARG	Argentina	101	KWT	Kuwait
32	BOL	Bolivia	102	OMN	Oman
33	BRA	Brazil	103	QAT	Qatar
34	CHL	Chile	104	SAU	Saudi Arabia
35	COL	Colombia	106	TUR	Turkey
36	ECU	Ecuador	105	ARE	United Arab Emirates
37	PRY	Paraguay	107	XWS	Rest of Western Asia
38	PER	Peru	108	EGY	Egypt, Arab Rep.
39	URY	Uruguay	109	MAR	Marocco
40	VEN	Venezuela, RB	110	TUN	Tunisia
41	XSM	Rest of South America	111	XNF	Rest of North Africa
42	CRI	Costa Rica	112	BEN	Benin
43	GTM	Guatemala	113	BFA	Burkina Faso
44	HND	Honduras	114	CMR	Cameroon
45	NIC	Nicaragua	115	CIV	Cote d'Ivoire
46	SLV	El Salvador	116	GHA	Ghana
47	PAN	Panama	117	GIN	Guinea
48	XCA	Rest of Central America	118	NGA	Nigeria
49	DOM	Dominican Republic	119	SEN	Senegal
50	JAM	Jamaica	120	TGO	Togo
51	PRI	Puerto Rico	121	XWF	Rest of Western Africa
52	TTO	Trinidad and Tobago	122	XCF	Rest of Central Africa
53	XCB	Caribbean	123	XAC	Rest of South Central Africa
54	AUT	Austria	124	ETH	Ethiopia
55	BEL	Belgium	125	KEN	Kenya
56	CYP	Cyprus	126	MDG	Madagascar
57	CZE	Czech Republic	127	MWI	Malawi
58	DNK	Denmark	128	MUS	Mauritius
59	EST	Estonia	129	MOZ	Mozambique
60	FIN	Finland	130	RWA	Rwanda
61	FRA	France	131	TZA	Tanzania
62	DEU	Germany	132	UGA	Uganda
63	GRC	Greece	133	ZMB	Zambia
64	HUN	Hungary	134	ZWE	Zimbabwe
65	IRL	Ireland	135	XEC	Rest of Eastern Africa
66	ITA	Italy	136	BWA	Botswana
67	LVA	Latvia	137	NAM	Namibia
68	LTU	Lithuania	138	ZAF	South Africa
69	LUX	Luxembourg	139	XSC	Rest of South African Customs Union
70	MLT	Malta	140	XTW	Rest of the World

Table A1. Sea level rise: percentage change of land stock by meter of SLR and VLM. Countries with asterisk do not have coastline.

N.	Code	% of land change by meter of SLR	VLM (m/yr)	N.	Code	% of land change by meter of SLR	VLM (m/yr)
1	AUS	-0.0026%	-0.0009	71	NLD	-0.0021%	-0.0005
2	NZL	-0.0567%	-0.0014	72	POL	-0.0010%	
3	XOC	-0.5611%	-0.0010	73	PRT	-0.0069%	-0.0005
4	CHN	-0.0013%	0.0017	74	SVK*	0.0000%	
5	HKG	-4.6796%	0.0017	75	SVN	-0.0046%	
6	JPN	-0.2873%	0.0006	76	ESP	-0.0011%	-0.0006
7	KOR	-0.0614%	0.0007	77	SWE	-0.0013%	0.0056
8	MNG*	0.0000%		78	GBR	-0.0094%	0.0004
9	TWN	-0.0715%	0.0010	79	CHE*	0.0000%	
10	XEA	-0.0422%		80	NOR	-0.0296%	0.0018
11	BRN	-0.3443%		81	XEF	-0.0016%	0.0064
12	KHM	-0.0019%		82	ALB	-0.0056%	
13	IDN	-0.0256%	0.0033	83	BGR	-0.0010%	
14	LAO*	0.0000%		84	BLR*	0.0000%	
15	MYS	-0.0145%		85	HRV	-0.2170%	
16	PHL	-0.0750%	0.0027	86	ROU	-0.0004%	
17	SGP	-6.8252%		87	RUS	-0.0067%	-0.0001
18	THA	-0.0039%		88	UKR	-0.0020%	0.0002
19	VNM	-0.0082%		89	XEE*	0.0000%	
20	XSE	-0.0051%		90	XER	-0.0025%	0.0001
21	BGD	-0.0013%		91	KAZ*	0.0000%	
22	IND	-0.0008%	0.0003	92	KGZ*	0.0000%	
23	NPL*	0.0000%		93	XSU*	0.0000%	
24	PAK	-0.0008%		94	ARM*	0.0000%	
25	LKA	-0.0105%		95	AZE*	0.0000%	
26	XSA	-0.0003%	0.0000	96	GEO	-0.0047%	
27	CAN	-0.0381%	0.0029	97	BHR	-0.8829%	
28	USA	-0.0023%	-0.0010	98	IRN	-0.0023%	0.0016
29	MEX	-0.0033%	-0.0009	99	ISR	-0.0237%	0.0021
30	XNA	-2.2812%	0.0011	100	JOR	-0.0012%	
31	ARG	-0.0021%	0.0014	101	KWT	-0.1477%	
32	BOL*	0.0000%		102	OMN	-0.0529%	0.0004
33	BRA	-0.0008%	0.0003	103	QAT	-0.3812%	
34	CHL	-0.0252%	-0.0006	104	SAU	-0.0007%	0.0002
35	COL	-0.0047%	-0.0022	106	TUR	-0.0082%	0.0002
36	ECU	-0.0186%	-0.0005	105	ARE	-0.1082%	
37	PRY*	0.0000%		107	XWS	-0.0028%	
38	PER	-0.0070%		108	EGY	-0.0351%	0.0001
39	URY	-0.0028%		109	MAR	-0.0031%	-0.0002
40	VEN	-0.0081%		110	TUN	-0.0059%	
41	XSM	-0.0888%	0.0013	111	XNF	-0.0025%	
42	CRI	-0.0420%		112	BEN	-0.0006%	-0.0020
43	GTM	-0.0056%	0.0006	113	BFA*	0.0000%	
44	HND	-0.0151%	0.0022	114	CMR	-0.0014%	
45	NIC	-0.0104%		115	CIV	-0.0004%	
46	SLV	-0.0116%		116	GHA	-0.0006%	0.0013
47	PAN	-0.0648%		117	GIN	-0.0004%	
48	XCA	-0.1487%		118	NGA	-0.0002%	
49	DOM	-0.0308%		119	SEN	-0.0010%	
50	JAM	-0.1333%		120	TGO	-0.0003%	
51	PRI	-0.1568%	-0.0012	121	XWF	-0.0004%	
52	TTO	-0.3925%		122	XCF	-0.0007%	0.0013
53	XCB	-0.0832%	-0.0009	123	XAC	-0.0007%	
54	AUT*	0.0000%		124	ETH*	0.0000%	
55	BEL	-0.0013%	0.0006	125	KEN	-0.0006%	-0.0017
56	CYP	-0.1232%	0.0000	126	MDG	-0.0048%	
57	CZE*	0.0000%		127	MWI*	0.0000%	
58	DNK	-0.0210%	0.0008	128	MUS	-0.0798%	
59	EST	-0.0001%	0.0044	129	MOZ	-0.0021%	
60	FIN	0.0000%	0.0065	130	RWA*	0.0000%	
61	FRA	-0.0020%	-0.0002	131	TZA	-0.0016%	0.0020
62	DEU	-0.0021%	0.0007	132	UGA*	0.0000%	
63	GRC	-0.0260%		133	ZMB*	0.0000%	
64	HUN*	0.0000%		134	ZWE*	0.0000%	
65	IRL	-0.0037%		135	XEC	-0.0012%	-0.0037
66	ITA	-0.0082%	0.0003	136	BWA*	0.0000%	
67	LVA	-0.0054%	0.0017	137	NAM	-0.0017%	
68	LTU	-0.0004%		138	ZAF	-0.0012%	-0.0001
69	LUX*	0.0000%		139	XSC	0.0000%	
70	MLT	-0.0423%		140	XTW	-0.4119%	0.0018

Table A2-1. Sea level rise: percentage losses of land for +1, +2, +3, +4 and +5 °C, years 2050 and 2100. Values lower than -0.1% in red.

N.	Code	2050					2100				
		+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C
1	AUS	-0.0007%	-0.0011%	-0.0016%	-0.0020%	-0.0025%	-0.0014%	-0.0023%	-0.0032%	-0.0041%	-0.0050%
2	NZL	-0.0163%	-0.0260%	-0.0357%	-0.0454%	-0.0551%	-0.0326%	-0.0520%	-0.0714%	-0.0908%	-0.1102%
3	XOC	-0.1505%	-0.2465%	-0.3424%	-0.4384%	-0.5344%	-0.3009%	-0.4929%	-0.6849%	-0.8769%	-1.0688%
4	CHN	-0.0002%	-0.0004%	-0.0006%	-0.0008%	-0.0010%	-0.0003%	-0.0008%	-0.0012%	-0.0016%	-0.0021%
5	HKG	-0.6151%	-1.4156%	-2.2161%	-3.0166%	-3.8171%	-1.2302%	-2.8312%	-4.4322%	-6.0333%	-7.6343%
6	JPN	-0.0549%	-0.1041%	-0.1532%	-0.2023%	-0.2515%	-0.1098%	-0.2081%	-0.3064%	-0.4047%	-0.5030%
7	KOR	-0.0112%	-0.0217%	-0.0322%	-0.0427%	-0.0532%	-0.0224%	-0.0433%	-0.0643%	-0.0853%	-0.1063%
8	MNG*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
9	TWN	-0.0121%	-0.0243%	-0.0366%	-0.0488%	-0.0610%	-0.0242%	-0.0487%	-0.0731%	-0.0976%	-0.1221%
10	XEA	-0.0092%	-0.0164%	-0.0237%	-0.0309%	-0.0381%	-0.0185%	-0.0329%	-0.0473%	-0.0617%	-0.0762%
11	BRN	-0.0753%	-0.1342%	-0.1931%	-0.2520%	-0.3109%	-0.1506%	-0.2684%	-0.3862%	-0.5040%	-0.6217%
12	KHM	-0.0004%	-0.0008%	-0.0011%	-0.0014%	-0.0018%	-0.0009%	-0.0015%	-0.0022%	-0.0028%	-0.0035%
13	IDN	-0.0014%	-0.0058%	-0.0102%	-0.0146%	-0.0189%	-0.0028%	-0.0116%	-0.0203%	-0.0291%	-0.0379%
14	LAO*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
15	MYS	-0.0032%	-0.0056%	-0.0081%	-0.0106%	-0.0131%	-0.0063%	-0.0113%	-0.0162%	-0.0212%	-0.0262%
16	PHL	-0.0064%	-0.0192%	-0.0320%	-0.0449%	-0.0577%	-0.0128%	-0.0384%	-0.0641%	-0.0897%	-0.1154%
17	SGP	-1.4932%	-2.6608%	-3.8283%	-4.9959%	-6.1634%	-2.9864%	-5.3215%	-7.6566%	-9.9917%	-12.3268%
18	THA	-0.0009%	-0.0015%	-0.0022%	-0.0029%	-0.0035%	-0.0017%	-0.0031%	-0.0044%	-0.0057%	-0.0071%
19	VNM	-0.0018%	-0.0032%	-0.0046%	-0.0060%	-0.0074%	-0.0036%	-0.0064%	-0.0092%	-0.0120%	-0.0148%
20	XSE	-0.0011%	-0.0020%	-0.0028%	-0.0037%	-0.0046%	-0.0022%	-0.0040%	-0.0057%	-0.0074%	-0.0092%
21	BGD	-0.0003%	-0.0005%	-0.0007%	-0.0009%	-0.0011%	-0.0006%	-0.0010%	-0.0014%	-0.0019%	-0.0023%
22	IND	-0.0002%	-0.0003%	-0.0004%	-0.0006%	-0.0007%	-0.0003%	-0.0006%	-0.0009%	-0.0011%	-0.0014%
23	NPL*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
24	PAK	-0.0002%	-0.0003%	-0.0005%	-0.0006%	-0.0007%	-0.0004%	-0.0006%	-0.0009%	-0.0012%	-0.0015%
25	LKA	-0.0023%	-0.0041%	-0.0059%	-0.0077%	-0.0095%	-0.0046%	-0.0082%	-0.0118%	-0.0154%	-0.0189%
26	XSA	-0.0001%	-0.0001%	-0.0002%	-0.0002%	-0.0003%	-0.0001%	-0.0003%	-0.0004%	-0.0005%	-0.0006%
27	CAN	-0.0027%	-0.0092%	-0.0158%	-0.0223%	-0.0288%	-0.0054%	-0.0185%	-0.0315%	-0.0445%	-0.0576%
28	USA	-0.0006%	-0.0010%	-0.0014%	-0.0018%	-0.0022%	-0.0013%	-0.0021%	-0.0029%	-0.0037%	-0.0045%
29	MEX	-0.0009%	-0.0014%	-0.0020%	-0.0026%	-0.0031%	-0.0018%	-0.0029%	-0.0040%	-0.0052%	-0.0063%
30	XNA	-0.3788%	-0.7690%	-1.1592%	-1.5494%	-1.9397%	-0.7575%	-1.5380%	-2.3184%	-3.0989%	-3.8793%
31	ARG	-0.0003%	-0.0007%	-0.0011%	-0.0014%	-0.0018%	-0.0006%	-0.0014%	-0.0021%	-0.0028%	-0.0036%
32	BOL*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
33	BRA	-0.0002%	-0.0003%	-0.0004%	-0.0006%	-0.0007%	-0.0003%	-0.0006%	-0.0009%	-0.0012%	-0.0014%
34	CHL	-0.0063%	-0.0106%	-0.0149%	-0.0192%	-0.0235%	-0.0125%	-0.0212%	-0.0298%	-0.0384%	-0.0470%
35	COL	-0.0015%	-0.0023%	-0.0031%	-0.0039%	-0.0047%	-0.0031%	-0.0046%	-0.0062%	-0.0078%	-0.0094%
36	ECU	-0.0046%	-0.0077%	-0.0109%	-0.0141%	-0.0173%	-0.0091%	-0.0155%	-0.0218%	-0.0282%	-0.0345%
37	PRY*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
38	PER	-0.0015%	-0.0027%	-0.0039%	-0.0051%	-0.0063%	-0.0030%	-0.0054%	-0.0078%	-0.0102%	-0.0126%
39	URY	-0.0006%	-0.0011%	-0.0015%	-0.0020%	-0.0025%	-0.0012%	-0.0022%	-0.0031%	-0.0040%	-0.0050%
40	VEN	-0.0018%	-0.0032%	-0.0045%	-0.0059%	-0.0073%	-0.0035%	-0.0063%	-0.0091%	-0.0119%	-0.0146%
41	XSM	-0.0136%	-0.0288%	-0.0440%	-0.0592%	-0.0744%	-0.0272%	-0.0576%	-0.0880%	-0.1184%	-0.1488%
42	CRI	-0.0092%	-0.0164%	-0.0235%	-0.0307%	-0.0379%	-0.0184%	-0.0327%	-0.0471%	-0.0614%	-0.0758%
43	GTM	-0.0011%	-0.0020%	-0.0030%	-0.0039%	-0.0049%	-0.0021%	-0.0040%	-0.0059%	-0.0078%	-0.0097%
44	HND	-0.0017%	-0.0042%	-0.0068%	-0.0094%	-0.0120%	-0.0033%	-0.0085%	-0.0137%	-0.0188%	-0.0240%
45	NIC	-0.0023%	-0.0040%	-0.0058%	-0.0076%	-0.0093%	-0.0045%	-0.0081%	-0.0116%	-0.0152%	-0.0187%
46	SLV	-0.0025%	-0.0045%	-0.0065%	-0.0085%	-0.0105%	-0.0051%	-0.0090%	-0.0130%	-0.0169%	-0.0209%
47	PAN	-0.0142%	-0.0253%	-0.0363%	-0.0474%	-0.0585%	-0.0283%	-0.0505%	-0.0727%	-0.0948%	-0.1170%
48	XCA	-0.0325%	-0.0580%	-0.0834%	-0.1088%	-0.1343%	-0.0651%	-0.1159%	-0.1668%	-0.2176%	-0.2685%
49	DOM	-0.0067%	-0.0120%	-0.0173%	-0.0226%	-0.0278%	-0.0135%	-0.0240%	-0.0346%	-0.0451%	-0.0557%
50	JAM	-0.0292%	-0.0519%	-0.0747%	-0.0975%	-0.1203%	-0.0583%	-0.1039%	-0.1495%	-0.1951%	-0.2407%
51	PRI	-0.0435%	-0.0703%	-0.0972%	-0.1240%	-0.1508%	-0.0870%	-0.1406%	-0.1943%	-0.2480%	-0.3016%
52	TTO	-0.0859%	-0.1530%	-0.2201%	-0.2873%	-0.3544%	-0.1717%	-0.3060%	-0.4403%	-0.5745%	-0.7088%
53	XCB	-0.0221%	-0.0363%	-0.0506%	-0.0648%	-0.0790%	-0.0442%	-0.0726%	-0.1011%	-0.1296%	-0.1580%
54	AUT*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
55	BEL	-0.0002%	-0.0005%	-0.0007%	-0.0009%	-0.0011%	-0.0005%	-0.0009%	-0.0014%	-0.0018%	-0.0022%
56	CYP	-0.0270%	-0.0481%	-0.0692%	-0.0903%	-0.1113%	-0.0540%	-0.0962%	-0.1384%	-0.1805%	-0.2227%
57	CZE*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
58	DNK	-0.0037%	-0.0073%	-0.0109%	-0.0145%	-0.0181%	-0.0075%	-0.0147%	-0.0219%	-0.0291%	-0.0363%
59	EST	0.0000%	0.0000%	-0.0001%	-0.0001%	-0.0001%	0.0000%	-0.0001%	-0.0001%	-0.0002%	-0.0002%
60	FIN	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
61	FRA	-0.0004%	-0.0008%	-0.0011%	-0.0015%	-0.0018%	-0.0009%	-0.0016%	-0.0022%	-0.0029%	-0.0036%
62	DEU	-0.0004%	-0.0008%	-0.0011%	-0.0015%	-0.0018%	-0.0008%	-0.0015%	-0.0022%	-0.0030%	-0.0037%
63	GRC	-0.0057%	-0.0101%	-0.0146%	-0.0190%	-0.0235%	-0.0114%	-0.0203%	-0.0292%	-0.0380%	-0.0469%
64	HUN*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
65	IRL	-0.0008%	-0.0014%	-0.0021%	-0.0027%	-0.0033%	-0.0016%	-0.0029%	-0.0041%	-0.0054%	-0.0066%
66	ITA	-0.0017%	-0.0031%	-0.0045%	-0.0059%	-0.0073%	-0.0034%	-0.0062%	-0.0090%	-0.0118%	-0.0146%
67	LVA	-0.0007%	-0.0017%	-0.0026%	-0.0035%	-0.0044%	-0.0015%	-0.0033%	-0.0052%	-0.0070%	-0.0089%
68	LTU	-0.0001%	-0.0002%	-0.0002%	-0.0003%	-0.0004%	-0.0002%	-0.0003%	-0.0005%	-0.0007%	-0.0008%
69	LUX*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
70	MLT	-0.0093%	-0.0165%	-0.0237%	-0.0309%	-0.0382%	-0.0185%	-0.0330%	-0.0474%	-0.0619%	-0.0764%

Table A2-2. Sea level rise: percentage losses of land for +1, +2, +3, +4 and +5 °C, years 2050 and 2100. Values lower than -0.1% in red.

N.	Code	2050					2100				
		+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C
71	NLD	-0.0005%	-0.0009%	-0.0012%	-0.0016%	-0.0019%	-0.0010%	-0.0017%	-0.0024%	-0.0031%	-0.0038%
72	POL	-0.0002%	-0.0004%	-0.0006%	-0.0007%	-0.0009%	-0.0004%	-0.0008%	-0.0011%	-0.0014%	-0.0018%
73	PRT	-0.0017%	-0.0029%	-0.0041%	-0.0053%	-0.0064%	-0.0034%	-0.0058%	-0.0081%	-0.0105%	-0.0129%
74	SVK*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
75	SVN	-0.0010%	-0.0018%	-0.0026%	-0.0034%	-0.0041%	-0.0020%	-0.0036%	-0.0051%	-0.0067%	-0.0083%
76	ESP	-0.0003%	-0.0005%	-0.0006%	-0.0008%	-0.0010%	-0.0005%	-0.0009%	-0.0013%	-0.0017%	-0.0020%
77	SWE	0.0001%	-0.0001%	-0.0004%	-0.0006%	-0.0008%	0.0001%	-0.0003%	-0.0007%	-0.0011%	-0.0016%
78	GBR	-0.0019%	-0.0035%	-0.0051%	-0.0067%	-0.0083%	-0.0037%	-0.0070%	-0.0102%	-0.0134%	-0.0166%
79	CHE*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
80	NOR	-0.0038%	-0.0088%	-0.0139%	-0.0190%	-0.0240%	-0.0075%	-0.0176%	-0.0278%	-0.0379%	-0.0481%
81	XEF	0.0002%	-0.0001%	-0.0004%	-0.0007%	-0.0009%	0.0003%	-0.0002%	-0.0008%	-0.0013%	-0.0019%
82	ALB	-0.0012%	-0.0022%	-0.0032%	-0.0041%	-0.0051%	-0.0025%	-0.0044%	-0.0063%	-0.0083%	-0.0102%
83	BGR	-0.0002%	-0.0004%	-0.0006%	-0.0007%	-0.0009%	-0.0004%	-0.0008%	-0.0011%	-0.0015%	-0.0018%
84	BLR*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
85	HRV	-0.0475%	-0.0846%	-0.1217%	-0.1588%	-0.1960%	-0.0950%	-0.1692%	-0.2435%	-0.3177%	-0.3919%
86	ROU	-0.0001%	-0.0001%	-0.0002%	-0.0003%	-0.0003%	-0.0002%	-0.0003%	-0.0004%	-0.0006%	-0.0007%
87	RUS	-0.0015%	-0.0027%	-0.0038%	-0.0050%	-0.0061%	-0.0030%	-0.0053%	-0.0076%	-0.0099%	-0.0123%
88	UKR	-0.0004%	-0.0007%	-0.0011%	-0.0014%	-0.0017%	-0.0008%	-0.0015%	-0.0022%	-0.0028%	-0.0035%
89	XEE*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
90	XER	-0.0005%	-0.0010%	-0.0014%	-0.0018%	-0.0022%	-0.0011%	-0.0019%	-0.0028%	-0.0036%	-0.0045%
91	KAZ*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
92	KGZ*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
93	XSU*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
94	ARM*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
95	AZE*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
96	GEO	-0.0010%	-0.0018%	-0.0027%	-0.0035%	-0.0043%	-0.0021%	-0.0037%	-0.0053%	-0.0069%	-0.0086%
97	BHR	-0.1932%	-0.3442%	-0.4952%	-0.6462%	-0.7973%	-0.3863%	-0.6884%	-0.9904%	-1.2925%	-1.5945%
98	IRN	-0.0003%	-0.0007%	-0.0011%	-0.0015%	-0.0019%	-0.0006%	-0.0014%	-0.0022%	-0.0030%	-0.0037%
99	ISR	-0.0027%	-0.0067%	-0.0108%	-0.0148%	-0.0189%	-0.0053%	-0.0134%	-0.0215%	-0.0296%	-0.0377%
100	JOR	-0.0003%	-0.0005%	-0.0007%	-0.0009%	-0.0011%	-0.0005%	-0.0009%	-0.0013%	-0.0017%	-0.0022%
101	KWT	-0.0323%	-0.0576%	-0.0828%	-0.1081%	-0.1334%	-0.0646%	-0.1151%	-0.1657%	-0.2162%	-0.2667%
102	OMN	-0.0105%	-0.0196%	-0.0286%	-0.0377%	-0.0467%	-0.0210%	-0.0391%	-0.0572%	-0.0753%	-0.0934%
103	QAT	-0.0834%	-0.1486%	-0.2138%	-0.2790%	-0.3442%	-0.1668%	-0.2972%	-0.4276%	-0.5581%	-0.6885%
104	SAU	-0.0001%	-0.0003%	-0.0004%	-0.0005%	-0.0006%	-0.0003%	-0.0005%	-0.0008%	-0.0010%	-0.0012%
106	TUR	-0.0017%	-0.0031%	-0.0045%	-0.0059%	-0.0073%	-0.0034%	-0.0062%	-0.0090%	-0.0119%	-0.0147%
105	ARE	-0.0237%	-0.0422%	-0.0607%	-0.0792%	-0.0977%	-0.0473%	-0.0843%	-0.1213%	-0.1583%	-0.1953%
107	XWS	-0.0006%	-0.0011%	-0.0016%	-0.0021%	-0.0025%	-0.0012%	-0.0022%	-0.0032%	-0.0041%	-0.0051%
108	EGY	-0.0076%	-0.0136%	-0.0196%	-0.0256%	-0.0316%	-0.0152%	-0.0272%	-0.0392%	-0.0512%	-0.0632%
109	MAR	-0.0007%	-0.0012%	-0.0018%	-0.0023%	-0.0028%	-0.0014%	-0.0025%	-0.0035%	-0.0046%	-0.0057%
110	TUN	-0.0013%	-0.0023%	-0.0033%	-0.0043%	-0.0053%	-0.0026%	-0.0046%	-0.0066%	-0.0086%	-0.0106%
111	XNF	-0.0005%	-0.0010%	-0.0014%	-0.0018%	-0.0022%	-0.0011%	-0.0019%	-0.0028%	-0.0036%	-0.0045%
112	BEN	-0.0002%	-0.0003%	-0.0004%	-0.0005%	-0.0006%	-0.0004%	-0.0006%	-0.0008%	-0.0010%	-0.0012%
113	BFA*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
114	CMR	-0.0003%	-0.0005%	-0.0008%	-0.0010%	-0.0012%	-0.0006%	-0.0011%	-0.0015%	-0.0020%	-0.0025%
115	CIV	-0.0001%	-0.0002%	-0.0002%	-0.0003%	-0.0004%	-0.0002%	-0.0003%	-0.0005%	-0.0006%	-0.0008%
116	GHA	-0.0001%	-0.0002%	-0.0003%	-0.0004%	-0.0005%	-0.0002%	-0.0004%	-0.0006%	-0.0008%	-0.0010%
117	GIN	-0.0001%	-0.0001%	-0.0002%	-0.0003%	-0.0003%	-0.0002%	-0.0003%	-0.0004%	-0.0006%	-0.0007%
118	NGA	0.0000%	-0.0001%	-0.0001%	-0.0001%	-0.0002%	-0.0001%	-0.0001%	-0.0002%	-0.0003%	-0.0003%
119	SEN	-0.0002%	-0.0004%	-0.0005%	-0.0007%	-0.0009%	-0.0004%	-0.0008%	-0.0011%	-0.0014%	-0.0017%
120	TGO	-0.0001%	-0.0001%	-0.0001%	-0.0002%	-0.0002%	-0.0001%	-0.0002%	-0.0003%	-0.0004%	-0.0005%
121	XWF	-0.0001%	-0.0001%	-0.0002%	-0.0003%	-0.0003%	-0.0002%	-0.0003%	-0.0004%	-0.0005%	-0.0007%
122	XCF	-0.0001%	-0.0002%	-0.0003%	-0.0005%	-0.0006%	-0.0002%	-0.0005%	-0.0007%	-0.0009%	-0.0012%
123	XAC	-0.0002%	-0.0003%	-0.0004%	-0.0005%	-0.0006%	-0.0003%	-0.0006%	-0.0008%	-0.0010%	-0.0013%
124	ETH*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
125	KEN	-0.0002%	-0.0003%	-0.0004%	-0.0005%	-0.0006%	-0.0003%	-0.0005%	-0.0007%	-0.0009%	-0.0011%
126	MDG	-0.0011%	-0.0019%	-0.0027%	-0.0035%	-0.0044%	-0.0021%	-0.0038%	-0.0054%	-0.0071%	-0.0087%
127	MWI*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
128	MUS*	-0.0175%	-0.0311%	-0.0448%	-0.0584%	-0.0721%	-0.0349%	-0.0622%	-0.0895%	-0.1169%	-0.1442%
129	MOZ	-0.0005%	-0.0008%	-0.0012%	-0.0015%	-0.0019%	-0.0009%	-0.0016%	-0.0023%	-0.0030%	-0.0037%
130	RWA*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
131	TZA	-0.0002%	-0.0005%	-0.0007%	-0.0010%	-0.0013%	-0.0004%	-0.0009%	-0.0015%	-0.0020%	-0.0025%
132	UGA*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
133	ZMB*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
134	ZWE*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
135	XEC	-0.0005%	-0.0007%	-0.0009%	-0.0011%	-0.0013%	-0.0009%	-0.0013%	-0.0017%	-0.0021%	-0.0025%
136	BWA*	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
137	NAM	-0.0004%	-0.0006%	-0.0009%	-0.0012%	-0.0015%	-0.0007%	-0.0013%	-0.0019%	-0.0024%	-0.0030%
138	ZAF	-0.0003%	-0.0005%	-0.0007%	-0.0009%	-0.0011%	-0.0005%	-0.0009%	-0.0013%	-0.0017%	-0.0021%
139	XSC	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
140	XTW	-0.0539%	-0.1244%	-0.1948%	-0.2653%	-0.3358%	-0.1079%	-0.2488%	-0.3897%	-0.5306%	-0.6715%

Table A3-1. Agriculture: percentage variation in multi-factor productivity. Values lower than -10% in red.

N.	Code	MAIZE					WHEAT					RICE				
		+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C
1	AUS	-1.94%	-4.56%	-5.88%	-8.56%	-11.94%	-2.19%	-5.38%	-11.06%	-16.13%	-19.94%	-2.75%	-2.69%	-2.63%	-6.69%	-13.50%
2	NZL	-0.78%	-2.63%	-3.55%	-6.63%	-10.78%	-5.68%	-6.15%	-6.03%	-6.05%	-6.38%	-4.30%	-3.08%	-1.85%	-7.08%	-16.60%
3	XOC	-3.03%	-6.38%	-8.05%	-10.38%	-13.03%	1.08%	-4.65%	-15.78%	-25.55%	-32.63%	-1.30%	-2.33%	-3.35%	-6.33%	-10.60%
4	CHN	-1.34%	-3.56%	-4.68%	-7.56%	-11.34%	-3.99%	-5.78%	-8.46%	-10.93%	-12.94%	-3.55%	-2.89%	-2.23%	-6.89%	-15.10%
5	HKG	-2.35%	-5.25%	-6.70%	-9.25%	-12.35%	-0.95%	-5.10%	-12.85%	-19.70%	-24.75%	-2.20%	-2.55%	-2.90%	-6.55%	-12.40%
6	JPN	-1.49%	-3.81%	-4.98%	-7.81%	-11.49%	-3.54%	-5.68%	-9.11%	-12.23%	-14.69%	-3.35%	-2.84%	-2.33%	-6.84%	-14.70%
7	KOR	-1.34%	-3.56%	-4.68%	-7.56%	-11.34%	-3.99%	-5.78%	-8.46%	-10.93%	-12.94%	-3.55%	-2.89%	-2.23%	-6.89%	-15.10%
8	MNG	-0.48%	-2.13%	-2.95%	-6.13%	-10.48%	-6.58%	-6.35%	-4.73%	-3.45%	-2.88%	-4.70%	-3.18%	-1.65%	-7.18%	-17.40%
9	TWN	-2.20%	-5.00%	-6.40%	-9.00%	-12.20%	-1.40%	-5.20%	-12.20%	-18.40%	-23.00%	-2.40%	-2.60%	-2.80%	-6.60%	-12.80%
10	XEA	-3.06%	-6.44%	-8.13%	-10.44%	-13.06%	1.19%	-4.63%	-15.94%	-25.88%	-33.06%	-1.25%	-2.31%	-3.38%	-6.31%	-10.50%
11	BRN	-3.66%	-7.44%	-9.33%	-11.44%	-13.66%	2.99%	-4.23%	-18.54%	-31.08%	-40.06%	-0.45%	-2.11%	-3.78%	-6.11%	-8.90%
12	KHM	-3.06%	-6.44%	-8.13%	-10.44%	-13.06%	1.19%	-4.63%	-15.94%	-25.88%	-33.06%	-1.25%	-2.31%	-3.38%	-6.31%	-10.50%
13	IDN	-3.81%	-7.69%	-9.63%	-11.69%	-13.81%	3.44%	-4.13%	-19.19%	-32.38%	-41.81%	-0.25%	-2.06%	-3.88%	-6.06%	-8.50%
14	LAO	-2.61%	-5.69%	-7.23%	-9.69%	-12.61%	-0.16%	-4.93%	-13.99%	-21.98%	-27.81%	-1.85%	-2.46%	-3.08%	-6.46%	-11.70%
15	MYS	-3.66%	-7.44%	-9.33%	-11.44%	-13.66%	2.99%	-4.23%	-18.54%	-31.08%	-40.06%	-0.45%	-2.11%	-3.78%	-6.11%	-8.90%
16	PHL	-3.03%	-6.38%	-8.05%	-10.38%	-13.03%	1.08%	-4.65%	-15.78%	-25.55%	-32.63%	-1.30%	-2.33%	-3.35%	-6.33%	-10.60%
17	SGP	-3.93%	-7.88%	-9.85%	-11.88%	-13.93%	3.78%	-4.05%	-19.68%	-33.35%	-43.13%	-0.10%	-2.03%	-3.95%	-6.03%	-8.20%
18	THA	-3.06%	-6.44%	-8.13%	-10.44%	-13.06%	1.19%	-4.63%	-15.94%	-25.88%	-33.06%	-1.25%	-2.31%	-3.38%	-6.31%	-10.50%
19	VNM	-2.84%	-6.06%	-7.68%	-10.06%	-12.84%	0.51%	-4.78%	-14.96%	-23.93%	-30.44%	-1.55%	-2.39%	-3.23%	-6.39%	-11.10%
20	XSE	-3.06%	-6.44%	-8.13%	-10.44%	-13.06%	1.19%	-4.63%	-15.94%	-25.88%	-33.06%	-1.25%	-2.31%	-3.38%	-6.31%	-10.50%
21	BGD	-2.20%	-5.00%	-6.40%	-9.00%	-12.20%	-1.40%	-5.20%	-12.20%	-18.40%	-23.00%	-2.40%	-2.60%	-2.80%	-6.60%	-12.80%
22	IND	-2.31%	-5.19%	-6.63%	-9.19%	-12.31%	-1.06%	-5.13%	-12.69%	-19.38%	-24.31%	-2.25%	-2.56%	-2.88%	-6.56%	-12.50%
23	NPL	-1.90%	-4.50%	-5.80%	-8.50%	-11.90%	-2.30%	-5.40%	-10.90%	-15.80%	-19.50%	-2.80%	-2.70%	-2.60%	-6.70%	-13.60%
24	PAK	-1.75%	-4.25%	-5.50%	-8.25%	-11.75%	-2.75%	-5.50%	-10.25%	-14.50%	-17.75%	-3.00%	-2.75%	-2.50%	-6.75%	-14.00%
25	LKA	-3.40%	-7.00%	-8.80%	-11.00%	-13.40%	2.20%	-4.40%	-17.40%	-28.80%	-37.00%	-0.80%	-2.20%	-3.60%	-6.20%	-9.60%
26	XSA	-2.31%	-5.19%	-6.63%	-9.19%	-12.31%	-1.06%	-5.13%	-12.69%	-19.38%	-24.31%	-2.25%	-2.56%	-2.88%	-6.56%	-12.50%
27	CAN	0.69%	-0.19%	-0.63%	-4.19%	-9.31%	-10.06%	-7.13%	0.31%	6.63%	10.69%	-6.25%	-3.56%	-0.88%	-7.56%	-20.50%
28	USA	-1.23%	-3.38%	-4.45%	-7.38%	-11.23%	-4.33%	-5.85%	-7.98%	-9.95%	-11.63%	-3.70%	-2.93%	-2.15%	-6.93%	-15.40%
29	MEX	-2.20%	-5.00%	-6.40%	-9.00%	-12.20%	-1.40%	-5.20%	-12.20%	-18.40%	-23.00%	-2.40%	-2.60%	-2.80%	-6.60%	-12.80%
30	XNA	-1.23%	-3.38%	-4.45%	-7.38%	-11.23%	-4.33%	-5.85%	-7.98%	-9.95%	-11.63%	-3.70%	-2.93%	-2.15%	-6.93%	-15.40%
31	ARG	-1.11%	-3.19%	-4.23%	-7.19%	-11.11%	-4.66%	-5.93%	-7.49%	-8.98%	-10.31%	-3.85%	-2.96%	-2.08%	-6.96%	-15.70%
32	BOL	-2.76%	-5.94%	-7.53%	-9.94%	-12.76%	0.29%	-4.83%	-14.64%	-23.28%	-29.56%	-1.65%	-2.41%	-3.18%	-6.41%	-11.30%
33	BRA	-2.54%	-5.56%	-7.08%	-9.56%	-12.54%	-0.39%	-4.98%	-13.66%	-21.33%	-26.94%	-1.95%	-2.49%	-3.03%	-6.49%	-11.90%
34	CHL	-1.26%	-3.44%	-4.53%	-7.44%	-11.26%	-4.21%	-5.83%	-8.14%	-10.28%	-12.06%	-3.65%	-2.91%	-2.18%	-6.91%	-15.30%
35	COL	-3.70%	-7.50%	-9.40%	-11.50%	-13.70%	3.10%	-4.20%	-18.70%	-31.40%	-40.50%	-0.40%	-2.10%	-3.80%	-6.10%	-8.80%
36	ECU	-3.89%	-7.81%	-9.78%	-11.81%	-13.89%	3.66%	-4.08%	-19.51%	-33.03%	-42.69%	-0.15%	-2.04%	-3.93%	-6.04%	-8.30%
37	PRY	-2.28%	-5.13%	-6.55%	-9.13%	-12.28%	-1.18%	-5.15%	-12.53%	-19.05%	-23.88%	-2.30%	-2.58%	-2.85%	-6.58%	-12.60%
38	PER	-3.33%	-6.88%	-8.65%	-10.88%	-13.33%	1.98%	-4.45%	-17.08%	-28.15%	-36.13%	-0.90%	-2.23%	-3.55%	-6.23%	-9.80%
39	URY	-1.56%	-3.94%	-5.13%	-7.94%	-11.56%	-3.31%	-5.63%	-9.44%	-12.88%	-15.56%	-3.25%	-2.81%	-2.38%	-6.81%	-14.50%
40	VEN	-3.51%	-7.19%	-9.03%	-11.19%	-13.51%	2.54%	-4.33%	-17.89%	-29.78%	-38.31%	-0.65%	-2.16%	-3.68%	-6.16%	-9.30%
41	XSM	-1.56%	-3.94%	-5.13%	-7.94%	-11.56%	-3.31%	-5.63%	-9.44%	-12.88%	-15.56%	-3.25%	-2.81%	-2.38%	-6.81%	-14.50%
42	CRI	-3.29%	-6.81%	-8.58%	-10.81%	-13.29%	1.86%	-4.48%	-16.91%	-27.83%	-35.69%	-0.95%	-2.24%	-3.53%	-6.24%	-9.90%
43	GTM	-2.80%	-6.00%	-7.60%	-10.00%	-12.80%	0.40%	-4.80%	-14.80%	-23.60%	-30.00%	-1.60%	-2.40%	-3.20%	-6.40%	-11.20%
44	HND	-2.91%	-6.19%	-7.83%	-10.19%	-12.91%	0.74%	-4.73%	-15.29%	-24.58%	-31.31%	-1.45%	-2.36%	-3.28%	-6.36%	-10.90%
45	NIC	-3.03%	-6.38%	-8.05%	-10.38%	-13.03%	1.08%	-4.65%	-15.78%	-25.55%	-32.63%	-1.30%	-2.33%	-3.35%	-6.33%	-10.60%
46	SLV	-3.36%	-6.94%	-8.73%	-10.94%	-13.36%	2.09%	-4.43%	-17.24%	-28.48%	-36.56%	-0.85%	-2.21%	-3.58%	-6.21%	-9.70%
47	PAN	-2.99%	-6.31%	-7.98%	-10.31%	-12.99%	0.96%	-4.68%	-15.61%	-25.23%	-32.19%	-1.35%	-2.34%	-3.33%	-6.34%	-10.70%
48	XCA	-3.03%	-6.38%	-8.05%	-10.38%	-13.03%	1.08%	-4.65%	-15.78%	-25.55%	-32.63%	-1.30%	-2.33%	-3.35%	-6.33%	-10.60%
49	DOM	-2.58%	-5.63%	-7.15%	-9.63%	-12.58%	-0.28%	-4.95%	-13.83%	-21.65%	-27.38%	-1.90%	-2.48%	-3.05%	-6.48%	-11.80%
50	JAM	-2.65%	-5.75%	-7.30%	-9.75%	-12.65%	-0.05%	-4.90%	-14.15%	-22.30%	-28.25%	-1.80%	-2.45%	-3.10%	-6.45%	-11.60%
51	PRI	-2.65%	-5.75%	-7.30%	-9.75%	-12.65%	-0.05%	-4.90%	-14.15%	-22.30%	-28.25%	-1.80%	-2.45%	-3.10%	-6.45%	-11.60%
52	TTO	-3.18%	-6.63%	-8.35%	-10.63%	-13.18%	1.53%	-4.55%	-16.43%	-26.85%	-34.38%	-1.10%	-2.28%	-3.45%	-6.28%	-10.20%
53	XCB	-2.65%	-5.75%	-7.30%	-9.75%	-12.65%	-0.05%	-4.90%	-14.15%	-22.30%	-28.25%	-1.80%	-2.45%	-3.10%	-6.45%	-11.60%
54	AUT	-0.44%	-2.06%	-2.88%	-6.06%	-10.44%	-6.69%	-6.38%	-4.56%	-3.13%	-2.44%	-4.75%	-3.19%	-1.63%	-7.19%	-17.50%
55	BEL	-0.21%	-1.69%	-2.43%	-5.69%	-10.21%	-7.36%	-6.53%	-3.59%	-1.18%	0.19%	-5.05%	-3.26%	-1.48%	-7.26%	-18.10%
56	CYP	-1.38%	-3.63%	-4.75%	-7.63%	-11.38%	-3.88%	-5.75%	-8.63%	-11.25%	-13.38%	-3.50%	-2.88%	-2.25%	-6.88%	-15.00%
57	CZE	-0.25%	-1.75%	-2.50%	-5.75%	-10.25%	-7.25%	-6.50%	-3.75%	-1.50%	-0.25%	-5.00%	-3.25%	-1.50%	-7.25%	-18.00%
58	DNK	0.24%	-0.94%	-1.53%	-4.94%	-9.76%	-8.71%	-6.83%	-1.64%	2.73%	5.44%	-5.65%	-3.41%	-1.18%	-7.41%	-19.30%
59	EST	0.43%	-0.63%	-1.15%	-4.63%	-9.58%	-9.28%	-6.95%	-0.82%	4.35%	7.63%	-5.90%	-3.48%	-1.05%	-7.48%	-19.80%
60	FIN	0.88%	0.13%	-0.25%	-3.88%	-9.13%	-10.63%	-7.25%	1.13%	8.25%	12.88%	-6.50%	-3.63%	-0.75%	-7.63%	-21.00%
61	FRA	-0.51%	-2.19%	-3.03%	-6.19%	-10.51%	-6.46%	-6.33%	-4.89%	-3.78%	-3.31%	-4.65%	-3.16%	-1.68%	-7.16%	-17.30%
62	DEU	-0.18%	-1.63%	-2.35%	-5.63%	-10.18%	-7.48%	-6.55%	-3.43%	-0.85%	0.63%	-5.10%	-3.28%	-1.45%	-7.28%	-18.20%
63	GRC	-1.11%	-3.19%	-4.23%	-7.19%	-11.11%	-4.66%	-5.93%	-7.49%	-8.98%	-10.31%	-3.85%	-2.96%	-2.08%	-6.96%	-15.70%
64	HUN	-0.44%	-2.06%	-2.88%	-6.06%	-10.44%	-6.69%	-6.38%	-4.56%	-3.13%	-2.44%	-4.75%	-3.19%	-1.63%	-7.19%	-17.50%
65	IRL	-0.02%	-1.38%	-2.05%	-5.38%	-10.03%	-7.93%	-6.65%	-2.78%	0.45%	2.38%	-5.30%	-3.33%	-1.35%	-7.33%	-18.60%
66	ITA	-0.89%	-2.81%	-3.78%	-6.81%	-10.89%	-5.34%	-6.08%	-6.51%	-7.03%	-7.69%	-4.15%	-3.04%	-1.93%	-7.04%	-16.30%
67	LVA	0.24%	-0.94%	-1.53%	-4.94%	-9.76%	-8.71%	-6.83%	-1.64%	2.73%	5.44%	-5.65%	-3.41%	-1.18%	-7.41%	-19.30%
68	LTU	0.13%	-1.13%	-1.75%	-5.13%	-9.88%	-8.38%	-6.75%	-2.13%	1.75%	4.13%	-5.50%	-3.38%	-1.25%	-7.38%	-19.00%
69	LUX	-0.29%	-1.81%	-2.58%	-5.81%	-10.29%	-7.14%	-6.48%	-3.91%	-1.83%	-0.69%	-4.95%	-3.24%	-1.53%	-7.24%	-17.90%
70	MLT	-1.34%	-3.56%	-4.68%	-7.56%	-11.34%	-3.99%	-5.78%	-8.46%	-10.93%	-12.94%	-3.55%	-2.89%	-2.23%	-6.89%	-15.10%

Table A3-2. Agriculture: percentage variation in multi-factor productivity. Values lower than -10% in red.

N.	Code	MAIZE					WHEAT					RICE				
		+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C
71	NLD	-0.06%	-1.44%	-2.13%	-5.44%	-10.06%	-7.81%	-6.63%	-2.94%	0.13%	1.94%	-5.25%	-3.31%	-1.38%	-7.31%	-18.50%
72	POL	-0.10%	-1.50%	-2.20%	-5.50%	-10.10%	-7.70%	-6.60%	-3.10%	-0.20%	1.50%	-5.20%	-3.30%	-1.40%	-7.30%	-18.40%
73	PRT	-1.04%	-3.06%	-4.08%	-7.06%	-11.04%	-4.89%	-5.98%	-7.16%	-8.33%	-9.44%	-3.95%	-2.99%	-2.03%	-6.99%	-15.90%
74	SVK	-0.33%	-1.88%	-2.65%	-5.88%	-10.33%	-7.03%	-6.45%	-4.08%	-2.15%	-1.13%	-4.90%	-3.23%	-1.55%	-7.23%	-17.80%
75	SVN	-0.55%	-2.25%	-3.10%	-6.25%	-10.55%	-6.35%	-6.30%	-5.05%	-4.10%	-3.75%	-4.60%	-3.15%	-1.70%	-7.15%	-17.20%
76	ESP	-1.00%	-3.00%	-4.00%	-7.00%	-11.00%	-5.00%	-6.00%	-7.00%	-8.00%	-9.00%	-4.00%	-3.00%	-2.00%	-7.00%	-16.00%
77	SWE	0.65%	-0.25%	-0.70%	-4.25%	-9.35%	-9.95%	-7.10%	0.15%	6.30%	10.25%	-6.20%	-3.55%	-0.90%	-7.55%	-20.40%
78	GBR	0.16%	-1.06%	-1.68%	-5.06%	-9.84%	-8.49%	-6.78%	-1.96%	2.08%	4.56%	-5.55%	-3.39%	-1.23%	-7.39%	-19.10%
79	CHE	-0.48%	-2.13%	-2.95%	-6.13%	-10.48%	-6.58%	-6.35%	-4.73%	-3.45%	-2.88%	-4.70%	-3.18%	-1.65%	-7.18%	-17.40%
80	NOR	0.84%	0.06%	-0.32%	-3.94%	-9.16%	-10.51%	-7.23%	0.96%	7.93%	12.44%	-6.45%	-3.61%	-0.78%	-7.61%	-20.90%
81	XEF	-0.48%	-2.13%	-2.95%	-6.13%	-10.48%	-6.58%	-6.35%	-4.73%	-3.45%	-2.88%	-4.70%	-3.18%	-1.65%	-7.18%	-17.40%
82	ALB	-0.89%	-2.81%	-3.78%	-6.81%	-10.89%	-5.34%	-6.08%	-6.51%	-7.03%	-7.69%	-4.15%	-3.04%	-1.93%	-7.04%	-16.30%
83	BGR	-0.81%	-2.69%	-3.63%	-6.69%	-10.81%	-5.56%	-6.13%	-6.19%	-6.38%	-6.81%	-4.25%	-3.06%	-1.88%	-7.06%	-16.50%
84	BLR	0.01%	-1.31%	-1.98%	-5.31%	-9.99%	-8.04%	-6.68%	-2.61%	0.77%	2.81%	-5.35%	-3.34%	-1.33%	-7.34%	-18.70%
85	HRV	-0.66%	-2.44%	-3.33%	-6.44%	-10.66%	-6.01%	-6.23%	-5.54%	-5.08%	-5.06%	-4.45%	-3.11%	-1.78%	-7.11%	-16.90%
86	ROU	-0.55%	-2.25%	-3.10%	-6.25%	-10.55%	-6.35%	-6.30%	-5.05%	-4.10%	-3.75%	-4.60%	-3.15%	-1.70%	-7.15%	-17.20%
87	RUS	0.61%	-0.31%	-0.78%	-4.31%	-9.39%	-9.84%	-7.08%	-0.01%	5.98%	9.81%	-6.15%	-3.54%	-0.93%	-7.54%	-20.30%
88	UKR	-0.40%	-2.00%	-2.80%	-6.00%	-10.40%	-6.80%	-6.40%	-4.40%	-2.80%	-2.00%	-4.80%	-3.20%	-1.60%	-7.20%	-17.60%
89	XEE	-0.40%	-2.00%	-2.80%	-6.00%	-10.40%	-6.80%	-6.40%	-4.40%	-2.80%	-2.00%	-4.80%	-3.20%	-1.60%	-7.20%	-17.60%
90	XER	-0.18%	-1.63%	-2.35%	-5.63%	-10.18%	-7.48%	-6.55%	-3.43%	-0.85%	0.63%	-5.10%	-3.28%	-1.45%	-7.28%	-18.20%
91	KAZ	-0.40%	-2.00%	-2.80%	-6.00%	-10.40%	-6.80%	-6.40%	-4.40%	-2.80%	-2.00%	-4.80%	-3.20%	-1.60%	-7.20%	-17.60%
92	KGZ	-0.96%	-2.94%	-3.93%	-6.94%	-10.96%	-5.11%	-6.03%	-6.84%	-7.68%	-8.56%	-4.05%	-3.01%	-1.98%	-7.01%	-16.10%
93	XSU	-0.40%	-2.00%	-2.80%	-6.00%	-10.40%	-6.80%	-6.40%	-4.40%	-2.80%	-2.00%	-4.80%	-3.20%	-1.60%	-7.20%	-17.60%
94	ARM	-0.96%	-2.94%	-3.93%	-6.94%	-10.96%	-5.11%	-6.03%	-6.84%	-7.68%	-8.56%	-4.05%	-3.01%	-1.98%	-7.01%	-16.10%
95	AZE	-1.00%	-3.00%	-4.00%	-7.00%	-11.00%	-5.00%	-6.00%	-7.00%	-8.00%	-9.00%	-4.00%	-3.00%	-2.00%	-7.00%	-16.00%
96	GEO	-0.81%	-2.69%	-3.63%	-6.69%	-10.81%	-5.56%	-6.13%	-6.19%	-6.38%	-6.81%	-4.25%	-3.06%	-1.88%	-7.06%	-16.50%
97	BHR	-2.05%	-4.75%	-6.10%	-8.75%	-12.05%	-1.85%	-5.30%	-11.55%	-17.10%	-21.25%	-2.60%	-2.65%	-2.70%	-6.65%	-13.20%
98	IRN	-1.56%	-3.94%	-5.13%	-7.94%	-11.56%	-3.31%	-5.63%	-9.44%	-12.88%	-15.56%	-3.25%	-2.81%	-2.38%	-6.81%	-14.50%
99	ISR	-1.68%	-4.13%	-5.35%	-8.13%	-11.68%	-2.98%	-5.55%	-9.93%	-13.85%	-16.88%	-3.10%	-2.78%	-2.45%	-6.78%	-14.20%
100	JOR	-1.68%	-4.13%	-5.35%	-8.13%	-11.68%	-2.98%	-5.55%	-9.93%	-13.85%	-16.88%	-3.10%	-2.78%	-2.45%	-6.78%	-14.20%
101	KWT	-1.83%	-4.38%	-5.65%	-8.38%	-11.83%	-2.53%	-5.45%	-10.58%	-15.15%	-18.63%	-2.90%	-2.73%	-2.55%	-6.73%	-13.80%
102	OMN	-2.39%	-5.31%	-6.78%	-9.31%	-12.39%	-0.84%	-5.08%	-13.01%	-20.03%	-25.19%	-2.15%	-2.54%	-2.93%	-6.54%	-12.30%
103	QAT	-2.13%	-4.88%	-6.25%	-8.88%	-12.13%	-1.63%	-5.25%	-11.88%	-17.75%	-22.13%	-2.50%	-2.63%	-2.75%	-6.63%	-13.00%
104	SAU	-2.24%	-5.06%	-6.48%	-9.06%	-12.24%	-1.29%	-5.18%	-12.36%	-18.73%	-23.44%	-2.35%	-2.59%	-2.83%	-6.59%	-12.70%
106	TUR	-1.08%	-3.13%	-4.15%	-7.13%	-11.08%	-4.78%	-5.95%	-7.33%	-8.65%	-9.88%	-3.90%	-2.98%	-2.05%	-6.98%	-15.80%
105	ARE	-2.16%	-4.94%	-6.33%	-8.94%	-12.16%	-1.51%	-5.23%	-12.04%	-18.08%	-22.56%	-2.45%	-2.61%	-2.78%	-6.61%	-12.90%
107	XWS	-1.68%	-4.13%	-5.35%	-8.13%	-11.68%	-2.98%	-5.55%	-9.93%	-13.85%	-16.88%	-3.10%	-2.78%	-2.45%	-6.78%	-14.20%
108	EGY	-1.98%	-4.63%	-5.95%	-8.63%	-11.98%	-2.08%	-5.35%	-11.23%	-16.45%	-20.38%	-2.70%	-2.68%	-2.65%	-6.68%	-13.40%
109	MAR	-1.64%	-4.06%	-5.28%	-8.06%	-11.64%	-3.09%	-5.58%	-9.76%	-13.53%	-16.44%	-3.15%	-2.79%	-2.43%	-6.79%	-14.30%
110	TUN	-1.49%	-3.81%	-4.98%	-7.81%	-11.49%	-3.54%	-5.68%	-9.11%	-12.23%	-14.69%	-3.35%	-2.84%	-2.33%	-6.84%	-14.70%
111	XNF	-1.49%	-3.81%	-4.98%	-7.81%	-11.49%	-3.54%	-5.68%	-9.11%	-12.23%	-14.69%	-3.35%	-2.84%	-2.33%	-6.84%	-14.70%
112	BEN	-3.29%	-6.81%	-8.58%	-10.81%	-13.29%	1.86%	-4.48%	-16.91%	-27.83%	-35.69%	-0.95%	-2.24%	-3.53%	-6.24%	-9.90%
113	BFA	-3.10%	-6.50%	-8.20%	-10.50%	-13.10%	1.30%	-4.60%	-16.10%	-26.20%	-33.50%	-1.20%	-2.30%	-3.40%	-6.30%	-10.40%
114	CMR	-3.44%	-7.06%	-8.88%	-11.06%	-13.44%	2.31%	-4.38%	-17.56%	-29.13%	-37.44%	-0.75%	-2.19%	-3.63%	-6.19%	-9.50%
115	CIV	-3.44%	-7.06%	-8.88%	-11.06%	-13.44%	2.31%	-4.38%	-17.56%	-29.13%	-37.44%	-0.75%	-2.19%	-3.63%	-6.19%	-9.50%
116	GHA	-3.40%	-7.00%	-8.80%	-11.00%	-13.40%	2.20%	-4.40%	-17.40%	-28.80%	-37.00%	-0.80%	-2.20%	-3.60%	-6.20%	-9.60%
117	GIN	-3.25%	-6.75%	-8.50%	-10.75%	-13.25%	1.75%	-4.50%	-16.75%	-27.50%	-35.25%	-1.00%	-2.25%	-3.50%	-6.25%	-10.00%
118	NGA	-3.33%	-6.88%	-8.65%	-10.88%	-13.33%	1.98%	-4.45%	-17.08%	-28.15%	-36.13%	-0.90%	-2.23%	-3.55%	-6.23%	-9.80%
119	SEN	-2.91%	-6.19%	-7.83%	-10.19%	-12.91%	0.74%	-4.73%	-15.29%	-24.58%	-31.31%	-1.45%	-2.36%	-3.28%	-6.36%	-10.90%
120	TGO	-3.36%	-6.94%	-8.73%	-10.94%	-13.36%	2.09%	-4.43%	-17.24%	-28.48%	-36.56%	-0.85%	-2.21%	-3.58%	-6.21%	-9.70%
121	XWF	-3.36%	-6.94%	-8.73%	-10.94%	-13.36%	2.09%	-4.43%	-17.24%	-28.48%	-36.56%	-0.85%	-2.21%	-3.58%	-6.21%	-9.70%
122	XCF	-3.51%	-7.19%	-9.03%	-11.19%	-13.51%	2.54%	-4.33%	-17.89%	-29.78%	-38.31%	-0.65%	-2.16%	-3.68%	-6.16%	-9.30%
123	XAC	-4.00%	-8.00%	-10.00%	-12.00%	-14.00%	4.00%	-4.00%	-20.00%	-34.00%	-44.00%	0.00%	-2.00%	-4.00%	-6.00%	-8.00%
124	ETH	-3.33%	-6.88%	-8.65%	-10.88%	-13.33%	1.98%	-4.45%	-17.08%	-28.15%	-36.13%	-0.90%	-2.23%	-3.55%	-6.23%	-9.80%
125	KEN	-4.00%	-8.00%	-10.00%	-12.00%	-14.00%	4.00%	-4.00%	-20.00%	-34.00%	-44.00%	0.00%	-2.00%	-4.00%	-6.00%	-8.00%
126	MDG	-2.58%	-5.63%	-7.15%	-9.63%	-12.58%	-0.28%	-4.95%	-13.83%	-21.65%	-27.38%	-1.90%	-2.48%	-3.05%	-6.48%	-11.80%
127	MWI	-3.03%	-6.38%	-8.05%	-10.38%	-13.03%	1.08%	-4.65%	-15.78%	-25.55%	-32.63%	-1.30%	-2.33%	-3.35%	-6.33%	-10.60%
128	MUS	-2.43%	-5.38%	-6.85%	-9.38%	-12.43%	-0.73%	-5.05%	-13.18%	-20.35%	-25.63%	-2.10%	-2.53%	-2.95%	-6.53%	-12.20%
129	MOZ	-2.61%	-5.69%	-7.23%	-9.69%	-12.61%	-0.16%	-4.93%	-13.99%	-21.98%	-27.81%	-1.85%	-2.46%	-3.08%	-6.46%	-11.70%
130	RWA	-3.85%	-7.75%	-9.70%	-11.75%	-13.85%	3.55%	-4.10%	-19.35%	-32.70%	-42.25%	-0.20%	-2.05%	-3.90%	-6.05%	-8.40%
131	TZA	-3.51%	-7.19%	-9.03%	-11.19%	-13.51%	2.54%	-4.33%	-17.89%	-29.78%	-38.31%	-0.65%	-2.16%	-3.68%	-6.16%	-9.30%
132	UGA	-3.89%	-7.81%	-9.78%	-11.81%	-13.89%	3.66%	-4.08%	-19.51%	-33.03%	-42.69%	-0.15%	-2.04%	-3.93%	-6.04%	-8.30%
133	ZMB	-3.03%	-6.38%	-8.05%	-10.38%	-13.03%	1.08%	-4.65%	-15.78%	-25.55%	-32.63%	-1.30%	-2.33%	-3.35%	-6.33%	-10.60%
134	ZWE	-2.61%	-5.69%	-7.23%	-9.69%	-12.61%	-0.16%	-4.93%	-13.99%	-21.98%	-27.81%	-1.85%	-2.46%	-3.08%	-6.46%	-11.70%
135	XEC	-2.61%	-5.69%	-7.23%	-9.69%	-12.61%	-0.16%	-4.93%	-13.99%	-21.98%	-27.81%	-1.85%	-2.46%	-3.08%	-6.46%	-11.70%
136	BWA	-2.31%	-5.19%	-6.63%	-9.19%	-12.31%	-1.06%	-5.13%	-12.69%	-19.38%	-24.31%	-2.25%	-2.56%	-2.88%	-6.56%	-12.50%
137	NAM	-2.28%	-5.13%	-6.55%	-9.13%	-12.28%	-1.18%	-5.15%	-12.53%	-19.05%	-23.88%	-2.30%	-2.58%	-2.85%	-6.58%	-12.60%
138	ZAF	-1.86%	-4.44%	-5.73%	-8.44%	-11.86%	-2.41%	-5.43%	-10.74%	-15.48%	-19.06%	-2.85%	-2.71%	-2.58%	-6.71%	-13.70%
139	XSC	-1.86%	-4.44%	-5.73%	-8.44%	-11.86%	-2.41%	-5.43%	-10.74%	-15.48%	-19.06%	-2.85%	-2.71%	-2.58%	-6.71%	-13.70%
140	XTW	-1.00%	-3.00%	-4.00%	-7.00%	-11.00%	-5.00%	-6.00%	-7.00%	-8.00%	-9.00%	-4.00%	-3.00%	-2.00%	-7.00%	-16.00%

Table A4-1. Agriculture: percentage variation in multi-factor productivity. Negative values in red.

N.	Code	Base Y	ref.imp.	adj	Base T	Delta T	Base P	Delta P	P/T Ratio	C/T Ratio	+1°C	+2°C	+3°C	+4°C	+5°C
1	AUS	5000	-6.5	-0.19%	21.95	2.7	1.59	-0.02	-0.0074	54.7037	-1.91%	-4.01%	-6.31%	-8.81%	-11.51%
2	NZL	500	-3.8	-2.03%	12.08	2	3.58	0.1	0.0500	73.8500	1.39%	0.80%	-1.78%	-6.35%	-12.90%
3	XOC	4000	-9.1	0.86%	25.24	1.84	5.14	0.23	0.1250	80.2717	-3.06%	-6.37%	-9.92%	-13.73%	-17.78%
4	CHN	10000	-5.1	-6.86%	5.3	3.4	2.37	0.21	0.0618	43.4412	0.68%	1.26%	1.74%	2.11%	2.40%
5	HKG	5000	-7.5	-0.83%	22.84	2.14	4.5	0.13	0.0607	69.0187	-2.02%	-4.24%	-6.65%	-9.27%	-12.08%
6	JPN	500	-5.5	-0.34%	12.13	2.94	4.43	0.23	0.0782	50.2381	0.28%	-1.43%	-5.13%	-10.81%	-18.48%
7	KOR	500	-5.1	-0.24%	12.07	2.99	3.16	0.26	0.0870	49.3980	0.36%	-1.26%	-4.88%	-10.48%	-18.06%
8	MNG	10000	-3.1	-6.52%	-0.4	3.66	1.01	0.13	0.0355	40.3552	1.24%	2.38%	3.41%	4.35%	5.19%
9	TWN	5000	-7.1	-0.48%	22.84	2.14	4.5	0.13	0.0607	69.0187	-2.02%	-4.24%	-6.65%	-9.27%	-12.08%
10	XEA	5000	-9.1	-0.95%	25.3	2.34	5.07	0.22	0.0940	63.1197	-2.53%	-5.27%	-8.20%	-11.33%	-14.66%
11	BRN	4000	-10.5	-0.30%	25.41	2.17	7.9	0.43	0.1982	68.0645	-3.17%	-6.58%	-10.24%	-14.16%	-18.32%
12	KHM	5000	-9.1	-0.95%	25.3	2.34	5.07	0.22	0.0940	63.1197	-2.53%	-5.27%	-8.20%	-11.33%	-14.66%
13	IDN	4000	-10.9	-0.55%	25.53	2.2	0.13	0.39	0.1773	67.1364	-3.20%	-6.65%	-10.35%	-14.30%	-18.49%
14	LAO	4000	-8.1	-0.31%	21.89	2.53	3.75	0.2	0.0791	58.3794	-2.35%	-4.94%	-7.78%	-10.87%	-14.21%
15	MYS	4000	-10.5	-0.29%	25.4	2.21	7.86	0.48	0.2172	66.8326	-3.17%	-6.59%	-10.26%	-14.17%	-18.34%
16	PHL	5000	-9.1	-0.42%	26.23	2.06	6.76	0.5	0.2427	71.6990	-2.68%	-5.56%	-8.64%	-11.91%	-15.39%
17	SGP	4000	-11.2	0.21%	26.96	2.11	7.5	0.18	0.0853	70.0000	-3.54%	-7.33%	-11.37%	-15.66%	-20.20%
18	THA	4000	-9.1	0.65%	24.63	2.46	4.27	0.18	0.0732	60.0407	-3.02%	-6.28%	-9.80%	-13.56%	-17.57%
19	VNM	4000	-8.6	-0.04%	23.05	2.36	4.42	0.25	0.1059	62.5847	-2.61%	-5.47%	-8.58%	-11.93%	-15.54%
20	XSE	5000	-9.1	-0.95%	25.3	2.34	5.07	0.22	0.0940	63.1197	-2.53%	-5.27%	-8.20%	-11.33%	-14.66%
21	BGD	5000	-7.1	0.49%	24.24	2.54	3.9	0.4	0.1575	58.1496	-2.34%	-4.89%	-7.63%	-10.57%	-13.71%
22	IND	5000	-7.4	-0.30%	23.24	2.77	2.65	0.27	0.0975	53.3213	-2.17%	-4.53%	-7.10%	-9.86%	-12.82%
23	NPL	500	-6.4	-6.19%	11.24	3.15	4.99	0.43	0.1365	46.8889	1.91%	1.83%	-0.24%	-4.29%	-10.34%
24	PAK	4000	-6.1	-0.35%	18.82	3.38	0.87	0.05	0.0148	43.6982	-1.66%	-3.57%	-5.73%	-8.14%	-10.80%
25	LKA	5000	-9.9	-0.93%	26.87	2.04	4.87	0.53	0.2598	72.4020	-2.80%	-5.81%	-9.01%	-12.41%	-16.01%
26	XSA	5000	-7.4	-0.30%	23.24	2.77	2.65	0.27	0.0975	53.3213	-2.17%	-4.53%	-7.10%	-9.86%	-12.82%
27	CAN	10000	-0.4	-4.87%	-4.13	4.54	1.83	0.23	0.0507	32.5330	1.59%	3.08%	4.48%	5.77%	6.96%
28	USA	10000	-4.9	-5.62%	8.52	3.63	2.37	0.13	0.0358	40.6887	0.35%	0.60%	0.76%	0.81%	0.77%
29	MEX	3000	-7.1	0.88%	19.35	2.89	2.54	-0.2	-0.0692	51.1073	-2.34%	-5.01%	-8.02%	-11.35%	-15.02%
30	XNA	10000	-4.9	-5.62%	8.52	3.63	2.37	0.13	0.0358	40.6887	0.35%	0.60%	0.76%	0.81%	0.77%
31	ARG	2000	-4.6	-0.21%	14.57	2.21	2.1	0.02	0.0090	66.8326	-0.97%	-2.43%	-4.39%	-6.84%	-9.79%
32	BOL	3000	-8.4	0.13%	19.82	3.17	4.11	-0.06	-0.0189	46.5931	-2.53%	-5.39%	-8.58%	-12.10%	-15.95%
33	BRA	5000	-7.9	0.21%	24.91	2.91	4.01	-0.08	-0.0275	50.7560	-2.51%	-5.22%	-8.13%	-11.23%	-14.54%
34	CHL	10000	-4.9	-5.24%	10.61	2.27	2.87	-0.19	-0.0837	65.0661	0.20%	0.29%	0.29%	0.19%	-0.01%
35	COL	3500	-10.6	0.11%	23.95	2.76	6.37	0.14	0.0507	53.5145	-3.30%	-6.88%	-10.74%	-14.89%	-19.32%
36	ECU	3000	-11.1	-0.75%	21.86	2.49	7.73	0.43	0.1727	59.3173	-3.11%	-6.55%	-10.32%	-14.42%	-18.86%
37	PRY	5000	-7.3	0.23%	23.9	2.99	2.89	0	0.0000	49.3980	-2.32%	-4.83%	-7.54%	-10.45%	-13.56%
38	PER	2500	-9.8	0.51%	19.89	2.91	5.6	0.22	0.0756	50.7560	-3.02%	-6.45%	-10.26%	-14.48%	-19.10%
39	URY	3000	-5.6	0.75%	18.15	2.09	2.51	0.21	0.1005	70.6699	-1.80%	-3.93%	-6.39%	-9.19%	-12.31%
40	VEN	4000	-10.2	0.17%	25.2	2.85	3.35	-0.25	-0.0877	51.8246	-3.21%	-6.66%	-10.36%	-14.31%	-18.51%
41	XSM	3000	-5.6	0.75%	18.15	2.09	2.51	0.21	0.1005	70.6699	-1.80%	-3.93%	-6.39%	-9.19%	-12.31%
42	CRI	4500	-9.7	-0.15%	25.96	2.26	3.44	-0.16	-0.0708	65.3540	-2.95%	-6.12%	-9.52%	-13.13%	-16.97%
43	GTM	4500	-8.5	-0.05%	24.15	2.75	2.79	-0.24	-0.0873	53.7091	-2.61%	-5.44%	-8.49%	-11.76%	-15.25%
44	HND	4500	-8.8	-0.16%	24.52	2.45	2.49	-0.25	-0.1020	60.2857	-2.66%	-5.54%	-8.64%	-11.96%	-15.50%
45	NIC	4500	-9.1	0.20%	25.5	2.38	2.34	-0.22	-0.0924	62.0588	-2.87%	-5.95%	-9.26%	-12.79%	-16.54%
46	SLV	4500	-9.8	-0.40%	25.89	2.2	5.35	0.14	0.0636	67.1364	-2.93%	-6.07%	-9.44%	-13.03%	-16.84%
47	PAN	4500	-9.0	0.39%	25.54	2.6	2.06	-0.22	-0.0846	56.8077	-2.90%	-6.02%	-9.36%	-12.93%	-16.71%
48	XCA	4500	-9.1	0.20%	25.5	2.38	2.34	-0.22	-0.0924	62.0588	-2.87%	-5.95%	-9.26%	-12.79%	-16.54%
49	DOM	5000	-8.0	0.13%	25.28	2.19	2.22	-0.25	-0.1142	67.4429	-2.51%	-5.22%	-8.13%	-11.24%	-14.55%
50	JAM	5000	-8.2	0.52%	26.34	2.04	2.27	-0.23	-0.1127	72.4020	-2.70%	-5.60%	-8.70%	-12.00%	-15.50%
51	PRI	5000	-8.2	-0.10%	25.38	1.95	1.82	-0.26	-0.1333	75.7436	-2.50%	-5.19%	-8.09%	-11.18%	-14.47%
52	TTO	4500	-9.4	-0.11%	25.8	2.01	2.26	-0.3	-0.1493	73.4826	-2.88%	-5.98%	-9.30%	-12.84%	-16.60%
53	XCB	5000	-8.2	0.52%	26.34	2.04	2.27	-0.23	-0.1127	72.4020	-2.70%	-5.60%	-8.70%	-12.00%	-15.50%
54	AUT	10000	-3.0	-4.01%	7.89	3.15	2.62	0	0.0000	46.8889	0.43%	0.76%	0.98%	1.11%	1.14%
55	BEL	10000	-2.5	-2.85%	10.18	2.66	2.62	0.03	0.0113	55.5263	0.22%	0.34%	0.36%	0.28%	0.10%
56	CYP	4000	-5.2	0.60%	19.18	2.63	1.38	-0.16	-0.0608	56.1597	-1.69%	-3.62%	-5.80%	-8.24%	-10.91%
57	CZE	10000	-2.6	-3.48%	8.2	3.11	2.34	0.03	0.0096	47.4920	0.40%	0.70%	0.90%	1.00%	1.00%
58	DNK	10000	-1.4	-2.42%	8.11	2.66	2.38	0.14	0.0526	55.5263	0.42%	0.75%	0.98%	1.10%	1.13%
59	EST	10000	-1.0	-2.92%	4.66	3.64	1.96	0.17	0.0467	40.5769	0.74%	1.37%	1.91%	2.34%	2.68%
60	FIN	10000	0.0	-3.22%	0.01	4.14	1.9	0.23	0.0556	35.6763	1.19%	2.27%	3.26%	4.15%	4.94%
61	FRA	10000	-3.2	-3.21%	11.26	2.85	2.75	-0.12	-0.0421	51.8246	0.10%	0.11%	0.01%	-0.18%	-0.48%
62	DEU	10000	-2.4	-3.17%	8.76	2.85	2.54	0.05	0.0175	51.8246	0.35%	0.60%	0.76%	0.81%	0.77%
63	GRC	3000	-4.6	-0.26%	15.59	3.05	1.63	-0.2	-0.0656	48.4262	-1.11%	-2.56%	-4.34%	-6.45%	-8.89%
64	HUN	10000	-3.0	-3.27%	10.28	3.36	2.03	-0.03	-0.0089	43.9583	0.18%	0.27%	0.25%	0.14%	-0.07%
65	IRL	10000	-2.1	-2.63%	10.02	1.84	3.29	0.09	0.0489	80.2717	0.29%	0.48%	0.57%	0.56%	0.45%
66	ITA	1500	-4.1	0.23%	13.4	3.02	2.05	-0.13	-0.0430	48.9073	-0.77%	-2.21%	-4.30%	-7.06%	-10.48%
67	LVA	10000	-1.4	-3.06%	5.67	3.48	2.04	0.16	0.0460	42.4425	0.64%	1.18%	1.62%	1.96%	2.20%
68	LTU	10000	-1.7	-3.06%	6.6	3.36	2.05	0.13	0.0387	43.9583	0.55%	1.00%	1.35%	1.60%	1.75%
69	LUX	10000	-2.7	-3.13%	9.76	2.82	2.93	0.01	0.0035	52.3759	0.25%	0.41%	0.46%	0.42%	0.27%
70	MLT	4000	-5.1	0.37%	18.85	2.44	0.86	-0.1	-0.0410	60.5328	-1.58%	-3.41%	-5.49%	-7.81%	-10.39%

Table A4-2. Agriculture: percentage variation in multi-factor productivity. Negative values in red.

N.	Code	Base Y	ref.imp.	adj	Base T	Delta T	Base P	Delta P	P/T Ratio	C/T Ratio	+1°C	+2°C	+3°C	+4°C	+5°C
71	NLD	10000	-2.1	-2.57%	10.03	2.52	2.49	0.08	0.0317	58.6111	0.24%	0.38%	0.42%	0.37%	0.21%
72	POL	10000	-2.2	-3.19%	8.38	2.26	2.02	0.07	0.0310	65.3540	0.42%	0.74%	0.96%	1.08%	1.10%
73	PRT	2500	-4.4	0.55%	15.53	2.69	2.13	-0.32	-0.1190	54.9071	-1.26%	-2.92%	-4.97%	-7.42%	-10.27%
74	SVK	10000	-2.8	-3.44%	8.88	3.28	2.23	-0.01	-0.0030	45.0305	0.33%	0.55%	0.68%	0.70%	0.63%
75	SVN	10000	-3.3	-3.74%	9.61	3.27	2.43	-0.07	-0.0214	45.1682	0.25%	0.41%	0.46%	0.42%	0.27%
76	ESP	2000	-4.3	-0.25%	14	2.95	1.8	-0.25	-0.0847	50.0678	-0.87%	-2.23%	-4.09%	-6.44%	-9.29%
77	SWE	10000	-0.5	-3.27%	1.75	3.49	2.2	0.22	0.0630	42.3209	1.03%	1.96%	2.79%	3.52%	4.15%
78	GBR	10000	-1.6	-2.35%	9.22	2.16	2.81	0.09	0.0417	68.3796	0.34%	0.58%	0.73%	0.77%	0.72%
79	CHE	10000	-3.1	-4.30%	7.22	3.07	3.41	-0.05	-0.0163	48.1107	0.50%	0.89%	1.19%	1.39%	1.49%
80	NOR	10000	0.0	-3.10%	0.89	3.3	2.89	0.31	0.0939	44.7576	1.12%	2.14%	3.06%	3.88%	4.60%
81	XEF	10000	-3.1	-4.30%	7.22	3.07	3.41	-0.05	-0.0163	48.1107	0.50%	0.89%	1.19%	1.39%	1.49%
82	ALB	1500	-4.1	0.16%	13.3	3.21	2.28	-0.22	-0.0685	46.0125	-0.75%	-2.16%	-4.23%	-6.97%	-10.36%
83	BGR	1000	-3.9	-0.67%	12.23	3.29	1.74	-0.11	-0.0334	44.8936	-0.08%	-1.16%	-3.22%	-6.29%	-10.34%
84	BLR	10000	-2.0	-3.24%	6.82	3.53	2.01	0.1	0.0283	41.8414	0.52%	0.95%	1.27%	1.50%	1.62%
85	HRV	500	-3.5	-1.89%	11.43	3.28	2.29	-0.09	-0.0274	45.0305	1.43%	0.88%	-1.66%	-6.19%	-12.70%
86	ROU	10000	-3.3	-3.54%	10.25	3.4	1.96	-0.06	-0.0176	43.4412	0.19%	0.27%	0.26%	0.15%	-0.07%
87	RUS	10000	-0.6	-5.20%	-4.64	4.6	1.53	0.23	0.0500	32.1087	1.64%	3.18%	4.62%	5.97%	7.21%
88	UKR	10000	-2.9	-3.34%	9.74	3.44	1.7	0.03	0.0087	42.9360	0.24%	0.37%	0.41%	0.34%	0.18%
89	XEE	10000	-2.9	-3.34%	9.74	3.44	1.7	0.03	0.0087	42.9360	0.24%	0.37%	0.41%	0.34%	0.18%
90	XER	10000	-2.4	-3.17%	8.76	2.85	2.54	0.05	0.0175	51.8246	0.35%	0.60%	0.76%	0.81%	0.77%
91	KAZ	10000	-2.9	-3.86%	7.88	3.9	0.92	0.08	0.0205	37.8718	0.41%	0.72%	0.93%	1.04%	1.05%
92	KGZ	10000	-4.2	-6.68%	2.88	3.63	1.54	0.06	0.0165	40.6887	0.91%	1.72%	2.44%	3.05%	3.57%
93	XSU	10000	-2.9	-3.86%	7.88	3.9	0.92	0.08	0.0205	37.8718	0.41%	0.72%	0.93%	1.04%	1.05%
94	ARM	10000	-4.2	-5.14%	8.1	3.44	1.79	-0.07	-0.0203	42.9360	0.40%	0.70%	0.90%	1.00%	1.00%
95	AZE	1500	-4.3	0.09%	13.44	3.09	1.25	0	0.0000	47.7994	-0.81%	-2.29%	-4.43%	-7.23%	-10.69%
96	GEO	10000	-3.9	-4.55%	8.96	3.3	2.32	-0.04	-0.0121	44.7576	0.32%	0.53%	0.65%	0.67%	0.59%
97	BHR	6000	-6.8	0.44%	25.72	3.21	0.2	0.01	0.0031	46.0125	-2.24%	-4.65%	-7.23%	-9.97%	-12.87%
98	IRN	3000	-5.6	-0.03%	16.74	3.51	0.63	-0.03	-0.0085	42.0798	-1.54%	-3.41%	-5.62%	-8.15%	-11.02%
99	ISR	4000	-5.9	0.15%	19.36	3.05	0.4	-0.07	-0.0230	48.4262	-1.77%	-3.79%	-6.06%	-8.58%	-11.34%
100	JOR	4000	-5.9	-0.36%	18.56	3.39	0.28	-0.04	-0.0118	43.5693	-1.60%	-3.45%	-5.54%	-7.89%	-10.48%
101	KWT	6000	-6.3	0.52%	24.73	3.55	0.24	0.01	0.0028	41.6056	-2.10%	-4.36%	-6.78%	-9.37%	-12.13%
102	OMN	6000	-7.6	0.09%	26.71	2.86	0.25	0.05	0.0175	51.6434	-2.39%	-4.94%	-7.66%	-10.54%	-13.59%
103	QAT	6000	-7.0	0.64%	26.45	3.29	0.18	0.01	0.0030	44.8936	-2.37%	-4.90%	-7.60%	-10.47%	-13.50%
104	SAU	6000	-7.2	-0.85%	23.91	3.56	0.23	0.03	0.0084	41.4888	-1.96%	-4.08%	-6.38%	-8.83%	-11.45%
106	TUR	500	-4.5	0.58%	11.99	3.33	1.79	-0.17	-0.0511	44.3544	0.29%	-1.41%	-5.09%	-10.77%	-18.42%
105	ARE	6000	-7.0	0.97%	27.28	3.28	0.19	0.01	0.0030	45.0305	-2.51%	-5.18%	-8.01%	-11.01%	-14.18%
107	XWS	4000	-5.9	-0.36%	18.56	3.39	0.28	-0.04	-0.0118	43.5693	-1.60%	-3.45%	-5.54%	-7.89%	-10.48%
108	EGY	5000	-6.6	0.00%	22.27	3.18	0.09	-0.01	-0.0031	46.4465	-2.00%	-4.21%	-6.61%	-9.21%	-12.01%
109	MAR	4000	-5.8	-0.50%	18.32	3.2	0.53	-0.12	-0.0375	46.1563	-1.53%	-3.30%	-5.32%	-7.60%	-10.12%
110	TUN	4000	-5.5	0.41%	19.14	2.98	0.46	-0.07	-0.0235	49.5638	-1.71%	-3.67%	-5.88%	-8.34%	-11.04%
111	XNF	4000	-5.5	0.41%	19.14	2.98	0.46	-0.07	-0.0235	49.5638	-1.71%	-3.67%	-5.88%	-8.34%	-11.04%
112	BEN	5000	-9.7	-0.73%	26.36	2.72	3.11	0.04	0.0147	54.3015	-2.78%	-5.76%	-8.95%	-12.32%	-15.90%
113	BFA	5000	-9.2	0.34%	27.29	3.02	2.09	0.08	0.0265	48.9073	-2.99%	-6.18%	-9.57%	-13.16%	-16.94%
114	CMR	3500	-10.0	0.29%	23.5	2.65	5.08	0.21	0.0792	55.7358	-3.15%	-6.59%	-10.31%	-14.32%	-18.61%
115	CIV	4000	-10.0	0.37%	25.33	2.65	4.04	0.04	0.0151	55.7358	-3.22%	-6.68%	-10.39%	-14.35%	-18.56%
116	GHA	4500	-9.9	-0.16%	26.17	2.59	3.5	0.03	0.0116	57.0270	-3.04%	-6.30%	-9.77%	-13.47%	-17.39%
117	GIN	4000	-9.6	0.92%	25.41	2.81	3.54	-0.03	-0.0107	52.5623	-3.25%	-6.75%	-10.50%	-14.50%	-18.75%
118	NGA	4000	-9.8	0.88%	25.63	2.73	3.2	0.09	0.0330	54.1026	-3.30%	-6.85%	-10.64%	-14.68%	-18.98%
119	SEN	5500	-8.8	0.17%	27.88	2.75	0.99	-0.02	-0.0073	53.7091	-2.81%	-5.79%	-8.96%	-12.31%	-15.84%
120	TGO	4500	-9.8	-0.03%	26.21	2.65	3.46	0.01	0.0038	55.7358	-3.05%	-6.33%	-9.82%	-13.53%	-17.47%
121	XWF	4500	-9.8	-0.03%	26.21	2.65	3.46	0.01	0.0038	55.7358	-3.05%	-6.33%	-9.82%	-13.53%	-17.47%
122	XCF	4000	-10.2	-0.48%	24.37	2.79	4.02	0.26	0.0932	52.9391	-2.99%	-6.23%	-9.72%	-13.45%	-17.44%
123	XAC	3500	-11.3	-0.68%	24	2.44	1.78	0.23	0.0943	60.5328	-3.27%	-6.82%	-10.65%	-14.77%	-19.17%
124	ETH	3500	-9.8	-0.50%	22.25	2.68	2.11	0.29	0.1082	55.1119	-2.80%	-5.89%	-9.26%	-12.91%	-16.85%
125	KEN	3500	-11.3	-0.68%	24	2.44	1.78	0.23	0.0943	60.5328	-3.27%	-6.82%	-10.65%	-14.77%	-19.17%
126	MDG	4000	-8.0	0.33%	22.74	2.33	3.56	-0.12	-0.0515	63.3906	-2.53%	-5.31%	-8.34%	-11.62%	-15.14%
127	MWI	3000	-9.1	0.67%	21.08	2.86	3.33	-0.17	-0.0594	51.6434	-2.91%	-6.15%	-9.72%	-13.63%	-17.86%
128	MUS	5000	-7.7	-0.32%	24.3	1.77	2.88	-0.11	-0.0621	83.4463	-2.25%	-4.70%	-7.34%	-10.19%	-13.23%
129	MOZ	4500	-8.1	-0.25%	23.21	2.68	3	-0.16	-0.0597	55.1119	-2.39%	-5.01%	-7.84%	-10.90%	-14.18%
130	RWA	2200	-11.0	0.26%	19.66	2.72	4.83	0.46	0.1691	54.3015	-3.30%	-7.04%	-11.24%	-15.89%	-21.00%
131	TZA	3000	-10.2	-0.35%	21.31	2.63	3.26	0.08	0.0304	56.1597	-2.95%	-6.24%	-9.85%	-13.80%	-18.07%
132	UGA	3000	-11.1	-0.30%	22.29	2.54	3.5	0.4	0.1575	58.1496	-3.26%	-6.85%	-10.78%	-15.03%	-19.61%
133	ZMB	3000	-9.1	0.63%	20.97	3.07	3.45	-0.12	-0.0391	48.1107	-2.90%	-6.13%	-9.69%	-13.58%	-17.81%
134	ZWE	3500	-8.1	0.28%	21.06	3.04	2.46	-0.15	-0.0493	48.5855	-2.51%	-5.30%	-8.37%	-11.73%	-15.38%
135	XEC	4000	-8.1	0.73%	23.21	2.68	3	-0.16	-0.0597	55.1119	-2.69%	-5.63%	-8.82%	-12.26%	-15.95%
136	BWA	4000	-7.4	0.02%	21.07	3.38	2.01	-0.15	-0.0444	43.6982	-2.22%	-4.69%	-7.41%	-10.38%	-13.60%
137	NAM	4000	-7.3	0.27%	21.35	3.17	1.49	-0.12	-0.0379	46.5931	-2.28%	-4.80%	-7.57%	-10.60%	-13.87%
138	ZAF	2500	-6.3	0.41%	16.93	2.94	2.32	-0.08	-0.0272	50.2381	-1.85%	-4.11%	-6.75%	-9.80%	-13.25%
139	XSC	2500	-6.3	0.41%	16.93	2.94	2.32	-0.08	-0.0272	50.2381	-1.85%	-4.11%	-6.75%	-9.80%	-13.25%
140	XTW	2000	-4.3	-0.25%	14	2.95	1.8	-0.25	-0.0847	50.0678	-0.87%	-2.23%	-4.09%	-6.44%	-9.29%

Table A5. Adjustment factors for regional temperature changes.

N.	Code	T. adj.		N.	Code	T. adj.
1	AUS	0.95		71	NLD	0.85
2	NZL	0.70		72	POL	0.88
3	XOC	0.64		73	PRT	0.79
4	CHN	1.19		74	SVK	0.94
5	HKG	0.75		75	SVN	1.15
6	JPN	1.03		76	ESP	1.15
7	KOR	1.05		77	SWE	1.03
8	MNG	1.28		78	GBR	1.22
9	TWN	0.75		79	CHE	0.76
10	XEA	0.82		80	NOR	1.08
11	BRN	0.76		81	XEF	1.16
12	KHM	0.82		82	ALB	1.08
13	IDN	0.77		83	BGR	1.12
14	LAO	0.89		84	BLR	1.15
15	MYS	0.77		85	HRV	1.24
16	PHL	0.72		86	ROU	1.15
17	SGP	0.74		87	RUS	1.19
18	THA	0.86		88	UKR	1.61
19	VNM	0.83		89	XEE	1.20
20	XSE	0.82		90	XER	1.20
21	BGD	0.89		91	KAZ	1.00
22	IND	0.97		92	KGZ	1.37
23	NPL	1.10		93	XSU	1.27
24	PAK	1.18		94	ARM	1.37
25	LKA	0.71		95	AZE	1.20
26	XSA	0.97		96	GEO	1.08
27	CAN	1.59		97	BHR	1.16
28	USA	1.27		98	IRN	1.12
29	MEX	1.01		99	ISR	1.23
30	XNA	1.27		100	JOR	1.07
31	ARG	0.77		101	KWT	1.19
32	BOL	1.11		102	OMN	1.24
33	BRA	1.02		103	QAT	1.00
34	CHL	0.80		104	SAU	1.15
35	COL	0.97		106	TUR	1.25
36	ECU	0.87		105	ARE	1.17
37	PRY	1.05		107	XWS	1.15
38	PER	1.02		108	EGY	1.19
39	URY	0.73		109	MAR	1.11
40	VEN	1.00		110	TUN	1.12
41	XSM	0.73		111	XNF	1.04
42	CRI	0.79		112	BEN	1.04
43	GTM	0.96		113	BFA	0.95
44	HND	0.86		114	CMR	1.06
45	NIC	0.83		115	CIV	0.93
46	SLV	0.77		116	GHA	0.93
47	PAN	0.91		117	GIN	0.91
48	XCA	0.83		118	NGA	0.98
49	DOM	0.77		119	SEN	0.96
50	JAM	0.71		120	TGO	0.96
51	PRI	0.68		121	XWF	0.93
52	TTO	0.70		122	XCF	0.93
53	XCB	0.71		123	XAC	0.98
54	AUT	1.10		124	ETH	0.85
55	BEL	0.93		125	KEN	0.94
56	CYP	0.92		126	MDG	0.85
57	CZE	1.09		127	MWI	0.82
58	DNK	0.93		128	MUS	1.00
59	EST	1.27		129	MOZ	0.62
60	FIN	1.45		130	RWA	0.94
61	FRA	1.00		131	TZA	0.95
62	DEU	1.00		132	UGA	0.92
63	GRC	1.07		133	ZMB	0.89
64	HUN	1.18		134	ZWE	1.08
65	IRL	0.64		135	XEC	1.06
66	ITA	1.06		136	BWA	0.94
67	LVA	1.22		137	NAM	1.18
68	LTU	1.18		138	ZAF	1.11
69	LUX	0.99		139	XSC	1.03
70	MLT	0.85		140	XTW	1.03

Table A6-1. Heat impacts on labor productivity, by sector (percentage change). Values below -10% in red.

N.	Code	AGRICULTURE					MANUFACTURING					SERVICES				
		+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C
1	AUS	0.00%	0.00%	-1.09%	-2.86%	-5.55%	0.00%	0.00%	0.00%	-0.02%	-0.87%	0.00%	0.00%	0.00%	0.00%	0.00%
2	NZL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	XOC	-5.53%	-12.90%	-21.93%	-31.19%	-40.70%	-1.32%	-4.24%	-8.08%	-13.20%	-19.20%	0.00%	-0.12%	-1.53%	-4.02%	-7.30%
4	CHN	-1.37%	-3.01%	-5.13%	-7.31%	-9.90%	0.00%	-0.51%	-1.46%	-2.69%	-4.17%	0.00%	0.00%	-0.06%	-0.58%	-1.33%
5	HKG	-3.76%	-7.69%	-12.36%	-17.44%	-23.14%	-1.95%	-3.99%	-6.52%	-9.13%	-12.25%	-0.39%	-1.44%	-2.96%	-4.65%	-6.63%
6	JPN	-1.31%	-2.78%	-4.92%	-7.50%	-10.46%	-0.07%	-0.58%	-1.54%	-2.66%	-4.15%	0.00%	0.00%	-0.14%	-0.64%	-1.40%
7	KOR	-1.39%	-2.81%	-4.28%	-6.61%	-9.55%	-0.01%	-0.68%	-1.65%	-2.64%	-3.68%	0.00%	0.00%	-0.11%	-0.73%	-1.50%
8	MNG	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
9	TWN	-3.76%	-7.69%	-12.36%	-17.44%	-23.14%	-1.95%	-3.99%	-6.52%	-9.13%	-12.25%	-0.39%	-1.44%	-2.96%	-4.65%	-6.63%
10	XEA	-8.05%	-16.95%	-27.22%	-37.76%	-47.95%	-3.79%	-8.33%	-13.23%	-18.66%	-24.93%	-1.22%	-3.74%	-6.71%	-10.16%	-13.89%
11	BRN	-10.71%	-21.70%	-32.98%	-44.57%	-56.47%	-5.75%	-11.82%	-18.06%	-24.46%	-31.04%	-0.69%	-3.70%	-8.19%	-12.82%	-17.58%
12	KHM	-8.05%	-16.95%	-27.22%	-37.76%	-47.95%	-3.79%	-8.33%	-13.23%	-18.66%	-24.93%	-1.22%	-3.74%	-6.71%	-10.16%	-13.89%
13	IDN	-9.78%	-19.81%	-30.11%	-40.67%	-51.53%	-4.03%	-9.60%	-15.56%	-21.67%	-27.95%	0.00%	-1.82%	-5.18%	-9.64%	-14.28%
14	LAO	-5.34%	-11.18%	-17.57%	-24.75%	-32.71%	-2.48%	-5.53%	-9.00%	-12.79%	-16.97%	-0.11%	-1.15%	-3.22%	-5.69%	-8.40%
15	MYS	-10.26%	-20.79%	-31.60%	-42.70%	-54.10%	-5.30%	-11.23%	-17.32%	-23.57%	-29.99%	-0.12%	-2.23%	-6.63%	-11.23%	-15.96%
16	PHL	-10.03%	-20.31%	-30.86%	-41.70%	-52.83%	-4.29%	-9.81%	-15.86%	-22.07%	-28.45%	-0.50%	-2.75%	-6.18%	-10.58%	-15.24%
17	SGP	-10.87%	-22.03%	-33.49%	-45.25%	-57.34%	-5.96%	-12.09%	-18.37%	-24.82%	-31.46%	-0.60%	-4.21%	-8.73%	-13.38%	-18.16%
18	THA	-7.84%	-16.92%	-27.20%	-37.95%	-47.97%	-3.69%	-8.30%	-13.07%	-18.63%	-24.90%	-1.67%	-4.25%	-7.14%	-10.61%	-14.23%
19	VNM	-5.40%	-11.73%	-18.42%	-26.15%	-34.56%	-2.45%	-5.23%	-8.86%	-12.96%	-17.32%	-0.45%	-1.98%	-3.88%	-6.13%	-9.09%
20	XSE	-8.05%	-16.95%	-27.22%	-37.76%	-47.95%	-3.79%	-8.33%	-13.23%	-18.66%	-24.93%	-1.22%	-3.74%	-6.71%	-10.16%	-13.89%
21	BGD	-5.07%	-11.12%	-18.06%	-25.28%	-31.73%	-2.45%	-5.33%	-8.59%	-12.38%	-16.84%	-1.01%	-2.59%	-4.47%	-6.68%	-9.23%
22	IND	-5.21%	-10.84%	-16.71%	-23.06%	-29.08%	-2.47%	-5.44%	-8.83%	-12.44%	-16.21%	-0.74%	-2.36%	-4.29%	-6.58%	-9.25%
23	NPL	-1.10%	-3.53%	-6.96%	-10.48%	-14.26%	0.00%	-0.36%	-1.29%	-3.05%	-5.45%	0.00%	0.00%	-0.01%	-0.38%	-1.30%
24	PAK	-3.60%	-7.28%	-11.05%	-15.60%	-20.24%	-1.40%	-3.43%	-5.79%	-8.21%	-10.69%	-0.78%	-1.83%	-2.91%	-4.51%	-6.33%
25	LKA	-8.14%	-17.23%	-26.55%	-36.11%	-45.92%	-1.70%	-5.86%	-11.23%	-17.12%	-23.16%	0.00%	-0.51%	-2.23%	-5.76%	-10.12%
26	XSA	-5.21%	-10.84%	-16.71%	-23.06%	-29.08%	-2.47%	-5.44%	-8.83%	-12.44%	-16.21%	-0.74%	-2.36%	-4.29%	-6.58%	-9.25%
27	CAN	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
28	USA	0.00%	0.00%	-0.59%	-1.91%	-3.66%	0.00%	0.00%	0.00%	0.00%	-0.51%	0.00%	0.00%	0.00%	0.00%	0.00%
29	MEX	-0.69%	-3.19%	-6.42%	-10.08%	-14.61%	0.00%	0.00%	-0.73%	-2.56%	-4.86%	0.00%	0.00%	0.00%	0.00%	-0.89%
30	XNA	0.00%	0.00%	-0.59%	-1.91%	-3.66%	0.00%	0.00%	0.00%	0.00%	-0.51%	0.00%	0.00%	0.00%	0.00%	0.00%
31	ARG	-0.04%	-0.81%	-2.81%	-5.11%	-8.44%	0.00%	0.00%	-0.09%	-0.74%	-2.15%	0.00%	0.00%	0.00%	0.00%	-0.15%
32	BOL	0.00%	0.00%	0.00%	0.00%	-0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
33	BRA	-3.99%	-9.28%	-15.65%	-23.79%	-32.32%	-0.05%	-1.59%	-4.37%	-8.06%	-12.47%	0.00%	0.00%	-0.19%	-1.65%	-3.93%
34	CHL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
35	COL	-5.20%	-12.82%	-21.22%	-29.84%	-38.69%	0.00%	-0.58%	-4.54%	-10.03%	-15.91%	0.00%	0.00%	0.00%	-1.14%	-4.51%
36	ECU	0.00%	0.00%	0.00%	-1.66%	-4.79%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.00%	0.00%	0.00%	0.00%	0.00%
37	PRY	-3.66%	-8.01%	-13.30%	-18.73%	-25.33%	-1.37%	-3.49%	-5.93%	-9.02%	-12.56%	0.00%	-0.50%	-1.67%	-3.45%	-5.48%
38	PER	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
39	URY	0.00%	-0.12%	-1.24%	-3.18%	-5.90%	0.00%	0.00%	0.00%	-0.14%	-0.98%	0.00%	0.00%	0.00%	0.00%	0.00%
40	VEN	-4.99%	-10.79%	-18.25%	-26.67%	-35.30%	0.00%	-1.45%	-4.98%	-9.01%	-14.17%	0.00%	0.00%	-0.02%	-1.65%	-4.56%
41	XSM	0.00%	-0.12%	-1.24%	-3.18%	-5.90%	0.00%	0.00%	0.00%	-0.14%	-0.98%	0.00%	0.00%	0.00%	0.00%	0.00%
42	CRI	-6.29%	-14.71%	-23.38%	-32.27%	-41.40%	-0.26%	-2.69%	-7.17%	-12.92%	-18.81%	0.00%	0.00%	-0.47%	-2.80%	-6.61%
43	GTM	0.00%	-0.57%	-3.91%	-8.59%	-14.28%	0.00%	0.00%	0.00%	-0.72%	-3.30%	0.00%	0.00%	0.00%	0.00%	0.00%
44	HND	-7.27%	-16.38%	-25.79%	-35.44%	-45.34%	-2.61%	-6.16%	-10.96%	-16.86%	-22.92%	0.00%	-0.99%	-3.16%	-6.15%	-10.09%
45	NIC	-9.03%	-18.29%	-27.79%	-37.53%	-47.52%	-2.34%	-7.09%	-12.81%	-18.69%	-24.72%	-0.19%	-0.75%	-3.01%	-6.91%	-11.41%
46	SLV	-8.22%	-17.46%	-26.93%	-36.65%	-46.62%	-2.87%	-7.19%	-12.40%	-18.26%	-24.28%	0.00%	-0.77%	-3.37%	-6.77%	-10.96%
47	PAN	-2.31%	-6.93%	-12.00%	-18.17%	-26.01%	0.00%	-0.30%	-2.32%	-5.59%	-9.13%	0.00%	0.00%	0.00%	-0.51%	-2.41%
48	XCA	-9.03%	-18.29%	-27.79%	-37.53%	-47.52%	-2.34%	-7.09%	-12.81%	-18.69%	-24.72%	-0.19%	-0.75%	-3.01%	-6.91%	-11.41%
49	DOM	-5.87%	-13.13%	-22.08%	-31.32%	-40.81%	-2.09%	-5.27%	-9.19%	-14.00%	-19.89%	0.00%	-0.22%	-2.19%	-4.85%	-8.02%
50	JAM	-6.33%	-14.64%	-23.86%	-33.31%	-43.01%	-2.62%	-5.97%	-10.13%	-15.56%	-21.50%	0.00%	-0.79%	-3.07%	-5.73%	-9.13%
51	PRI	-5.80%	-12.81%	-21.72%	-31.07%	-40.66%	-2.05%	-5.31%	-9.21%	-13.89%	-19.77%	0.00%	-0.30%	-2.26%	-4.95%	-8.14%
52	TTO	-8.94%	-18.61%	-28.52%	-38.70%	-49.14%	-3.60%	-7.87%	-13.47%	-19.49%	-25.66%	-0.14%	-2.22%	-5.10%	-8.48%	-12.90%
53	XCB	-6.33%	-14.64%	-23.86%	-33.31%	-43.01%	-2.62%	-5.97%	-10.13%	-15.56%	-21.50%	0.00%	-0.79%	-3.07%	-5.73%	-9.13%
54	AUT	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
55	BEL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
56	CYP	-0.26%	-1.46%	-3.03%	-5.38%	-8.02%	0.00%	0.00%	-0.12%	-0.96%	-2.04%	0.00%	0.00%	0.00%	0.00%	-0.11%
57	CZE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
58	DNK	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
59	EST	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
60	FIN	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
61	FRA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
62	DEU	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
63	GRC	0.00%	-0.85%	-2.08%	-4.09%	-6.64%	0.00%	0.00%	0.00%	-0.56%	-1.41%	0.00%	0.00%	0.00%	0.00%	0.00%
64	HUN	0.00%	0.00%	0.00%	0.00%	-0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
65	IRL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
66	ITA	0.00%	0.00%	0.00%	-0.72%	-2.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
67	LVA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
68	LTU	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
69	LUX	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
70	MLT	-0.29%	-1.31%	-2.99%	-5.06%	-8.17%	0.00%	0.00%	-0.18%	-0.87%	-2.05%	0.00%	0.00%	0.00%	0.00%	-0.15%

Table A6-2. Heat impacts on labor productivity, by sector (percentage change). Values below -10% in red.

N.	Code	AGRICULTURE					MANUFACTURING					SERVICES				
		+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C	+1°C	+2°C	+3°C	+4°C	+5°C
71	NLD	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
72	POL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**0.00%**	0.00%	0.00%	0.00%	0.00%
73	PRT	0.00%	0.00%	0.00%	0.00%	-0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	**0.00%**	0.00%	0.00%	0.00%	0.00%
74	SVK	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**0.00%**	0.00%	0.00%	0.00%	0.00%
75	SVN	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**0.00%**	0.00%	0.00%	0.00%	0.00%
76	ESP	0.00%	0.00%	0.00%	-0.25%	-1.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
77	SWE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
78	GBR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
79	CHE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
80	NOR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
81	XEF	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
82	ALB	0.00%	0.00%	-0.03%	-1.19%	-2.52%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
83	BGR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
84	BLR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
85	HRV	0.00%	0.00%	0.00%	-0.87%	-2.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
86	ROU	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
87	RUS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
88	UKR	0.00%	0.00%	0.00%	0.00%	-0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
89	XEE	0.00%	0.00%	0.00%	0.00%	-0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
90	XER	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
91	KAZ	0.00%	0.00%	0.00%	-0.48%	-1.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
92	KGZ	0.00%	0.00%	0.00%	0.00%	-0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
93	XSU	0.00%	0.00%	0.00%	-0.48%	-1.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
94	ARM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
95	AZE	0.00%	-0.37%	-1.52%	-2.90%	-4.85%	0.00%	0.00%	0.00%	-0.26%	-1.07%	0.00%	0.00%	0.00%	0.00%	0.00%
96	GEO	0.00%	0.00%	-0.45%	-1.76%	-3.56%	0.00%	0.00%	0.00%	0.00%	-0.40%	0.00%	0.00%	0.00%	0.00%	0.00%
97	BHR	-4.22%	-8.54%	-13.46%	-19.24%	-25.08%	-1.95%	-4.42%	-7.11%	-9.86%	-12.98%	-0.98%	-2.28%	-3.75%	-5.63%	-7.67%
98	IRN	-1.06%	-2.49%	-4.35%	-6.67%	-9.25%	0.00%	-0.22%	-0.93%	-1.90%	-3.20%	0.00%	0.00%	0.00%	-0.18%	-0.74%
99	ISR	0.00%	-0.96%	-2.77%	-5.23%	-8.18%	0.00%	0.00%	0.00%	-0.61%	-1.83%	0.00%	0.00%	0.00%	0.00%	0.00%
100	JOR	-0.58%	-1.78%	-4.07%	-6.54%	-9.27%	0.00%	0.00%	-0.34%	-1.18%	-2.72%	0.00%	0.00%	0.00%	0.00%	-0.27%
101	KWT	-4.18%	-8.78%	-13.54%	-17.56%	-20.69%	-2.28%	-4.61%	-7.19%	-10.07%	-13.13%	-1.32%	-2.76%	-4.47%	-6.22%	-8.16%
102	OMN	-4.70%	-9.60%	-14.61%	-20.92%	-27.53%	-1.98%	-4.26%	-7.26%	-10.42%	-13.65%	-0.54%	-1.71%	-3.23%	-4.99%	-7.29%
103	QAT	-4.44%	-9.53%	-14.91%	-21.05%	-25.52%	-2.25%	-4.97%	-7.75%	-10.91%	-14.26%	-1.18%	-2.78%	-4.47%	-6.52%	-8.61%
104	SAU	-3.66%	-8.20%	-13.27%	-18.45%	-23.72%	-2.16%	-4.37%	-6.69%	-9.58%	-12.83%	-0.85%	-2.05%	-3.70%	-5.38%	-7.15%
106	TUR	0.00%	0.00%	0.00%	-0.45%	-1.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
105	ARE	-4.39%	-9.49%	-14.79%	-20.91%	-26.07%	-2.23%	-4.78%	-7.54%	-10.74%	-14.08%	-1.17%	-2.63%	-4.31%	-6.23%	-8.33%
107	XWS	-0.58%	-1.78%	-4.07%	-6.54%	-9.27%	0.00%	0.00%	-0.34%	-1.18%	-2.72%	0.00%	0.00%	0.00%	0.00%	-0.27%
108	EGY	-1.75%	-4.18%	-6.99%	-10.57%	-14.42%	0.00%	-0.40%	-1.54%	-3.22%	-5.14%	0.00%	0.00%	0.00%	-0.31%	-1.21%
109	MAR	0.00%	0.00%	-0.53%	-1.75%	-3.54%	0.00%	0.00%	0.00%	0.00%	-0.33%	0.00%	0.00%	0.00%	0.00%	0.00%
110	TUN	-0.53%	-1.87%	-3.73%	-6.17%	-8.75%	0.00%	0.00%	-0.32%	-1.26%	-2.56%	0.00%	0.00%	0.00%	0.00%	-0.27%
111	XNF	-0.53%	-1.87%	-3.73%	-6.17%	-8.75%	0.00%	0.00%	-0.32%	-1.26%	-2.56%	0.00%	0.00%	0.00%	0.00%	-0.27%
112	BEN	-8.35%	-17.67%	-27.22%	-37.01%	-47.05%	-2.73%	-7.05%	-12.24%	-18.09%	-24.09%	-0.64%	-1.94%	-4.32%	-7.75%	-11.77%
113	BFA	-8.25%	-16.69%	-26.25%	-36.16%	-45.00%	-3.91%	-7.91%	-12.88%	-17.98%	-23.71%	-1.29%	-3.84%	-6.77%	-9.78%	-13.52%
114	CMR	-3.09%	-9.09%	-16.21%	-24.63%	-33.37%	-0.15%	-1.40%	-3.75%	-8.16%	-13.06%	0.00%	0.00%	-0.25%	-1.49%	-3.66%
115	CIV	-7.63%	-16.71%	-26.08%	-35.68%	-45.54%	-2.30%	-6.35%	-11.24%	-17.04%	-23.03%	-0.06%	-1.17%	-3.20%	-6.59%	-10.44%
116	GHA	-8.48%	-17.71%	-27.17%	-36.87%	-46.81%	-2.58%	-6.65%	-12.05%	-17.90%	-23.90%	-0.27%	-1.55%	-3.78%	-7.06%	-11.33%
117	GIN	-3.94%	-9.35%	-15.21%	-22.98%	-31.00%	-1.37%	-3.34%	-6.04%	-9.63%	-13.53%	-0.05%	-0.44%	-1.71%	-3.29%	-5.51%
118	NGA	-7.33%	-15.37%	-24.59%	-34.45%	-44.40%	-3.45%	-7.38%	-11.94%	-16.96%	-22.68%	-0.78%	-2.23%	-5.08%	-8.12%	-11.67%
119	SEN	-6.25%	-13.25%	-21.13%	-30.22%	-38.92%	-2.60%	-5.71%	-9.60%	-14.01%	-18.98%	-1.10%	-2.80%	-4.78%	-7.15%	-10.13%
120	TGO	-7.90%	-17.03%	-26.39%	-35.98%	-45.82%	-2.31%	-6.32%	-11.32%	-17.15%	-23.12%	-0.30%	-1.41%	-3.49%	-6.79%	-10.70%
121	XWF	-7.90%	-17.03%	-26.39%	-35.98%	-45.82%	-2.31%	-6.32%	-11.32%	-17.15%	-23.12%	-0.30%	-1.41%	-3.49%	-6.79%	-10.70%
122	XCF	-3.33%	-9.48%	-16.52%	-24.76%	-33.40%	-0.28%	-3.12%	-7.43%	-12.44%		0.00%	0.00%	0.00%	-0.47%	-3.26%
123	XAC	0.00%	0.00%	-0.94%	-4.03%	-9.32%	0.00%	0.00%	0.00%	-0.06%	-0.89%	0.00%	0.00%	0.00%	0.00%	0.00%
124	ETH	0.00%	0.00%	0.00%	-0.34%	-3.30%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
125	KEN	0.00%	0.00%	-0.94%	-4.03%	-9.32%	0.00%	0.00%	0.00%	-0.06%	-0.89%	0.00%	0.00%	0.00%	0.00%	0.00%
126	MDG	-2.58%	-6.12%	-10.34%	-15.22%	-20.99%	0.00%	-0.33%	-2.23%	-4.86%	-7.82%	0.00%	0.00%	0.00%	-0.64%	-2.17%
127	MWI	-0.66%	-3.97%	-7.67%	-12.47%	-17.46%	0.00%	0.00%	-0.81%	-3.19%	-5.81%	0.00%	0.00%	0.00%	-0.04%	-1.11%
128	MUS	-3.74%	-8.64%	-14.26%	-21.77%	-30.86%	-1.43%	-3.84%	-6.40%	-9.70%	-13.54%	0.00%	-0.39%	-1.73%	-3.63%	-5.73%
129	MOZ	-3.51%	-7.73%	-12.82%	-18.21%	-24.87%	-1.23%	-3.14%	-5.54%	-8.41%	-11.84%	0.00%	-0.11%	-1.33%	-2.88%	-4.81%
130	RWA	0.00%	0.00%	0.00%	0.00%	-0.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
131	TZA	-0.28%	-3.97%	-8.28%	-13.83%	-19.95%	0.00%	0.00%	-0.50%	-3.24%	-6.34%	0.00%	0.00%	0.00%	0.00%	-0.85%
132	UGA	0.00%	0.00%	-1.90%	-7.49%	-15.51%	0.00%	0.00%	0.00%	-0.10%	-1.76%	0.00%	0.00%	0.00%	0.00%	0.00%
133	ZMB	-0.07%	-2.37%	-6.38%	-10.57%	-15.69%	0.00%	0.00%	-0.13%	-2.09%	-4.91%	0.00%	0.00%	0.00%	0.00%	-0.35%
134	ZWE	0.00%	-0.69%	-3.33%	-6.83%	-10.99%	0.00%	0.00%	0.00%	-0.75%	-2.65%	0.00%	0.00%	0.00%	0.00%	0.00%
135	XEC	-3.51%	-7.73%	-12.82%	-18.21%	-24.87%	-1.23%	-3.14%	-5.54%	-8.41%	-11.84%	0.00%	-0.11%	-1.33%	-2.88%	-4.81%
136	BWA	-1.68%	-4.43%	-8.02%	-12.09%	-16.26%	0.00%	-0.30%	-1.57%	-3.52%	-6.03%	0.00%	0.00%	0.00%	-0.35%	-1.48%
137	NAM	0.00%	-0.43%	-2.16%	-5.26%	-8.65%	0.00%	0.00%	0.00%	-0.38%	-1.63%	0.00%	0.00%	0.00%	0.00%	0.00%
138	ZAF	0.00%	0.00%	-0.03%	-1.12%	-3.29%	0.00%	0.00%	0.00%	0.00%	-0.08%	0.00%	0.00%	0.00%	0.00%	0.00%
139	XSC	0.00%	0.00%	-0.03%	-1.12%	-3.29%	0.00%	0.00%	0.00%	0.00%	-0.08%	0.00%	0.00%	0.00%	0.00%	0.00%
140	XTW	0.00%	0.00%	0.00%	-0.25%	-1.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table A7. Human health: percentage variation of labor productivity for +1°C.

N.	Code	% var. in labor productivity	N.	Code	% var. in labor productivity
1	AUS	-0.1489	71	NLD	-0.0337
2	NZL	-0.1489	72	POL	-0.0315
3	XOC	-0.2423	73	PRT	-0.0337
4	CHN	-0.5378	74	SVK	-0.0337
5	HKG	-0.5378	75	SVN	-0.0337
6	JPN	-0.0631	76	ESP	-0.0337
7	KOR	-0.0631	77	SWE	-0.0337
8	MNG	-0.5378	78	GBR	-0.0337
9	TWN	-0.5378	79	CHE	-0.0337
10	XEA	-0.1315	80	NOR	-0.0337
11	BRN	-0.1840	81	XEF	-0.0527
12	KHM	-0.1315	82	ALB	-0.0697
13	IDN	-0.1453	83	BGR	-0.0697
14	LAO	-0.1315	84	BLR	-0.0697
15	MYS	-0.1453	85	HRV	-0.0315
16	PHL	-0.1315	86	ROU	-0.0315
17	SGP	-0.2375	87	RUS	-0.0589
18	THA	-0.1386	88	UKR	-0.0589
19	VNM	-0.1315	89	XEE	-0.0697
20	XSE	-0.1315	90	XER	-0.0337
21	BGD	-0.1386	91	KAZ	-0.0589
22	IND	-0.7468	92	KGZ	-0.0589
23	NPL	-0.7468	93	XSU	-0.0589
24	PAK	-0.1386	94	ARM	-0.0589
25	LKA	-0.7468	95	AZE	-0.0589
26	XSA	-0.1386	96	GEO	-0.0589
27	CAN	0.0000	97	BHR	-0.5921
28	USA	-0.1447	98	IRN	-0.2128
29	MEX	-0.2412	99	ISR	-0.6843
30	XNA	-0.2349	100	JOR	-0.5921
31	ARG	-0.2191	101	KWT	-0.5921
32	BOL	-0.1131	102	OMN	-0.5921
33	BRA	-0.2191	103	QAT	-0.5921
34	CHL	-0.2191	104	SAU	-0.5921
35	COL	-0.1131	106	TUR	-0.3050
36	ECU	-0.1131	105	ARE	-0.5921
37	PRY	-0.1131	107	XWS	-0.1990
38	PER	-0.1131	108	EGY	-0.3657
39	URY	-0.2191	109	MAR	-0.4044
40	VEN	-0.1269	110	TUN	-0.4044
41	XSM	-0.1131	111	XNF	-0.4044
42	CRI	-0.2412	112	BEN	-0.6308
43	GTM	-0.1352	113	BFA	-0.6308
44	HND	-0.1352	114	CMR	-0.6308
45	NIC	-0.1352	115	CIV	-0.6308
46	SLV	-0.1352	116	GHA	-0.6308
47	PAN	-0.1352	117	GIN	-0.6308
48	XCA	-0.1352	118	NGA	-0.6308
49	DOM	-0.1352	119	SEN	-0.6308
50	JAM	-0.1352	120	TGO	-0.6308
51	PRI	-0.1352	121	XWF	-0.6308
52	TTO	-0.1352	122	XCF	-0.6308
53	XCB	-0.1352	123	XAC	-0.6308
54	AUT	-0.0337	124	ETH	-0.6308
55	BEL	-0.0337	125	KEN	-0.6308
56	CYP	-0.0337	126	MDG	-0.6308
57	CZE	-0.0315	127	MWI	-0.6308
58	DNK	-0.0337	128	MUS	-0.5783
59	EST	-0.0315	129	MOZ	-0.6308
60	FIN	-0.0337	130	RWA	-0.6308
61	FRA	-0.0337	131	TZA	-0.6308
62	DEU	-0.0337	132	UGA	-0.6308
63	GRC	-0.0337	133	ZMB	-0.6308
64	HUN	-0.0315	134	ZWE	-0.6308
65	IRL	-0.0337	135	XEC	-0.6308
66	ITA	-0.0337	136	BWA	-0.6308
67	LVA	-0.0315	137	NAM	-0.6308
68	LTU	-0.0315	138	ZAF	-0.6308
69	LUX	-0.0337	139	XSC	-0.6308
70	MLT	-0.0337	140	XTW	-0.5783

Table A8. Tourism: changes in net foreign currency inflows (relative to 2011 GDP). Negative values in red.

N.	Code	+1°C	+2°C	+3°C	+4°C	+5°C	N.	Code	+1°C	+2°C	+3°C	+4°C	+5°C
1	AUS	-0.14%	-0.31%	-0.50%	-0.71%	-0.94%	71	NLD	0.29%	0.55%	0.76%	0.93%	1.07%
2	NZL	0.06%	0.12%	0.18%	0.25%	0.33%	72	POL	0.33%	0.65%	0.95%	1.23%	1.48%
3	XOC	0.00%	0.00%	0.00%	0.00%	0.00%	73	PRT	-0.25%	-0.50%	-0.76%	-1.01%	-1.24%
4	CHN	0.05%	0.08%	0.09%	0.08%	0.06%	74	SVK	0.30%	0.71%	1.23%	1.84%	2.55%
5	HKG	-1.77%	-3.53%	-5.25%	-6.93%	-8.57%	75	SVN	0.21%	0.65%	1.30%	2.14%	3.16%
6	JPN	0.01%	0.02%	0.02%	0.02%	0.01%	76	ESP	-0.13%	-0.32%	-0.55%	-0.82%	-1.12%
7	KOR	0.09%	0.16%	0.21%	0.24%	0.26%	77	SWE	0.60%	1.17%	1.72%	2.23%	2.71%
8	MNG	-1.51%	-1.18%	0.95%	4.83%	10.47%	78	GBR	0.26%	0.47%	0.64%	0.77%	0.86%
9	TWN	-0.69%	-1.39%	-2.09%	-2.80%	-3.51%	79	CHE	0.52%	1.01%	1.47%	1.89%	2.26%
10	XEA	0.00%	0.00%	0.00%	0.00%	0.00%	80	NOR	0.52%	1.00%	1.44%	1.87%	2.27%
11	BRN	-1.88%	-2.75%	-2.68%	-1.68%	0.21%	81	XEF	0.00%	0.00%	0.00%	0.00%	0.00%
12	KHM	-5.21%	-8.74%	-10.65%	-11.02%	-9.92%	82	ALB	-1.57%	-2.18%	-1.85%	-0.59%	1.63%
13	IDN	-0.26%	-0.50%	-0.71%	-0.90%	-1.08%	83	BGR	0.20%	0.57%	1.08%	1.72%	2.49%
14	LAO	-3.93%	-5.82%	-5.76%	-3.81%	0.01%	84	BLR	-0.20%	-0.15%	0.15%	0.68%	1.44%
15	MYS	-1.63%	-3.10%	-4.44%	-5.66%	-6.81%	85	HRV	-0.15%	-0.28%	-0.42%	-0.54%	-0.62%
16	PHL	-0.59%	-1.11%	-1.59%	-2.03%	-2.46%	86	ROU	0.02%	0.11%	0.26%	0.47%	0.74%
17	SGP	-2.04%	-4.01%	-5.92%	-7.84%	-9.84%	87	RUS	0.43%	0.82%	1.21%	1.58%	1.95%
18	THA	-1.72%	-3.22%	-4.50%	-5.61%	-6.55%	88	UKR	0.29%	0.61%	0.94%	1.30%	1.67%
19	VNM	-0.82%	-1.55%	-2.19%	-2.77%	-3.29%	89	XEE	0.00%	0.00%	0.00%	0.00%	0.00%
20	XSE	0.00%	0.00%	0.00%	0.00%	0.00%	90	XER	0.00%	0.00%	0.00%	0.00%	0.00%
21	BGD	-0.25%	-0.37%	-0.34%	-0.18%	0.11%	91	KAZ	0.05%	0.16%	0.34%	0.58%	0.88%
22	IND	-0.21%	-0.40%	-0.58%	-0.76%	-0.93%	92	KGZ	-3.09%	-3.63%	-1.76%	2.45%	9.00%
23	NPL	-1.46%	-2.08%	-1.88%	-0.88%	0.92%	93	XSU	0.00%	0.00%	0.00%	0.00%	0.00%
24	PAK	-0.15%	-0.24%	-0.25%	-0.20%	-0.08%	94	ARM	-1.48%	-1.45%	0.02%	2.88%	7.12%
25	LKA	-0.72%	-1.14%	-1.29%	-1.17%	-0.78%	95	AZE	-0.23%	-0.27%	-0.13%	0.20%	0.71%
26	XSA	0.00%	0.00%	0.00%	0.00%	0.00%	96	GEO	-1.65%	-2.28%	-1.92%	-0.59%	1.72%
27	CAN	0.40%	0.76%	1.10%	1.42%	1.71%	97	BHR	-1.67%	-2.74%	-3.23%	-3.18%	-2.61%
28	USA	0.06%	0.10%	0.12%	0.11%	0.09%	98	IRN	-0.05%	-0.08%	-0.08%	-0.06%	-0.02%
29	MEX	-0.15%	-0.29%	-0.42%	-0.54%	-0.65%	99	ISR	-0.29%	-0.54%	-0.76%	-0.92%	-1.04%
30	XNA	0.00%	0.00%	0.00%	0.00%	0.00%	100	JOR	-1.81%	-3.16%	-4.05%	-4.46%	-4.36%
31	ARG	-0.09%	-0.18%	-0.25%	-0.31%	-0.35%	101	KWT	-0.53%	-1.04%	-1.54%	-2.05%	-2.60%
32	BOL	-1.10%	-1.53%	-1.33%	-0.50%	0.95%	102	OMN	-0.75%	-1.27%	-1.56%	-1.64%	-1.53%
33	BRA	-0.11%	-0.22%	-0.33%	-0.45%	-0.58%	103	QAT	-0.37%	-0.64%	-0.83%	-0.94%	-0.98%
34	CHL	-0.05%	-0.04%	0.00%	0.09%	0.22%	104	SAU	-0.44%	-0.87%	-1.30%	-1.74%	-2.21%
35	COL	-0.26%	-0.48%	-0.65%	-0.77%	-0.86%	106	TUR	0.03%	0.03%	-0.01%	-0.08%	-0.18%
36	ECU	-0.44%	-0.67%	-0.70%	-0.54%	-0.18%	105	ARE	-0.97%	-1.92%	-2.87%	-3.87%	-4.94%
37	PRY	-1.12%	-1.59%	-1.43%	-0.65%	0.74%	107	XWS	0.00%	0.00%	0.00%	0.00%	0.00%
38	PER	-0.18%	-0.28%	-0.31%	-0.27%	-0.16%	108	EGY	-0.59%	-1.11%	-1.55%	-1.91%	-2.18%
39	URY	-0.74%	-1.19%	-1.36%	-1.24%	-0.83%	109	MAR	-0.69%	-1.30%	-1.82%	-2.23%	-2.50%
40	VEN	-0.16%	-0.27%	-0.35%	-0.38%	-0.38%	110	TUN	-0.85%	-1.38%	-1.59%	-1.50%	-1.07%
41	XSM	0.00%	0.00%	0.00%	0.00%	0.00%	111	XNF	0.00%	0.00%	0.00%	0.00%	0.00%
42	CRI	-1.51%	-2.56%	-3.14%	-3.28%	-2.98%	112	BEN	-3.88%	-5.43%	-4.77%	-1.95%	3.01%
43	GTM	-0.87%	-1.41%	-1.62%	-1.51%	-1.08%	113	BFA	-2.55%	-3.51%	-2.93%	-0.88%	2.65%
44	HND	-2.15%	-3.32%	-3.57%	-2.93%	-1.40%	114	CMR	-1.32%	-2.00%	-2.07%	-1.55%	-0.45%
45	NIC	-3.36%	-5.01%	-5.03%	-3.47%	-0.35%	115	CIV	-1.28%	-1.88%	-1.84%	-1.17%	0.11%
46	SLV	-1.01%	-1.50%	-1.50%	-1.02%	-0.08%	116	GHA	-1.05%	-1.65%	-1.84%	-1.64%	-1.04%
47	PAN	-3.02%	-5.38%	-7.11%	-8.24%	-8.80%	117	GIN	-4.86%	-6.45%	-4.94%	-0.40%	7.16%
48	XCA	0.00%	0.00%	0.00%	0.00%	0.00%	118	NGA	-0.23%	-0.44%	-0.64%	-0.85%	-1.08%
49	DOM	-1.83%	-3.23%	-4.21%	-4.78%	-4.95%	119	SEN	-2.43%	-3.63%	-3.68%	-2.60%	-0.43%
50	JAM	-4.23%	-7.04%	-8.49%	-8.60%	-7.42%	120	TGO	-6.91%	-9.38%	-7.63%	-1.76%	8.20%
51	PRI	-0.44%	-0.69%	-0.78%	-0.70%	-0.46%	121	XWF	0.00%	0.00%	0.00%	0.00%	0.00%
52	TTO	-1.45%	-2.17%	-2.18%	-1.52%	-0.18%	122	XCF	-0.41%	-0.56%	-0.47%	-0.13%	0.44%
53	XCB	-1.49%	-2.70%	-3.66%	-4.37%	-4.85%	123	XAC	0.00%	0.00%	0.00%	0.00%	0.00%
54	AUT	0.71%	1.37%	1.98%	2.52%	2.98%	124	ETH	-1.00%	-1.48%	-1.48%	-0.98%	0.01%
55	BEL	0.48%	0.90%	1.25%	1.55%	1.79%	125	KEN	-1.02%	-1.57%	-1.66%	-1.28%	-0.45%
56	CYP	-1.88%	-3.22%	-4.00%	-4.22%	-3.86%	126	MDG	-2.84%	-4.01%	-3.59%	-1.62%	1.89%
57	CZE	0.47%	0.96%	1.44%	1.91%	2.37%	127	MWI	-4.43%	-5.93%	-4.63%	-0.60%	6.15%
58	DNK	0.68%	1.29%	1.85%	2.34%	2.78%	128	MUS	-4.35%	-7.13%	-8.38%	-8.13%	-6.40%
59	EST	0.07%	0.79%	2.11%	4.00%	6.44%	129	MOZ	-2.30%	-3.29%	-3.02%	-1.52%	1.18%
60	FIN	0.43%	0.90%	1.40%	1.92%	2.48%	130	RWA	-4.15%	-5.74%	-4.89%	-1.65%	3.99%
61	FRA	0.16%	0.28%	0.35%	0.38%	0.37%	131	TZA	-1.92%	-3.16%	-3.75%	-3.69%	-2.99%
62	DEU	0.31%	0.57%	0.79%	0.97%	1.11%	132	UGA	-2.40%	-3.75%	-4.07%	-3.39%	-1.70%
63	GRC	-0.35%	-0.70%	-1.06%	-1.40%	-1.71%	133	ZMB	-1.37%	-1.87%	-1.56%	-0.44%	1.48%
64	HUN	0.30%	0.61%	0.95%	1.30%	1.68%	134	ZWE	-2.45%	-3.42%	-2.96%	-1.12%	2.12%
65	IRL	0.23%	0.47%	0.72%	0.96%	1.22%	135	XEC	0.00%	0.00%	0.00%	0.00%	0.00%
66	ITA	0.04%	0.03%	-0.00%	-0.07%	-0.16%	136	BWA	-1.63%	-2.18%	-1.71%	-0.23%	2.25%
67	LVA	-0.23%	0.05%	0.83%	2.07%	3.77%	137	NAM	-2.41%	-3.51%	-3.36%	-1.97%	0.65%
68	LTU	0.00%	0.34%	0.98%	1.90%	3.11%	138	ZAF	-0.18%	-0.35%	-0.52%	-0.67%	-0.81%
69	LUX	0.88%	1.85%	2.88%	3.96%	5.09%	139	XSC	0.00%	0.00%	0.00%	0.00%	0.00%
70	MLT	-3.74%	-5.83%	-6.30%	-5.15%	-2.37%	140	XTW	0.00%	0.00%	0.00%	0.00%	0.00%

Table A9-1. Household energy demand (percentage variations).

N.	Code	+1°C Electr.	Gas	Oil.P.	+2°C Electr.	Gas	Oil.P.	+3°C Electr.	Gas	Oil.P.	+4°C Electr.	Gas	Oil.P.	+5°C Electr.	Gas	Oil.P.
1	AUS	0.00%	-0.03%	-4.04%	0.00%	-0.05%	-7.98%	0.00%	-0.08%	-11.80%	0.00%	-0.10%	-15.52%	0.00%	-0.13%	-19.15%
2	NZL	0.00%	-0.02%	-4.74%	0.00%	-0.04%	-9.32%	0.00%	-0.05%	-13.76%	0.00%	-0.07%	-18.06%	0.00%	-0.09%	-22.23%
3	XOC	0.28%	-0.05%	-3.35%	0.55%	-0.11%	-6.62%	0.82%	-0.16%	-9.82%	1.08%	-0.21%	-12.94%	1.34%	-0.26%	-16.00%
4	CHN	-0.06%	-0.15%	-4.76%	-0.11%	-0.28%	-9.34%	-0.15%	-0.40%	-13.77%	-0.19%	-0.50%	-18.05%	-0.23%	-0.59%	-22.18%
5	HKG	0.28%	-0.01%	-3.57%	0.55%	-0.02%	-7.06%	0.81%	-0.03%	-10.46%	1.07%	-0.04%	-13.78%	1.33%	-0.05%	-17.03%
6	JPN	-0.04%	-0.01%	-4.53%	-0.07%	-0.02%	-8.92%	-0.10%	-0.03%	-13.16%	-0.12%	-0.03%	-17.28%	-0.15%	-0.03%	-21.27%
7	KOR	-0.06%	-0.12%	-4.91%	-0.12%	-0.22%	-9.63%	-0.16%	-0.30%	-14.19%	-0.21%	-0.37%	-18.59%	-0.25%	-0.43%	-22.83%
8	MNG	0.10%	-0.75%	-8.16%	0.21%	-1.30%	-15.74%	0.31%	-1.69%	-22.80%	0.40%	-1.96%	-29.41%	0.50%	-2.13%	-35.62%
9	TWN	0.29%	-0.03%	-3.63%	0.56%	-0.06%	-7.18%	0.84%	-0.09%	-10.64%	1.10%	-0.12%	-14.01%	1.37%	-0.15%	-17.31%
10	XEA	-0.12%	-0.46%	-6.17%	-0.23%	-0.84%	-12.02%	-0.32%	-1.16%	-17.58%	-0.41%	-1.42%	-22.87%	-0.48%	-1.64%	-27.93%
11	BRN	0.27%	-0.06%	-3.27%	0.54%	-0.13%	-6.46%	0.80%	-0.19%	-9.59%	1.06%	-0.24%	-12.64%	1.31%	-0.30%	-15.64%
12	KHM	0.26%	-0.08%	-3.24%	0.52%	-0.16%	-6.42%	0.78%	-0.24%	-9.52%	1.03%	-0.32%	-12.56%	1.27%	-0.39%	-15.54%
13	IDN	0.28%	-0.08%	-3.32%	0.55%	-0.16%	-6.57%	0.82%	-0.24%	-9.74%	1.08%	-0.32%	-12.85%	1.33%	-0.39%	-15.89%
14	LAO	0.27%	-0.09%	-3.41%	0.53%	-0.17%	-6.73%	0.79%	-0.25%	-9.98%	1.04%	-0.33%	-13.16%	1.29%	-0.41%	-16.27%
15	MYS	0.28%	-0.07%	-3.30%	0.54%	-0.13%	-6.52%	0.81%	-0.20%	-9.68%	1.07%	-0.26%	-12.76%	1.32%	-0.32%	-15.78%
16	PHL	0.27%	-0.07%	-3.28%	0.54%	-0.14%	-6.49%	0.80%	-0.21%	-9.62%	1.05%	-0.27%	-12.69%	1.30%	-0.34%	-15.70%
17	SGP	0.27%	-0.06%	-3.25%	0.54%	-0.13%	-6.44%	0.80%	-0.19%	-9.55%	1.05%	-0.25%	-12.60%	1.30%	-0.31%	-15.58%
18	THA	0.26%	-0.09%	-3.25%	0.52%	-0.17%	-6.43%	0.77%	-0.25%	-9.53%	1.02%	-0.33%	-12.58%	1.26%	-0.40%	-15.55%
19	VNM	0.27%	-0.06%	-3.40%	0.54%	-0.11%	-6.72%	0.80%	-0.17%	-9.97%	1.05%	-0.22%	-13.15%	1.30%	-0.27%	-16.25%
20	XSE	0.28%	-0.11%	-3.42%	0.55%	-0.22%	-6.76%	0.82%	-0.32%	-10.02%	1.08%	-0.42%	-13.22%	1.34%	-0.52%	-16.34%
21	BGD	0.26%	-0.13%	-3.37%	0.51%	-0.25%	-6.66%	0.76%	-0.37%	-9.88%	1.00%	-0.48%	-13.02%	1.24%	-0.59%	-16.10%
22	IND	0.26%	-0.10%	-3.42%	0.51%	-0.20%	-6.76%	0.76%	-0.29%	-10.02%	1.00%	-0.39%	-13.21%	1.24%	-0.47%	-16.33%
23	NPL	0.28%	-0.10%	-3.93%	0.56%	-0.20%	-7.76%	0.83%	-0.29%	-11.48%	1.10%	-0.38%	-15.11%	1.36%	-0.47%	-18.64%
24	PAK	0.26%	-0.12%	-3.69%	0.51%	-0.23%	-7.29%	0.76%	-0.33%	-10.79%	1.01%	-0.44%	-14.21%	1.25%	-0.53%	-17.55%
25	LKA	0.28%	-0.07%	-3.35%	0.55%	-0.14%	-6.62%	0.81%	-0.21%	-9.83%	1.07%	-0.27%	-12.96%	1.32%	-0.34%	-16.02%
26	XSA	0.00%	-0.04%	-3.86%	0.00%	-0.08%	-7.61%	-0.01%	-0.12%	-11.27%	-0.01%	-0.16%	-14.83%	-0.01%	-0.20%	-18.31%
27	CAN	0.08%	-1.10%	-8.03%	0.15%	-1.96%	-15.47%	0.23%	-2.64%	-22.42%	0.31%	-3.17%	-28.93%	0.39%	-3.58%	-35.04%
28	USA	-0.05%	-0.04%	-4.87%	-0.09%	-0.06%	-9.57%	-0.14%	-0.08%	-14.10%	-0.17%	-0.10%	-18.48%	-0.21%	-0.10%	-22.72%
29	MEX	0.30%	-0.06%	-3.73%	0.58%	-0.13%	-7.38%	0.86%	-0.19%	-10.93%	1.14%	-0.25%	-14.39%	1.41%	-0.31%	-17.77%
30	XNA	0.12%	0.17%	-5.83%	0.22%	0.33%	-11.42%	0.33%	0.47%	-16.80%	0.43%	0.61%	-21.97%	0.52%	0.74%	-26.95%
31	ARG	0.00%	-0.01%	-4.02%	-0.01%	-0.03%	-7.94%	-0.01%	-0.05%	-11.74%	-0.01%	-0.06%	-15.45%	-0.02%	-0.08%	-19.06%
32	BOL	0.02%	-0.11%	-4.11%	0.03%	-0.21%	-8.11%	0.05%	-0.31%	-12.00%	0.07%	-0.41%	-15.78%	0.09%	-0.51%	-19.46%
33	BRA	0.02%	-0.08%	-3.43%	0.04%	-0.16%	-6.77%	0.05%	-0.23%	-10.04%	0.07%	-0.31%	-13.24%	0.09%	-0.38%	-16.36%
34	CHL	0.00%	0.00%	-4.74%	0.01%	-0.01%	-9.33%	0.01%	-0.02%	-13.77%	0.02%	-0.03%	-18.07%	0.02%	-0.04%	-22.25%
35	COL	0.30%	-0.08%	-3.50%	0.58%	-0.15%	-6.92%	0.87%	-0.23%	-10.27%	1.14%	-0.30%	-13.53%	1.41%	-0.37%	-16.72%
36	ECU	0.32%	-0.08%	-3.87%	0.64%	-0.15%	-7.65%	0.95%	-0.22%	-11.32%	1.25%	-0.29%	-14.90%	1.54%	-0.36%	-18.40%
37	PRY	0.01%	-0.03%	-3.56%	0.01%	-0.06%	-7.03%	0.02%	-0.08%	-10.41%	0.02%	-0.11%	-13.72%	0.03%	-0.14%	-16.95%
38	PER	0.36%	-0.07%	-4.30%	0.70%	-0.14%	-8.47%	1.04%	-0.20%	-12.52%	1.36%	-0.26%	-16.46%	1.68%	-0.33%	-20.29%
39	URY	0.00%	0.01%	-4.11%	-0.01%	0.02%	-8.10%	-0.01%	0.02%	-11.98%	-0.01%	0.03%	-15.75%	-0.01%	0.03%	-19.43%
40	VEN	0.29%	-0.10%	-3.47%	0.58%	-0.19%	-6.85%	0.85%	-0.28%	-10.16%	1.13%	-0.37%	-13.40%	1.39%	-0.46%	-16.56%
41	XSM	0.31%	-0.08%	-3.77%	0.62%	-0.16%	-7.44%	0.91%	-0.23%	-11.02%	1.20%	-0.30%	-14.51%	1.49%	-0.37%	-17.92%
42	CRI	0.28%	-0.08%	-3.42%	0.56%	-0.15%	-6.76%	0.83%	-0.22%	-10.02%	1.10%	-0.29%	-13.22%	1.36%	-0.36%	-16.34%
43	GTM	0.30%	-0.09%	-3.73%	0.60%	-0.17%	-7.38%	0.89%	-0.26%	-10.93%	1.17%	-0.34%	-14.39%	1.45%	-0.42%	-17.77%
44	HND	0.28%	-0.07%	-3.35%	0.54%	-0.14%	-6.62%	0.81%	-0.21%	-9.82%	1.07%	-0.28%	-12.95%	1.32%	-0.34%	-16.02%
45	NIC	0.27%	-0.08%	-3.30%	0.54%	-0.15%	-6.54%	0.80%	-0.22%	-9.70%	1.06%	-0.29%	-12.79%	1.31%	-0.36%	-15.81%
46	SLV	0.29%	-0.08%	-3.52%	0.57%	-0.16%	-6.96%	0.85%	-0.23%	-10.32%	1.12%	-0.31%	-13.60%	1.39%	-0.38%	-16.80%
47	PAN	0.28%	-0.07%	-3.32%	0.55%	-0.14%	-6.57%	0.81%	-0.21%	-9.75%	1.07%	-0.28%	-12.85%	1.33%	-0.34%	-15.89%
48	XCA	0.27%	-0.07%	-3.36%	0.54%	-0.14%	-6.64%	0.80%	-0.21%	-9.84%	1.06%	-0.27%	-12.98%	1.31%	-0.34%	-16.05%
49	DOM	0.28%	-0.06%	-3.38%	0.55%	-0.11%	-6.68%	0.82%	-0.17%	-9.90%	1.08%	-0.22%	-13.06%	1.34%	-0.27%	-16.15%
50	JAM	0.28%	-0.05%	-3.34%	0.55%	-0.10%	-6.60%	0.82%	-0.15%	-9.79%	1.08%	-0.20%	-12.91%	1.33%	-0.24%	-15.96%
51	PRI	0.28%	-0.05%	-3.41%	0.56%	-0.11%	-6.74%	0.83%	-0.16%	-10.00%	1.10%	-0.21%	-13.18%	1.36%	-0.26%	-16.29%
52	TTO	0.27%	-0.07%	-3.29%	0.54%	-0.14%	-6.51%	0.80%	-0.21%	-9.65%	1.06%	-0.27%	-12.73%	1.31%	-0.34%	-15.75%
53	XCB	0.28%	-0.06%	-3.30%	0.54%	-0.11%	-6.52%	0.81%	-0.16%	-9.68%	1.06%	-0.21%	-12.77%	1.32%	-0.27%	-15.79%
54	AUT	-0.06%	-0.05%	-5.78%	-0.12%	-0.09%	-11.32%	-0.16%	-0.12%	-16.63%	-0.21%	-0.14%	-21.72%	-0.25%	-0.15%	-26.62%
55	BEL	-0.03%	0.02%	-5.30%	-0.06%	0.04%	-10.39%	-0.08%	0.07%	-15.31%	-0.10%	0.09%	-20.05%	-0.12%	0.11%	-24.63%
56	CYP	-0.01%	0.01%	-3.91%	-0.02%	0.02%	-7.71%	-0.03%	0.03%	-11.41%	-0.04%	0.04%	-15.02%	-0.05%	0.05%	-18.53%
57	CZE	0.08%	-0.03%	-5.84%	0.17%	-0.04%	-11.44%	0.24%	-0.04%	-16.80%	0.32%	-0.04%	-21.96%	0.39%	-0.03%	-26.92%
58	DNK	0.10%	0.12%	-5.69%	0.19%	0.24%	-11.16%	0.28%	0.36%	-16.41%	0.37%	0.46%	-21.47%	0.45%	0.56%	-26.34%
59	EST	0.10%	0.00%	-6.35%	0.20%	0.02%	-12.41%	0.30%	0.06%	-18.19%	0.39%	0.12%	-23.71%	0.48%	0.18%	-28.99%
60	FIN	0.12%	-0.24%	-7.56%	0.23%	-0.39%	-14.66%	0.34%	-0.47%	-21.35%	0.45%	-0.50%	-27.67%	0.55%	-0.49%	-33.66%
61	FRA	-0.03%	0.03%	-4.87%	-0.05%	0.06%	-9.57%	-0.07%	0.09%	-14.11%	-0.08%	0.12%	-18.51%	-0.10%	0.14%	-22.77%
62	DEU	-0.05%	0.01%	-5.50%	-0.09%	0.02%	-10.79%	-0.12%	0.04%	-15.87%	-0.15%	0.06%	-20.76%	-0.18%	0.08%	-25.48%
63	GRC	-0.02%	0.05%	-4.09%	-0.04%	0.10%	-8.07%	-0.05%	0.15%	-11.93%	-0.07%	0.20%	-15.69%	-0.08%	0.24%	-19.34%
64	HUN	-0.05%	-0.09%	-5.17%	-0.10%	-0.16%	-10.14%	-0.15%	-0.22%	-14.93%	-0.18%	-0.27%	-19.55%	-0.22%	-0.32%	-24.00%
65	IRL	0.08%	0.07%	-5.22%	0.15%	0.12%	-10.26%	0.23%	0.17%	-15.12%	0.29%	0.22%	-19.82%	0.36%	0.26%	-24.37%
66	ITA	-0.02%	0.04%	-4.52%	-0.05%	0.08%	-8.90%	-0.07%	0.12%	-13.14%	-0.09%	0.16%	-17.25%	-0.10%	0.20%	-21.24%
67	LVA	0.10%	0.03%	-6.14%	0.20%	0.08%	-12.00%	0.29%	0.14%	-17.60%	0.38%	0.21%	-22.98%	0.47%	0.28%	-28.13%
68	LTU	0.09%	-0.12%	-6.13%	0.17%	-0.21%	-11.98%	0.26%	-0.28%	-17.57%	0.33%	-0.32%	-22.93%	0.41%	-0.35%	-28.06%
69	LUX	-0.04%	0.03%	-5.42%	-0.08%	0.06%	-10.63%	-0.11%	0.09%	-15.64%	-0.14%	0.12%	-20.47%	-0.16%	0.15%	-25.13%
70	MLT	-0.01%	0.05%	-3.92%	-0.02%	0.09%	-7.73%	-0.02%	0.14%	-11.44%	-0.03%	0.17%	-15.06%	-0.04%	0.21%	-18.58%

Table A9-2. Household energy demand (percentage variations).

N.	Code	+1°C			+2°C			+3°C			+4°C			+5°C		
		Electr.	Gas	Oil.P.	Electr.	Gas	Oil.P.	Electr.	Gas	Oil.P.	Electr.	Gas	Oil.P.	Electr.	Gas	Oil.P.
71	NLD	-0.03%	0.02%	-5.26%	-0.05%	0.05%	-10.32%	-0.08%	0.07%	-15.20%	-0.10%	0.09%	-19.91%	-0.11%	0.11%	-24.46%
72	POL	0.08%	-0.07%	-5.87%	0.17%	-0.12%	-11.48%	0.24%	-0.16%	-16.87%	0.32%	-0.18%	-22.04%	0.39%	-0.19%	-27.01%
73	PRT	0.00%	0.02%	-4.24%	0.00%	0.03%	-8.36%	0.00%	0.04%	-12.36%	0.00%	0.05%	-16.25%	0.00%	0.06%	-20.03%
74	SVK	-0.07%	-0.12%	-6.02%	-0.13%	-0.21%	-11.77%	-0.18%	-0.29%	-17.28%	-0.23%	-0.35%	-22.55%	-0.28%	-0.39%	-27.60%
75	SVN	-0.05%	-0.04%	-5.54%	-0.10%	-0.07%	-10.85%	-0.14%	-0.09%	-15.96%	-0.18%	-0.11%	-20.88%	-0.21%	-0.12%	-25.61%
76	ESP	-0.01%	0.04%	-4.25%	-0.02%	0.08%	-8.38%	-0.03%	0.11%	-12.39%	-0.03%	0.15%	-16.29%	-0.04%	0.17%	-20.07%
77	SWE	0.11%	0.07%	-6.59%	0.22%	0.15%	-12.87%	0.32%	0.24%	-18.85%	0.42%	0.35%	-24.55%	0.52%	0.46%	-30.01%
78	GBR	0.08%	0.07%	-5.30%	0.16%	0.14%	-10.42%	0.23%	0.19%	-15.35%	0.31%	0.25%	-20.12%	0.38%	0.29%	-24.72%
79	CHE	-0.06%	-0.02%	-6.02%	-0.11%	-0.04%	-11.77%	-0.16%	-0.04%	-17.28%	-0.20%	-0.04%	-22.57%	-0.23%	-0.03%	-27.64%
80	NOR	0.11%	0.05%	-6.55%	0.21%	0.12%	-12.80%	0.31%	0.19%	-18.76%	0.40%	0.26%	-24.46%	0.49%	0.34%	-29.92%
81	XEF	0.09%	0.07%	-5.89%	0.18%	0.14%	-11.54%	0.27%	0.21%	-16.97%	0.35%	0.27%	-22.19%	0.43%	0.33%	-27.21%
82	ALB	-0.03%	0.06%	-4.44%	-0.05%	0.12%	-8.75%	-0.07%	0.17%	-12.92%	-0.09%	0.22%	-16.97%	-0.11%	0.27%	-20.90%
83	BGR	-0.05%	-0.05%	-5.25%	-0.10%	-0.10%	-10.31%	-0.14%	-0.13%	-15.17%	-0.18%	-0.16%	-19.86%	-0.21%	-0.18%	-24.38%
84	BLR	0.08%	-0.28%	-6.36%	0.16%	-0.49%	-12.41%	0.24%	-0.66%	-18.16%	0.31%	-0.78%	-23.65%	0.38%	-0.87%	-28.89%
85	HRV	-0.03%	0.01%	-4.66%	-0.06%	0.02%	-9.17%	-0.09%	0.03%	-13.54%	-0.11%	0.05%	-17.77%	-0.14%	0.06%	-21.86%
86	ROU	-0.06%	-0.12%	-5.51%	-0.12%	-0.23%	-10.80%	-0.17%	-0.31%	-15.87%	-0.21%	-0.38%	-20.75%	-0.25%	-0.44%	-25.45%
87	RUS	0.10%	-0.82%	-8.24%	0.20%	-1.44%	-15.89%	0.29%	-1.90%	-23.02%	0.39%	-2.23%	-29.70%	0.48%	-2.45%	-35.97%
88	UKR	-0.08%	-0.11%	-5.51%	-0.14%	-0.19%	-10.79%	-0.21%	-0.26%	-15.86%	-0.26%	-0.31%	-20.72%	-0.31%	-0.34%	-25.40%
89	XEE	-0.07%	-0.16%	-5.33%	-0.13%	-0.29%	-10.45%	-0.18%	-0.41%	-15.37%	-0.23%	-0.50%	-20.10%	-0.28%	-0.58%	-24.66%
90	XER	-0.03%	0.01%	-4.95%	-0.05%	0.02%	-9.74%	-0.07%	0.03%	-14.36%	-0.09%	0.04%	-18.83%	-0.11%	0.05%	-23.15%
91	KAZ	-0.20%	-0.98%	-7.30%	-0.37%	-1.76%	-14.08%	-0.52%	-2.39%	-20.39%	-0.65%	-2.88%	-26.31%	-0.77%	-3.27%	-31.88%
92	KGZ	-0.11%	-0.45%	-5.93%	-0.20%	-0.83%	-11.56%	-0.29%	-1.16%	-16.93%	-0.36%	-1.43%	-22.05%	-0.43%	-1.66%	-26.95%
93	XSU	-0.06%	-0.11%	-4.63%	-0.11%	-0.20%	-9.10%	-0.16%	-0.27%	-13.42%	-0.20%	-0.34%	-17.59%	-0.24%	-0.39%	-21.63%
94	ARM	-0.10%	-0.30%	-6.07%	-0.19%	-0.55%	-11.86%	-0.27%	-0.76%	-17.37%	-0.34%	-0.93%	-22.64%	-0.41%	-1.08%	-27.67%
95	AZE	-0.05%	-0.05%	-4.71%	-0.10%	-0.09%	-9.26%	-0.14%	-0.12%	-13.65%	-0.18%	-0.15%	-17.90%	-0.21%	-0.17%	-22.01%
96	GEO	-0.03%	0.02%	-4.53%	-0.06%	0.04%	-8.92%	-0.08%	0.06%	-13.17%	-0.10%	0.08%	-17.29%	-0.12%	0.10%	-21.28%
97	BHR	0.01%	-0.17%	-3.47%	0.01%	-0.34%	-6.85%	0.02%	-0.49%	-10.16%	0.02%	-0.65%	-13.39%	0.03%	-0.79%	-16.55%
98	IRN	-0.04%	-0.05%	-4.25%	-0.08%	-0.09%	-8.36%	-0.11%	-0.13%	-12.35%	-0.14%	-0.16%	-16.23%	-0.17%	-0.19%	-19.99%
99	ISR	-0.01%	-0.04%	-3.89%	-0.02%	-0.09%	-7.67%	-0.03%	-0.13%	-11.36%	-0.03%	-0.17%	-14.94%	-0.04%	-0.20%	-18.44%
100	JOR	-0.02%	-0.05%	-3.95%	-0.03%	-0.10%	-7.79%	-0.05%	-0.15%	-11.52%	-0.06%	-0.19%	-15.16%	-0.08%	-0.24%	-18.70%
101	KWT	0.00%	-0.21%	-3.59%	0.00%	-0.41%	-7.10%	-0.01%	-0.60%	-10.52%	-0.01%	-0.78%	-13.85%	-0.01%	-0.96%	-17.11%
102	OMN	0.26%	-0.13%	-3.36%	0.51%	-0.26%	-6.64%	0.76%	-0.38%	-9.85%	1.00%	-0.50%	-12.99%	1.24%	-0.61%	-16.06%
103	QAT	0.01%	-0.19%	-3.43%	0.02%	-0.36%	-6.77%	0.02%	-0.54%	-10.04%	0.03%	-0.70%	-13.24%	0.04%	-0.86%	-16.37%
104	SAU	0.00%	-0.16%	-3.49%	0.01%	-0.31%	-6.89%	0.01%	-0.46%	-10.22%	0.02%	-0.60%	-13.47%	0.02%	-0.74%	-16.64%
106	TUR	-0.04%	-0.01%	-4.70%	-0.08%	-0.01%	-9.24%	-0.11%	-0.02%	-13.64%	-0.14%	-0.02%	-17.89%	-0.16%	-0.01%	-22.01%
105	ARE	0.26%	-0.14%	-3.40%	0.52%	-0.27%	-6.72%	0.77%	-0.40%	-9.97%	1.02%	-0.53%	-13.15%	1.26%	-0.65%	-16.25%
107	XWS	0.29%	-0.01%	-3.73%	0.56%	-0.03%	-7.37%	0.84%	-0.04%	-10.92%	1.10%	-0.05%	-14.38%	1.36%	-0.06%	-17.75%
108	EGY	-0.01%	-0.05%	-3.64%	-0.01%	-0.10%	-7.19%	-0.01%	-0.15%	-10.65%	-0.02%	-0.19%	-14.03%	-0.02%	-0.24%	-17.32%
109	MAR	-0.01%	0.03%	-4.04%	-0.02%	0.05%	-7.98%	-0.02%	0.07%	-11.80%	-0.03%	0.09%	-15.52%	-0.03%	0.11%	-19.15%
110	TUN	-0.01%	0.03%	-3.95%	-0.03%	0.07%	-7.79%	-0.04%	0.09%	-11.53%	-0.05%	0.12%	-15.17%	-0.06%	0.15%	-18.72%
111	XNF	-0.01%	0.01%	-3.90%	-0.03%	0.02%	-7.69%	-0.04%	0.02%	-11.38%	-0.05%	0.03%	-14.97%	-0.06%	0.04%	-18.48%
112	BEN	0.27%	-0.11%	-3.28%	0.54%	-0.22%	-6.48%	0.80%	-0.32%	-9.62%	1.05%	-0.42%	-12.69%	1.30%	-0.52%	-15.69%
113	BFA	0.25%	-0.14%	-3.18%	0.50%	-0.27%	-6.30%	0.74%	-0.40%	-9.35%	0.98%	-0.53%	-12.33%	1.21%	-0.65%	-15.25%
114	CMR	0.29%	-0.10%	-3.51%	0.58%	-0.21%	-6.94%	0.85%	-0.30%	-10.29%	1.13%	-0.40%	-13.56%	1.39%	-0.49%	-16.75%
115	CIV	0.28%	-0.10%	-3.34%	0.55%	-0.20%	-6.60%	0.81%	-0.30%	-9.80%	1.07%	-0.40%	-12.92%	1.33%	-0.49%	-15.97%
116	GHA	0.28%	-0.10%	-3.30%	0.55%	-0.20%	-6.53%	0.81%	-0.29%	-9.69%	1.07%	-0.39%	-12.78%	1.32%	-0.47%	-15.81%
117	GIN	0.27%	-0.11%	-3.37%	0.54%	-0.21%	-6.66%	0.81%	-0.32%	-9.89%	1.06%	-0.42%	-13.04%	1.32%	-0.51%	-16.12%
118	NGA	0.27%	-0.12%	-3.29%	0.53%	-0.23%	-6.50%	0.78%	-0.34%	-9.65%	1.03%	-0.44%	-12.73%	1.28%	-0.55%	-15.74%
119	SEN	0.26%	-0.11%	-3.26%	0.52%	-0.21%	-6.44%	0.77%	-0.32%	-9.56%	1.02%	-0.41%	-12.60%	1.26%	-0.51%	-15.59%
120	TGO	0.28%	-0.11%	-3.32%	0.54%	-0.22%	-6.56%	0.81%	-0.32%	-9.73%	1.07%	-0.42%	-12.83%	1.32%	-0.52%	-15.87%
121	XWF	0.27%	-0.10%	-3.36%	0.54%	-0.19%	-6.65%	0.80%	-0.28%	-9.87%	1.06%	-0.37%	-13.01%	1.31%	-0.46%	-16.09%
122	XCF	0.28%	-0.11%	-3.41%	0.56%	-0.21%	-6.74%	0.83%	-0.32%	-10.00%	1.09%	-0.42%	-13.18%	1.35%	-0.51%	-16.29%
123	XAC	0.30%	-0.09%	-3.62%	0.59%	-0.18%	-7.15%	0.87%	-0.27%	-10.60%	1.15%	-0.35%	-13.97%	1.42%	-0.43%	-17.25%
124	ETH	0.34%	-0.12%	-3.98%	0.67%	-0.23%	-7.86%	0.99%	-0.34%	-11.63%	1.30%	-0.44%	-15.31%	1.61%	-0.54%	-18.89%
125	KEN	0.31%	-0.09%	-3.77%	0.62%	-0.17%	-7.45%	0.92%	-0.25%	-11.03%	1.21%	-0.33%	-14.53%	1.49%	-0.41%	-17.94%
126	MDG	0.30%	-0.06%	-3.64%	0.59%	-0.11%	-7.20%	0.87%	-0.17%	-10.66%	1.15%	-0.22%	-14.05%	1.42%	-0.28%	-17.35%
127	MWI	0.29%	-0.10%	-3.68%	0.57%	-0.20%	-7.27%	0.85%	-0.30%	-10.77%	1.12%	-0.40%	-14.19%	1.38%	-0.49%	-17.52%
128	MUS	0.29%	-0.04%	-3.49%	0.57%	-0.08%	-6.89%	0.85%	-0.12%	-10.21%	1.12%	-0.16%	-13.46%	1.38%	-0.20%	-16.64%
129	MOZ	0.28%	-0.07%	-3.48%	0.55%	-0.13%	-6.89%	0.82%	-0.20%	-10.21%	1.08%	-0.26%	-13.46%	1.34%	-0.32%	-16.63%
130	RWA	0.33%	-0.08%	-3.95%	0.65%	-0.15%	-7.79%	0.97%	-0.22%	-11.53%	1.27%	-0.29%	-15.18%	1.57%	-0.36%	-18.73%
131	TZA	0.30%	-0.08%	-3.62%	0.59%	-0.16%	-7.14%	0.87%	-0.24%	-10.59%	1.14%	-0.31%	-13.95%	1.41%	-0.38%	-17.24%
132	UGA	0.31%	-0.07%	-3.70%	0.61%	-0.14%	-7.32%	0.91%	-0.21%	-10.84%	1.20%	-0.27%	-14.28%	1.48%	-0.33%	-17.64%
133	ZMB	0.29%	-0.12%	-3.72%	0.57%	-0.24%	-7.34%	0.85%	-0.36%	-10.88%	1.12%	-0.47%	-14.33%	1.38%	-0.58%	-17.70%
134	ZWE	0.29%	-0.10%	-3.82%	0.58%	-0.20%	-7.54%	0.86%	-0.30%	-11.17%	1.14%	-0.39%	-14.71%	1.40%	-0.48%	-18.16%
135	XEC	0.29%	-0.09%	-3.43%	0.57%	-0.19%	-6.77%	0.85%	-0.27%	-10.05%	1.12%	-0.36%	-13.24%	1.38%	-0.44%	-16.37%
136	BWA	0.27%	-0.08%	-3.68%	0.54%	-0.16%	-7.26%	0.81%	-0.23%	-10.75%	1.06%	-0.30%	-14.17%	1.32%	-0.37%	-17.49%
137	NAM	0.29%	-0.07%	-3.77%	0.57%	-0.14%	-7.44%	0.85%	-0.20%	-11.02%	1.12%	-0.27%	-14.51%	1.39%	-0.33%	-17.91%
138	ZAF	0.00%	-0.06%	-4.08%	0.01%	-0.11%	-8.05%	0.01%	-0.16%	-11.91%	0.01%	-0.21%	-15.67%	0.02%	-0.26%	-19.32%
139	XSC	0.00%	-0.05%	-4.13%	0.01%	-0.11%	-8.14%	0.01%	-0.16%	-12.04%	0.02%	-0.21%	-15.84%	0.02%	-0.25%	-19.54%
140	XTW	0.12%	-0.26%	-7.58%	0.23%	-0.45%	-14.72%	0.33%	-0.56%	-21.44%	0.44%	-0.63%	-27.81%	0.53%	-0.66%	-33.83%