Vienna Yearbook of Population Research 2018 (Vol. 16), pp. 235–257

'Express transitioning' as a special case of the demographic transition

Marc Luy and Bernhard Köppen*

Abstract

The theory of the '(first) demographic transition' (DT) still has considerable practical relevance in the field of population research. For instance, the DT serves as a conceptual model that underlies the UN's population projections, and is central to the discussion around the so-called 'demographic dividend'. Although it was first described 90 years ago, several questions related to the DT remain open or need verification. In particular, there is debate about the question of what the indispensable triggers of the DT are. Assumptions regarding the primary causes include increased education for women and related changes in values, as well as economic development, urbanisation, migration, and the democratisation process. This paper aims to contribute to DT-related research using an innovative research approach. Our study covers all 102 countries with populations that have undergone the DT between 1950 and 2010. Among these countries, we identified 25 populations that passed through this process at an exceptionally high tempo. We refer to this process as 'express transitioning' (ET), and seek to identify its main determinants by comparing the ET populations with the populations of the other DT countries. The data we use are taken from the Wittgenstein Centre Data Explorer, the UN World Population Prospects, the UN World Urbanization Prospects, the World Bank Group, and the Center for Systematic Peace. Our analysis is based on rather descriptive methods, including ANOVA tests and bivariate correlations. We find that the urbanisation level and the education dynamics are most closely associated with ET, whereas other variables show no significant association with the ET process.

* Marc Luy (corresponding author), Vienna Institute of Demography of the Austrian Academy of Sciences, Welthandelsplatz 2/Level 2, 1020 Vienna, Austria
E-mail: mail@marcluy.eu

Bernhard Köppen, University of Koblenz-Landau, Universitätsstraße 1, 56070 Koblenz, Germany
E-mail: koeppen@uni-koblenz.de

DOI: 10.1553/populationyearbook2018s235

1 Introduction

The '(first) demographic transition' (DT) model holds a dominant position in population studies, and thus continues to be of considerable practical relevance. The model describes the demographic changes that occur in a society as it undergoes the process of industrialisation; i.e., as a society transitions from being a pre-modern regime with high fertility and mortality rates to being a post-modern regime in which the vital rates stabilise at lower levels (Thompson 1929; Landry 1934; Carr-Saunders 1936; Notestein 1945). In most cases, fertility does not decrease until the population has undergone a period of growth due to a decrease in mortality. Whereas today's industrialised countries experienced this transition between the 18th century and the beginning of the 20th century, the so-called 'developing countries' have started moving through this process only very recently (Reher 2004). As the DT provides us with a picture of past, present, and future developments across the global population, studying it has been called a 'recurrent task in demography' (Bocquier and Costa 2015, 1297). Furthermore, the DT has been characterised as "[...] one of the best-documented generalizations in social sciences" (Kirk 1996, 361), which has made a significant contribution to the scholarship generated in a field of science that is typically "short on theory, but rich in quantification" (ibid). Nonetheless, as Dyson (2011, 34) pointed out, "[...] demographers have made rather little out of the demographic transition", and have underestimated its "central role" for the "creation of the modern world" (Dyson 2001, 67). Instead, the use of follow-up conceptual-theoretical approaches has become increasingly popular in demography for explaining causalities (Caldwell 1976) or addressing demographic developments in post-industrialised societies. These models include the 'second demographic transition', which refers to the transition to below-replacement fertility (Van de Kaa 1987; Lesthaeghe 1995); and the controversial idea that shifts in migration and fertility trends are leading to the emergence of a 'third demographic transition', which is characterised by increasing proportions of people with foreign cultural backgrounds living in formerly ethnically homogenous societies (Coleman 2006).

Although the implied (but unproven) assumption in the model that there is a causal linkage between fertility and mortality has been criticised, the DT continues to be a highly relevant concept and a widely used tool for categorising and assessing populations around the world. Currently, the DT serves as a conceptual model that underlies the UN's population projections, as well as the 'demographic dividend' paradigm that informs development policy for the Global South (Bloom et al. 2003). However, even though the DT model has been the subject of numerous scientific investigations over many years, and continues to be important, the model's central explanatory factors remain vague or in need of verification. For example, the question of which factors are the decisive triggers of this process is still open. As we described above, the original DT model linked the stages of population growth rate cycles directly to the broader economic developments in a given population. But based on observations made in sub-Saharan Africa, where the DT process has taken place without the expected degree of economic development, it has been suggested

that the underlying causes of fertility decline go beyond the state of a country's economy and wealth (Caldwell 1986; Caldwell and Caldwell 1987; Caldwell et al. 1992; Bongaarts 2008; Shapiro and Gebreselassie 2008; Ezeh et al. 2009; Bongaarts and Casterline 2012). The most commonly cited factors other than those directly related to economics are the education of women (e.g., Axinn and Barber 2001; Murtin 2012; Cuaresma et al. 2014) and its influence on (societal) values and roles (Mason 2001; Korotayev et al. 2016), urbanisation (Haggett 2001; Boquier et al. 2011; Dyson 2011), and shifts in migration regimes (Rees et al. 2016). Most recently, Wilson and Dyson (2017) proposed going beyond these rather conventional explanations to study the influence of a more comprehensive set of societal changes, including democratisation processes.

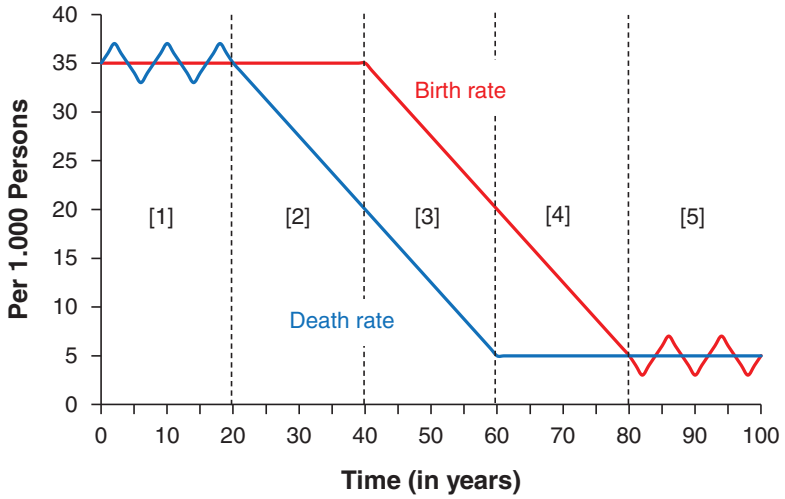
Because of restrictions in data availability and quality, most of the existing research on the DT has focused on larger spatial entities (such as whole continents or groups of countries), or it has been based on case studies for individual populations. This paper aims to contribute to DT-related research using an innovative, yet challenging research design with a global perspective. In a first step, we select all of the populations of the world that underwent the DT between 1950 and 2010, and identify those that underwent this process at an exceptionally fast pace. We refer to this process as 'express transitioning' (ET). Then, we try to find evidence of the main determinant(s) of this accelerated demographic development by comparing the ET populations with those of the other DT countries. Using recent as well as established scholarly findings, we create a set of indicators for our analyses that are broad, but also concise and experimental. These indicators include the standard explanatory factors: namely, the education of women, urbanisation, population density, and GDP per capita (as an economic indicator). In addition, we include information on migration flows and an assessment of the prevailing political system and its stability.

Besides providing new insights into the possible factors behind the accelerated transition process of the ET countries, this study can help to extend our understanding of the DT in general. Moreover, the approach and the results presented in this paper might also be helpful for the development of future population projections based on country-specific characteristics. In Section 2, we clarify our definition and assessment of the ET as a concept. In Section 3, we present the underlying data and the methods we use for our empirical investigation. The results of this analysis are presented in Section 4. Finally, in Section 5, we conclude the paper with a summary and a discussion of our main findings.

2 Definition and assessment of express transitioning

Our definition of express transitioning (ET) is rooted in the well-known 'phase model' of the DT, as introduced by Thompson (1929), Blacker (1947), and Notestein (1953). The original variant of this model identified four sequential and connected phases of the transition from a pre-modern demographic regime with

Figure 1:
The five-phase model of the demographic transition



Source: Authors' own.

high fertility and mortality levels to a post-modern pattern with low fertility and low mortality levels. However, an examination of empirical data for European populations showed that the subdivision of the DT into just four phases was too crude. The model has, therefore, been extended to five phases, with an additional phase placed in the middle of the transition process, as illustrated in Figure 1 (see, e.g., Haggett 2001). The five phases are as follows:

1. the 'high stationary' phase, during which birth and death rates are high, but the population is stable, with the population growth rate fluctuating at around zero;
2. the 'early transitional' or 'early expanding' phase, during which the birth rate remains high but the death rate starts to decline and the rate of population growth starts to increase;
3. the 'middle transitional' or 'middle transformative' phase, during which the death rate continues to decline and the birth rate starts to decrease as well, with the population growth rate reaching its maximum level around the middle of the phase, and starting to decrease thereafter;
4. the 'late transitional' or 'late expanding' phase, during which the death rate has stabilised while the birth rate is still declining, which keeps the total growth rate at a positive but decreasing level; and, finally,
5. the 'low stationary' phase, during which the birth and the death rates stabilise at low levels, and population growth returns to a zero or very low rate.

The third phase of the five-phase model is of crucial importance for our definition of ET. We define a population as having undergone ET if it moved through the middle transitional phase in five years or less. The identification of such populations depends on our ability to determine the DT stage of each of the countries in our study sample at any given time of observation. The classical phase model described above is problematic for this purpose because it is based on crude birth and death rates. Initially, these crude rates were seen as appropriate proxies for roughly characterising and comparing the demographic trends of populations that were predominantly agricultural or in the early stages of industrialisation. The countries experienced similar demographic conditions (high fertility and mortality rates with singular or temporary fluctuations) and inevitably developed comparable, pyramid-shaped population structures. Today, the age structures of countries differ considerably. As a consequence, crude birth and death rates, which are strongly affected by the age composition of the population, cannot be used for comparative studies.

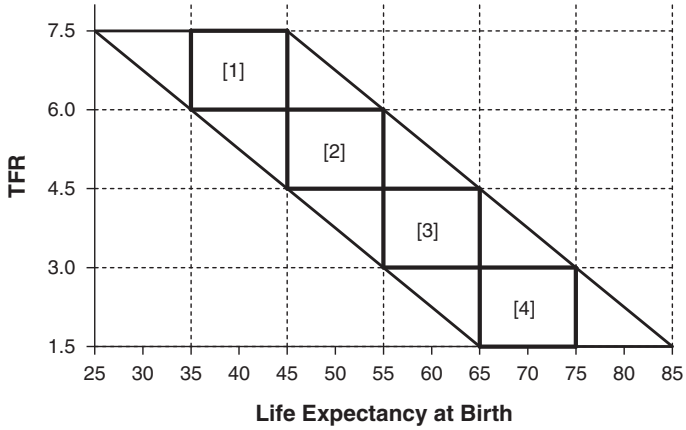
The United Nations (1989) addressed this problem by introducing an alternative 'stage model', which is based on the age-standardised parameters of life expectancy at birth (LE) and the total fertility rate (TFR). Compared to the phase model, this approach is more flexible for combining the trends in fertility and mortality, even though it again summarises the DT in only four stages. The stages are defined by ranges of LE levels and TFRs (see Fig. 2):

1. stage [1] covers LE below 45 years and TFRs above 6.0 children per woman;
2. stage [2] covers LE from 45–55 years and TFRs from 4.5 to 6.0;
3. stage [3] covers LE from 55–65 years and TFRs from 3.0 to 4.5; and
4. stage [4] covers LE above 65 years and TFRs below 3.0.

However, despite its advantages relative to the classic phase model, this approach also turned out to be problematic for the purposes of empirical application. Many populations exceed the hypothesised ranges of TFR and LE within a predefined stage. As Büttner (2000) has shown, these deviations can be so accentuated that some populations cannot be assigned to a specific DT stage with the UN stage model.

As an alternative approach for the systematic identification and assignment of phases, or stages, of the DT, we propose combining the classic five-phase approach with the UN stage model. In crafting our approach, we retain the logic of the five-phase model in terms of DT sequences, but use the TFRs and LE levels cited in the UN stage model for classifying countries and allocating them to a specific DT phase (Table 1). In our approach, the initial phase 1 is defined in accordance with UN stage [1]. The DT starts (phase 2) when LE increases to the stage [2] level of the UN model, while fertility remains in UN stage [1]. In line with the DT concept, the decline in mortality (i.e., the increase in LE) is the key element at this point. The decisive indicator for the identification of phases 3 to 5 is, by contrast, the fertility level. As soon as fertility falls below the level of the pre-modern DT stage [1] – i.e., when the TFR falls below 6.0 children per woman – the population is assigned to

Figure 2:
The stage model of the demographic transition



Source: United Nations (1989), slightly modified by the authors.

Table 1:
Classification of the DT phases according to the five-phase model on the basis of the indicators of the four-stage model

	4-stage model of the UN	
5-phase model	**TFR**	**LE**
Phase [1]	Stage [1]	Stage [1]
Phase [2]	Stage [1]	Stage [2]+
Phase [3]	Stage [2]	Stage [3]±
Phase [4]	Stage [3]	Stage [4]−
Phase [5]	Stage [4]	Stage [4]

Source: Authors' own.

DT phase 3. Phase 4 begins when the population's fertility decreases to the level of stage [3] of the UN model. Accordingly, the population has completed the DT process (phase 5) when its TFR has fallen below 3.0 children per women (UN stage [4]).

Note that LE is treated more flexibly than fertility in our approach. There are several reasons why we made this choice. During the 19th and 20th centuries, mortality declines were linked to significant changes (increases) in economic structure and wealth. However, the exportation via colonialism or 'foreign aid' programmes of scientific knowledge, health care infrastructure and know-how, foodstuffs, and other foreign goods to societies with a pre-modern demographic

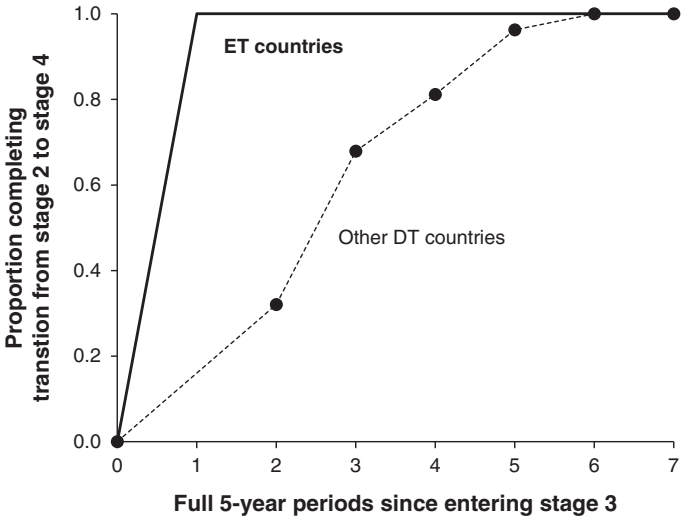
regime led to immediate and strong decreases in mortality in many populations that did not experience accompanying changes in their economy, culture, society, and wealth. Furthermore, in the so-called low and least developed countries, mortality can fluctuate significantly when conditions are changing (e.g., through famine, epidemics, military conflicts, or a lack of funding). LE is a less stable indicator than fertility in such vulnerable societies because it strongly depends on external factors. Fertility, by contrast, is related to a greater extent to individual decisions that are embedded in a larger social context. Therefore, fertility is usually not as volatile as mortality can be under certain circumstances.

Moreover, for technical reasons, it is reasonable to focus on fertility as the key indicator. In some populations, LE increased at a faster pace than the TFR decreased. This pattern led some of these populations to jump a mortality stage, but not a fertility stage, according to the logic of the UN model. In addition, the spread of the HIV/AIDS epidemic in sub-Saharan Africa resulted in such strong increases in mortality in some populations that these societies stepped backwards, following the logic of the UN stage model. But such mortality spikes would not represent a stage change, according to the logic of the DT concept (as long as fertility keeps declining). When we look at these populations over the long term, we see that sudden, but temporary, increases in mortality are a common phenomenon, because disasters – whether 'natural' or man-made (such as war and conflict) – are occurring with increasing frequency, especially in parts of Africa and the Near and Middle East. With our approach of treating mortality more flexibly than fertility, a population can only move forward along the phases, but it cannot fall back once the DT has started. This is in line with the basic assumptions of DT theory, and is not a limitation introduced by our phase assignment logic.

3 Data and methods

Considering that "demographers and others in search of causality are dealing with a very complex and highly interrelated structure of causation that at time seems nebulous" (Kirk 1996: 386), we tried to create a set of clearly arranged, meaningful indicators that would help us identify the possible drivers of the ET and DT processes in a more general way. These potential contributing factors include women's education, urbanisation, population density, migration, the political system (as an indicator that is also related to societal change), and the economy. Naturally, there might be additional relevant determinants of the DT and ET processes. However, the range of available reliable longitudinal data with a time span of more than 20 years for every country in the world is very limited. The inclusion of a variable or a proxy reflecting culture and cultural change would have been highly desirable, but such variables are practically unavailable. While this is unsatisfactory given that culture and demographic change are related to each other, a general lack of quantifiable indicators and the often qualitative nature of research on culture make the use of quantitative approaches difficult or unfeasible. Consequently,

Figure 3:
Tempo of the demographic transition (DT) from phase 2 to phase 4 of the 'express transitioning' (ET) countries and the other countries that underwent the demographic transition between 1950 and 2010



Source: The authors' own analyses.

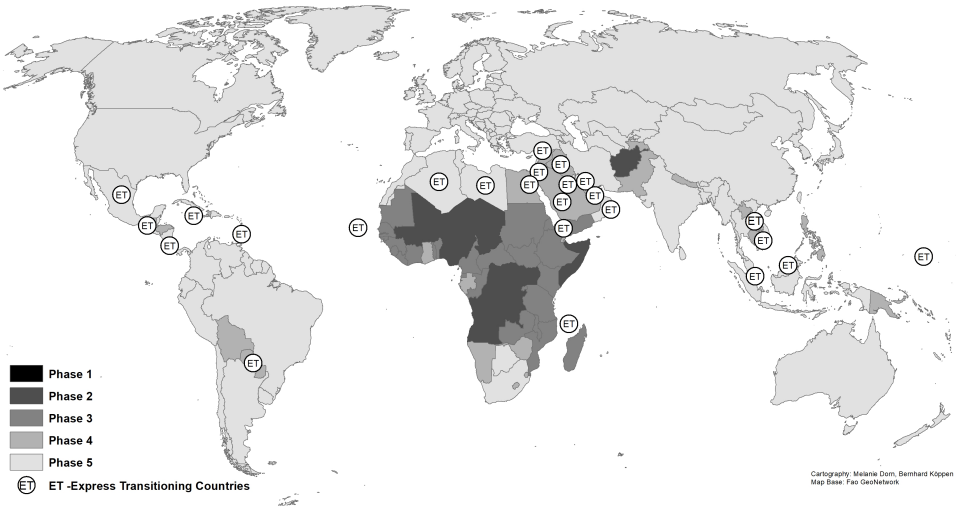
culture remains an under-researched and underestimated factor in demographic studies (see also Bachrach 2014).

Hence, the sampling and harmonisation of our database was an especially challenging undertaking that generated satisfactory, but not perfect, results. Nonetheless, even though meaningful longitudinal variables are (still) sparse, we believe that examining cases of countries that underwent ET will contribute to a better understanding of the complexity and multi-faced character of the DT. The empirical analysis presented in this paper is based on descriptive statistics for all study variables, presented separately for the ET and the other DT countries, with one-way ANOVA tests for the differences between the ET and the other DT countries. We are aware that further statistical analysis using more sophisticated methods is the next necessary step. But for our aim of introducing a new research approach to extend research on the DT process, the descriptive approach can be a suitable starting point.

3.1 Study populations

We used the LE and TFR data of the 2012 revision of the United Nations World Population Prospects (United Nations 2013) to identify the study populations

Figure 4:
The development stages (phases) in the demographic transition process of the world's countries in the period 2005–10, with the 'express transitioning' countries marked



Note: No country in DT phase 1.
Source: The authors' own analyses.

according to our classification system of DT phases (see Section 2). Following the logic of this system, we assigned to each country of the world a specific DT phase in 12 five-year periods from 1950–55 to 2005–10. Based on these data, we identified 102 populations that moved from phase 2 to a higher phase; i.e., that passed through the DT during the 60-year observation period. We refer to these populations as 'DT countries'. Among these DT countries we identified 25 cases of ET; i.e., countries that jumped over phase [3] in this series of five-year periods by entering phase [4] directly from phase [2]. Among the other 77 DT countries, 53 also completed phase 3 and reached phase 4, but at a slower pace. Figure 3 illustrates the difference between the ET and these other DT countries in terms of the speed with which they moved through DT phase 3. The graph visualises our concept of the ET process, which is applied in the empirical analysis. As most populations of the Northern hemisphere completed the DT before 1950, the ET countries are located primarily in a belt between the Tropic of Cancer and the Tropic of Capricorn. This pattern can be seen in Figure 4, which identifies the ET countries and shows the DT phases reached in all countries across the world during our last observation period of 2005–10. A detailed overview of the 25 ET countries and the 77 other DT countries, with their corresponding DT phases across the whole observation period, can be found in the appendix.

3.2 Study variables

We chose the following variables for our analyses:

Period *t*: last five-year calendar period in which a population was in DT phase 2.

Primary education at period *t*: percentage of women aged 20–39 with at least primary education; data downloaded from the Wittgenstein Centre Data Explorer;[1] if period *t* was earlier than 1970–74 (beginning of the available data in the Wittgenstein Centre Data Explorer), we used the data for 1970–74 as the primary education indicator for *t*.[2] We refrained from modelling the missing values because the use of 1970 data for our sample of only less and least developed populations would lead at most to a slight overestimation of education levels. Note that the level of education was still very low in all of the populations included in our analysis. Thus, because the education of women tends to be correlated with fertility (Cuaresma et al. 2014), the use of this approach appears to be more constructive than modelling values that might underestimate the role of education.

Primary education dynamics: change in the percentage of women aged 20–39 with at least primary education between periods $t - 5$ and t (calculated as the difference between t and $t - 5$ in absolute as well as in relative terms); data downloaded from the Wittgenstein Centre Data Explorer (see Footnote 1); if period *t* was 1970–74 (beginning of the available data in the Wittgenstein Centre Data Explorer) or earlier, we derived the indicator for the primary education dynamics from the difference between the periods 1975–79 and 1970–74.[3]

Average years of schooling at period *t*: average number of school years among women aged 20–39; data downloaded from the Wittgenstein Centre Data Explorer (see Footnote 1); if period *t* was earlier than 1970–74 (beginning of the available data in the Wittgenstein Centre Data Explorer), we used the data for 1970–74 as the average years of schooling indicator for *t* (see Footnote 2).

Average years of schooling dynamics: change in the average years of schooling among women aged 20–39 between periods $t - 5$ and t (calculated as the difference between t and $t - 5$ in absolute as well as in relative terms); data downloaded from

[1] Available at: http://www.wittgensteincentre.org/dataexplorer (accessed: 16 February 2017).

[2] This applies to Albania (t = 1955–59), Bahrain (t = 1965–69), Brazil (t = 1960–64), Colombia (t = 1965–69), Costa Rica (t = 1960–64), Dominican Republic (t = 1965–69), Ecuador (t = 1965–69), Egypt (t = 1965–69), El Salvador (t = 1965–69), French Polynesia (t = 1950–54), Malaysia (t = 1960–64), Myanmar (t = 1960–64), Paraguay (t = 1965–69), Republic of Korea (t = 1955–59), Réunion (t = 1960–64), Saint Lucia (t = 1965–69), Saint Vincent and the Grenadines (t = 1965–69), Singapore (t = 1955–59), South Africa (t = 1960–64), Suriname (t = 1960–64), Thailand (t = 1965–69), Tonga (1965–69), Turkey (t = 1960–64), and Venezuela (t = 1960–64).

[3] In addition to the cases given in Footnote 2, this applies to the following countries with t = 1970–74: Bolivia, Kuwait, Mexico, Morocco, Peru, Philippines, Tajikistan, Turkmenistan, United Arab Emirates, Vanuatu, and Vietnam.

the Wittgenstein Centre Data Explorer (see Footnote 1); if period t was 1970–74 (beginning of the available data in the Wittgenstein Centre Data Explorer) or earlier, we derived the indicator for primary education dynamics from the difference between the periods 1975–79 and 1970–74 (see Footnote 3).

Urbanisation at period t: percentage of population at period t residing in urban areas, averaged from mid-year data for the start years of the five-year periods; data downloaded from the United Nations World Urbanisation Prospects, 2014 revision.[4]

Urbanisation dynamics: change in the percentage of the population residing in urban areas between periods $t - 5$ and t (calculated as the difference between t and $t - 5$ in absolute as well as in relative terms); data downloaded from the United Nations World Urbanisation Prospects, 2014 revision (see Footnote 4).[5]

Population density at period t: persons per square kilometre at period t, averaged for five-year periods from data for single years; data downloaded from the United Nations World Population Prospects, 2015 revision.[6]

Population density dynamics: change in the number of persons per square kilometre between periods $t - 5$ and t (calculated as the difference between t and $t - 5$ in absolute as well as in relative terms); data downloaded from the United Nations World Population Prospects, 2015 revision (see Footnote 6).[7]

Net migration rate at period t: number of immigrants minus the number of emigrants during period t, divided by the person-years lived by the population of the receiving country over that period (expressed as the average annual net number of migrants per 1000 population); data downloaded from the United Nations World Population Prospects, 2015 revision (see Footnote 6).

Migration dynamics: change in the migration balance (number of immigrants minus the number of emigrants) between periods $t - 5$ and t (calculated as the difference between t and $t - 5$ in absolute as well as in relative terms); data downloaded from the United Nations World Population Prospects, 2015 revision (see Footnote 6).[8]

Polity at period t: polity score at period t, averaged for five-year periods from single-year data obtained from the Polity IV dataset of the Center for Systemic

---

[4] Available at: https://esa.un.org/unpd/wup/ (accessed: 20 February 2017). Note: the data of the 2014 revision of World Urbanisation Prospects are consistent with the size of the total population of each country as estimated or projected in the 2012 Revision of World Population Prospects.

[5] For French Polynesia (t = 1950–54), we derived the indicator for urbanisation dynamics from the difference between the periods 1955–59 and 1950–54 (no data available for the period $t - 5$).

[6] Available at: https://esa.un.org/unpd/wpp/ (accessed: 15 February 2017).

[7] For French Polynesia (t = 1950–54), we derived the indicator for population density dynamics from the difference between the periods 1955–59 and 1950–54 (no data available for the period $t - 5$).

[8] For French Polynesia (t = 1950–54), we derived the indicator for migration dynamics from the difference between the periods 1955–59 and 1950–54 (no data available for the period $t - 5$).

Peace.[9] The polity score (POLIT) of the Polity IV project is derived from two scale indicators for institutionalised democracy (DEMOC) and institutionalised autocracy (AUTOC). The polity score ranges from −10 (strongly autocratic) to +10 (strongly democratic).[10]

Polity dynamics: index for polity type and transition during the 10-year period $t - 5$ and t. We derived this 'pd index' from the abovementioned single-year polity scores developed by the Center for Systematic Peace, excluding the power of the indicator value, but including the following values: 0 = neutral, 1 = exclusively democratic, 2 = exclusively autocratic, 3 = change from autocracy to democracy, 4 = change from democracy to autocracy, 5 = crisis, and 6 = colony.[11] Finally, these categories were further grouped into the categories 'exclusively democratic' (pd = 1), 'exclusively autocratic' (pd = 2), 'regime change' (pd = 3 or 4), and 'others' (pd = 0, 5, or 6).

Relative economy: five-decades ranking of relative GDP per capita over the period 1960–2009. The five-decades ranking was derived from the average of rankings for the decades 1960–69 (n = 63), 1970–79 (n = 71), 1980–89 (n = 88), 1990–99 (n = 96), and 2000–09 (n = 99). The decadal average GDPs per capita were

[9] Available at: http://www.systemicpeace.org/inscrdata.html (accessed: 15 February 2017).

[10] The indicators DEMOC and AUTOC express the countries' levels of institutionalised democracy and autocracy by weighted additive 11-point scales (0–10). Both are derived from codings of (1) the competitiveness of political participation, (2) the openness and competitiveness of executive recruitment, and (3) the constraints on the chief executive. Despite being based on the same assessment domains, DEMOC and AUTOC differ in the specific coding categories they use. Because many polities have mixed authority traits, countries can have middle scores on both the autocracy and the democracy scales. The combined POLITY score is computed by subtracting the AUTOC score from the DEMOC score. More details can be found in the Polity IV Project Dataset User's Manual (available at: http://www.systemicpeace.org/inscr/p4manualv2015.pdf). If no polity score was available for period t, we derived the score indicator from the earliest years available: Bahrain refers to the period 1971–76 (t = 1965–69), Fiji to 1970–74 (t = 1960–64), Namibia to 1990–94 (t = 1980–84), Papua New Guinea to 1975–79 (t = 1970–74), Singapore to 1959–1963 (t = 1955–59), Suriname to 1975–79 (t = 1960–64), United Arab Emirates to 1971–75 (t = 1970–74), and Vietnam to 1976–81 (t = 1970–74); while Tajikistan, Turkmenistan, and Uzbekistan (t = 1970–74) were assigned the data for the former USSR. In addition to the 21-point scale POLIT indicator, we also used a manual recoding of the polity score into the categories 'strongly autocratic' [POLIT < (−5.0)], 'rather autocratic' [POLIT = (−0.5) – (−0.0)], 'neutral' [POLIT = 0], 'rather democratic' [POLIT = (+0.0) – (+5.0)], and 'strongly democratic' [POLIT > (+5.0)]. However, this variant with reduced categories did not provide any results that differed from those of the original polity scale of the Polity IV project.

[11] The following specific adjustments were necessary: Ecuador started with POLIT = 2 in 1960, then POLIT = −1 until 1967, then POLIT = 5 in 1968–69; we defined the polity dynamics (pd) in this case as pd = 2. El Salvador is assessed with POLIT = −3 from 1960 to 1963, then with POLIT = 0 from 1964 to 1971, followed by POLIT = −1 until 1976 and POLIT = −6 in 1977–78; we defined pd = 2. Finally, we assessed the polity dynamics manually in the following cases for which no polity score was available: Maldives = 1, Micronesia = 2.

Table 2:
Descriptive statistics of the study variables, presented separately for the ET and the other DT countries, with ANOVA test statistics for the differences between the ET and the other countries

	ET countries		Other DT countries		
	N	**Mean**	***N***	**Mean**	**Sign.**
Period *t*	25	1976.9	77	1979.9	.288
Primary education at period *t*	20	40.5	63	34.9	.345
Primary education dynamics (abs.)	20	8.6	63	6.3	.016*
Primary education dynamics (rel.)	20	32.3	63	33.7	.849
Average years of schooling at period *t*	20	4.6	63	3.7	.066†
Average yrs. of schooling dynamics (abs.)	20	1.0	63	0.7	.003**
Average yrs. of schooling dynamics (rel.)	20	28.9	63	29.0	.981
Urbanisation at period *t*	25	55.0	77	32.7	.000***
Urbanisation dynamics (abs.)	25	3.0	77	2.6	.511
Urbanisation dynamics (rel.)	25	6.8	77	10.8	.091†
Population density at period *t*	25	151.4	77	69.9	.116
Population density dynamics (abs.)	25	28.2	77	8.6	.064†
Population density dynamics (rel.)	25	23.5	77	15.4	.000***
Net migration rate at period *t*	24	5.9	73	1.7	.355
Migration dynamics (abs.)	24	−0.5	73	5.0	.257
Migration dynamics (rel.)	24	−95.1	73	−1233.0	.717
Polity at period *t*	18	−5.5	67	−2.2	.038*
Relative economy	24	74.5	75	42.2	.000***

Note: $^{\dagger}p < 0.1$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.
Source: The authors' own analyses.

calculated from the annual values that were available from the databank of the World Bank Group.[12]

4 Results

The results of the first analysis reveal that the ET and the DT countries vary with regard to most of the chosen variables. Table 2 displays the descriptive statistics (number of observations *N* and mean values) for all of the study variables, presented separately for the ET and the other DT countries, with the last column showing the one-way ANOVA tests for the difference between the ET and the DT countries.

[12] Available at: http://databank.worldbank.org/data/home.aspx (accessed: 15 February 2017).

On average, the ET countries left DT phase 2 three years earlier than the other DT countries (not statistically significant), and they had higher levels of education at that time (not statistically significant for the proportion of women with at least primary education, but mildly statistically significant for the average years of schooling). The education dynamics are found to be statistically significantly higher among ET countries when the changes are measured in absolute terms, but no differences between ET and other DT countries can be seen when the education dynamics are assessed in relative terms.

The largest and the most statistically significant differences between the ET and the other DT countries are observed for levels of urbanisation and population density. Whereas the proportion of the population residing in urban areas at the time of leaving DT phase 2 is 55.0 per cent across all of the ET countries, the corresponding proportion is only 32.7 per cent across the other countries. The number of persons per square kilometre at that time is 151.4 among the ET countries, and is 69.9 among the others. For both urbanisation and population density, we also see mildly significant differences in the relative dynamics. However, among the ET countries, these dynamics appear to be larger with regard to population density, but smaller with regard to urbanisation. The absolute changes show no statistically significant differences in both cases. Moreover, the net migration rate at period *t* and its dynamic indicators show no statistically significant differences, even though the rate is almost threefold among the ET countries (5.9 versus 1.7 immigrants per 1000 population).

With regard to polity, the differences between the ET and the other DT countries are revealed to be statistically significant. The ET countries exhibit higher levels of autocracy at the time of leaving DT phase 2. Our indicator for polity dynamics cannot be expressed by arithmetic means (and thus is not shown in Table 2), but the distributions across our categories correspond to the differences in the polity indicator. During the decade prior to leaving DT phase 2, 62.5 per cent of the ET countries were exclusively autocratic, 12.5 per cent were exclusively democratic, 4.2 per cent experienced a regime change, and 20.8 per cent belonged to the group of others (including colonies, neutral countries, and countries in military crisis). The corresponding numbers for the other DT countries are 50.0, 20.3, 17.6 and 12.2 per cent, respectively.

Finally, for our indicator for economic conditions, we find highly statistically significant differences between the ET and the other DT countries, with the former being characterised by a higher average position in our constructed five-decades ranking. However, it is important to note that the available data did not enable us to derive a reliable indicator that reflects the economic conditions at period *t*. Even after the five-decades ranking is applied as the average of the decadal rankings, the indicator is strongly biased towards more recent times. This is because for many countries, the time series for GDP per capita starts in the 1990s or later; i.e., at a time when globally, the average GDP per capita was markedly higher than in

the previous decades.[13] Because this indicator is likely to reflect the more recent economic situation rather than the economic situation at the time when the countries left DT phase 2, we cannot include the economy when considering the empirical evidence for the possible drivers of ET. In sum, the ANOVA statistics suggest that both education and urbanisation are the most important factors in the ET process; and that while the dynamic appears to be more relevant for education, the absolute level seems to be more relevant for urbanisation.

5 Summary and conclusions

The demographic transition (DT) is one of the central concepts of demography, and it is one of the few long-standing theoretical approaches in the field that continue to have a high degree of practical relevance up to today. Although the DT was first described some 90 years ago, many questions about this process are still unanswered, such as the question of what its indispensable triggers are. The aim of the presented study was to extend our understanding by providing an innovative perspective on the DT. Our study contributes to the existing research on this topic in three main ways:

1. We introduced a new approach for determining a population's stage within the DT. This approach allowed us to assign each country of the world to the prevailing phase of the DT at any given time.
2. This approach enabled us to detect a group of populations that progressed through the DT at an exceptionally fast pace over the last 60 years. We referred to this accelerated DT process as 'express transitioning' (ET).
3. The results of our descriptive analysis of the ET countries compared to all of the other populations that experienced the DT since 1950 suggest that urbanisation and education are the factors most strongly associated with this special case of the DT process. While the dynamic appears to be more relevant for education, the absolute level seems to be more relevant for urbanisation. In addition, democratisation might contribute to the ET process as well.

Most of the existing research on the DT either focused on larger spatial entities (such as whole continents) or relied on case studies on individual countries because of restrictions in data availability and quality. Therefore, our global approach, which uses a long time series of demographic indicators and a large number of explanatory variables, is innovative, yet challenging to implement. In addition to facilitating the description of the ET process as such and the identification of the most important factors associated with this process, the present study might help to extend our

[13] The average GDP per capita of the studied countries with available data was US$ 362.40 in the period 1960–69, US$ 1582.00 in 1970–79, US$ 2352.53 in 1980–89, US$ 2783.67 in 1990–99, and US$ 4375.09 in 2000–09.

understanding of the DT in general. Our findings can be seen as providing support for the work of Boquier and Costa (2015) and Dyson (2011), who suggested that urbanisation could be an important determinant of the overall DT process. While we could not prove in this preliminary study that urbanisation is a distinct determinant, we were at least able to show that it is a constant epiphenomenon. Given the nature of urbanisation, this is not surprising. The concept of urbanisation refers to more than just the proportion of the population living in urban areas. It also refers to the emergence of high-density agglomerations of built structures with relatively developed infrastructure and economic conditions, as well as political significance. Furthermore, urban areas are places that foster societal innovation and a distinct 'urban lifestyle' that is shaped by individualisation (Simmel 1903; Wirth 1938). This means that urban areas are potentially favourable places for societal change, as the infrastructure and the wide range of opportunities they provide in terms of education, culture, health care, and the labour market are accessible to many people. This tangible infrastructure and the specific social environment of urban spaces may be advantageous for fostering the cultural change and changes in individual behaviour that finally lead to fertility decline, and, thus, to an acceleration of the DT process.

Our analyses suggest that urbanisation might be even more closely associated with ET than education, at least when we consider the significance levels. Our analyses further indicate that education dynamics – rather than education level – is a highly relevant factor in the DT process. This finding supports the results of previous studies that described an increase in the education of women as a pivotal factor in the recent fertility decline in the so-called developing countries (e.g., Axinn and Barber 2001; Murtin 2012; Cuaresma et al. 2014). The effects of the education level might be missing because the education of women is a distinct indicator, whereas urbanisation is multidimensional in its meaning. Finally, we found some support for the approaches of Dyson (2012) and Wilson and Dyson (2017), who have argued that DT is related to democratisation.

It is, however, important to note that our findings refer to the very restricted group of countries that underwent ET and DT processes after 1950. Thus, our results may not be fully generalisable. Moreover, although our analyses covered a wide range of relevant economic and societal conditions, it is probable that the examined variables did not cover the whole range of possible determinants of both the ET and the general DT processes. Future research should identify and analyse further possible factors, and give special attention to variables or proxies that reflect cultural dimensions. It is also likely that demographic changes are not processed homogenously across national populations. Thus, analyses at the level of smaller regional units and subpopulations, such as education or ethnic groups, are needed. However, data availability remains a major obstacle to addressing all of these issues, and to overcoming the limitations of our study. Reliable global data are still rare and sparse. The restrictions of our indicators and the total impracticality of using the economic variable in our research illustrate this problem. As we mentioned above, the main factors that underlie the DT may be related to changing norms, such as

changes in culture or living arrangements. As these factors are often of a qualitative nature, they may be difficult to measure quantitatively. The polity indicator chosen in this study as a proxy for governance is an example of the challenges we face. Governance is an important factor, but it is difficult to measure, and the polity index we used can provide only a rough picture and rather superficial insights. Thus, examining this issue in more detail could prove rewarding. Follow-up research should also include the testing of different time spans for the identification of changes in the DT process. The choice of five-year periods may itself have a determining impact on the presented findings. We are aware that single-year data would have been preferable; but again, such data are not available. Finally, the long time series and the rich data matrix prepared for this study could be explored further, and methods that control for time-invariant country characteristics, such as cultural and institutional features, could be applied. This would bring the analysis closer to being able to determine the causal drivers of the DT process than is possible with the methods applied in the present study.

Despite the abovementioned challenges concerning data availability and quality, examining ET appears to be a promising approach. In the fields of applied demography, development economics, and development aid, the low-fertility-based concept of a 'demographic dividend' (Bloom et al. 2003) represents a major paradigm for improving the economic and societal conditions of currently disfavoured societies in the Global South. Following the example of the 'Asian Tigers', several African countries are seeking to generate a demographic dividend, or an economic surplus that emerges from the contributions of large numbers of young people of working ages. But to reap this economic dividend, it is crucial that the younger generations are in good health, are well-educated, and have access to job opportunities. The indispensable basis for all dividend-related outcomes is a significant decline in fertility, as the major demographic condition of the paradigm is that a country's (young) dependent population decreases in relation to the working-age population, thereby generating and harnessing the demographic dividend. This means that the concept is directly linked to the DT, and especially to phases 3 and 4. Thus, having more precise knowledge about the catalysts and the conditions of the DT is important for advancing both the theory and the implementation of the demographic dividend. Given that the window of opportunity for taking advantage of a demographic dividend (i.e., the time span before a relatively large population cohort of working ages enters old-age dependency) is limited, it is essential that we understand not just the underlying causes of the DT, but its tempo – which we focused on by studying ET. In other words: since the strength of the demographic dividend depends on the speed of the DT, knowledge of the ET process may help us better understand why per capita income is growing faster in some African countries than in others (Mason 2001).

To conclude, despite all the challenges mentioned above, we were able to propose an experimental quantitative analysis of the DT since 1950 in a systematic and coherent global perspective. By combining the DT phase and stage models, we were able to overcome the deficiencies of these two concepts, and to identify the

stages of the DT process on the basis of empirical data. Hence, we were able to assign each population of the world to a specific stage of the DT process for every five-year period from 1950–55 to 2005–10, and to identify a group of countries that underwent the DT especially quickly. Our findings suggest that urbanisation and its links and interdependencies with the DT merit further investigation, because most of the previous research on the DT concentrated on other factors. From a historical perspective, we can see that the DT has generally been accompanied by a phase of urban growth (because the DT was linked to industrialisation, and industrialisation is intrinsically tied to urban development and societal change). However, the reasons why urban growth occurs can differ greatly. For example, cities can emerge from ancient foundations, or from centres of industry, as often occurred in 19th century Europe. More recently, megacities have been developing in Asia and Africa, which – and this is important to note – can occur with or without major economic dynamics. The present study cannot prove whether urbanisation is actually a prerequisite for the DT. It is, however, obvious that these two processes almost always appear together and in parallel to each other. Our findings suggest that at least for the specific ET process, urbanisation in conjunction with increasing education are necessary preconditions. Exploring distinct causalities in this context by joining the data-driven findings of demography with knowledge from urban sociology and urban geography should be the next, albeit challenging step towards gaining further insights into this important and still open research question.

References

Axinn, W. G. and J. S. Barber 2001. Mass education and fertility transition. *American Sociological Review* 66(4): 481–505.

Bachrach, C. A. 2014. Culture and demography: From reluctant bedfellows to committed partners. *Demography* 51(1): 3–25.

Blacker, C. P. 1947. Stages in population growth. *The Eugenics Review* 39(3): 88–102.

Bloom, D. E., D. Canning and J. Sevilla 2003. *The democratic dividend: A new perspective perspective on the economic consequences of population change*. Santa Monica: RAND (URL: http://www.rand.org/pubs/monograph_reports/MR1274.html).

Bocquier, P. and R. Costa 2015. Which transition comes first? urban and demographic transitions in Belgium and Sweden. *Demographic Research* 33: 1297–1332.

Bocquier, P., N. J. Madise and E. Zulu 2011. Is there an urban advantage in child survival in sub-Saharan Africa? evidence from 18 countries in the 1990s. *Demography* 48(2): 531–558.

Bongaarts, J. 2008. Fertility transitions in developing countries: progress or stagnation? *Studies in Family Planning* 39(2): 105–110.

Bongaarts, J. and J. Casterline 2012. Fertility transition: is sub-Saharan Africa different? *Population and Development Review* 38(1): 153–168.

Büttner, T. 2000. Überblick über moderne Bevölkerungsgeschichte nach Weltreligionen. In *Handbuch der Demographie 2: Anwendungen*, eds U. Mueller, B. Nauck and A. Diekmann, 1172–1249. Berlin: Springer.

Caldwell, J. C. 1976. Toward a restatement of demographic transition theory. *Population and Development Review* 2(3/4): 321–366.

Caldwell, J. C. 1986. Routes to low mortality in poor countries. *Population and Development Review* 12(2): 171–220.

Caldwell, J. C. and P. Caldwell 1987. The cultural context of high fertility in sub-Saharan Africa. *Population and Development Review* 13(3): 409–437.

Caldwell, J. C., I. O. Orubuloye and P. Caldwell 1992. Fertility decline in Africa: A new type of transition? *Population and Development Review* 18(2): 211–242.

Carr-Saunders, A. M. 1936. *World population: past growth and present trends*. New York: Oxford University Press.

Coleman, D. A. 2006. Immigration and ethnic change in low-fertility countries: A third demographic transition. *Population and Development Review* 32(3): 401–446.

Cuaresma, J. C., W. Lutz and W. Sanderson 2014. Is the demographic dividend an educational dividend? *Demography* 51: 299–315.

Dyson, T. 2001. A partial theory of world development: The neglected role of the demographic transition in the shaping of modern society. *International Journal of Population Geography* 7(2): 67–90.

Dyson, T. 2011. The role of the demographic transition in the process of urbanization. *Population and Development Review* 37(Supplement): 34–54.

Dyson, T. 2012. On demographic and democratic transitions. *Population and Development Review* 38(Supplement): 83–102.

Ezeh, A. C., B. U. Mberu and J. O. Emina, 2009. Stall in fertility decline in Eastern African countries: Regional analysis of patterns, determinants and implications. *Philosophical Transactions of the Royal Society of London* 364(1532): 2991–3007.

Haggett, P. 2001. *Geography: A global synthesis*. Harlow: Pearson Education/Prentice Hall.

Hirschman, C. 2011. Globalization and theories of fertility decline. *Population and Development Review* 27(Supplement): 116–125.

Kirk, D. 1996. Demographic transition theory. *Population Studies* 50(3): 361–387.

Korotayev, A., J. Zinkina, J. Goldstone and S. Shulgin 2016. Explaining current fertility dynamics in tropical Africa from an anthropological perspective: A cross-cultural investigation. *Cross-Cultural Research* 50(3): 251–280.

Landry, A. 1934. *La Révolution Démographique. De la Subordination des Peuples au Principe de Rationalisation de la Vie*. Paris: Recueil Sirey.

Lesthaeghe, R. 1995. The second demographic transition in Western countries: An interpretation. In *Gender and family change in industrialized countries*, eds K. O. Mason and A.-M. Jensen, 17–62. Oxford: Clarendon Press.

Mason, A. 2001. *Population change and economic development in East Asia: Challenges met, opportunities seized*. Stanford: Stanford University Press.

Mason, K. O. 2001. Gender and family systems in the fertility transition. *Population and Development Review* 27(Supplement): 160–176.

Murtin, F. 2012. Long-Term determinants of the demographic transition: 1870–2000. *Review of Economics and Statistics* 95(2): 617–631.

Notestein, F. W. 1945. Population: The long view. In *Food for the World*, ed. T. Schultz, 36–57. Chicago: University of Chicago Press.

Notestein, F. W. 1953. Economic problems of population change. In *Proceedings of the Eighth International Conference of Agricultural Economists*, ed. G. Cumberledge, 13–31. London: Oxford University Press.

Rees, P., M. Bell, M. Kupiszewski, D. Kupiszewski, P. Ueffing, A. Bernard, E. Charles-Edwards and J. Stillwell 2016. The impact of internal migration on population redistribution: An international comparison. *Population, Space and Place* 23(6), online first, DOI: 10.1002/psp.2036.

Reher, D. S. 2004. The demographic transition revisited as a global process. *Population, Space and Place* 10(1): 19–41.

Shapiro, D. and T. Gebreselassie 2008. Fertility transition in sub-Saharan Africa: Falling and stalling. *African Population Studies* 23(1): 3–23.

Simmel, G. 1903. Die Großstädte und das Geistesleben. In *Die Großstadt. Vorträge und Aufsätze zur Städteausstellung (Jahrbuch der Gehe-Stiftung zu Dresden Vol. 9)*, ed. T. Petermann, 185–206. Dresden.

Thompson, W. S. 1929. Population. *American Journal of Sociology* 34(6): 959–975.

United Nations, Department of Economic and Social Affairs 1989. *World Population at the turn of the century*. Population Studies 111. New York: United Nations.

United Nations, Department of Economic and Social Affairs, Population Division 2013. *World Population Prospects: The 2012 Revision*, DVD Edition. New York: United Nations.

Van de Kaa, D. J. 1987. Europe's second demographic transition. *Population Bulletin* 42(1): 1–59.

Wilson, B. and T. Dyson 2017. democracy and the demographic transition. *Democratization* 24(4): 594–612.

Wirth, L. 1938. Urbanism as a way of life. *The American Journal of Sociology* 44(1): 1–24.

Appendix

Table A.1:
Overview of the studied DT countries with the corresponding DT phases from 1950–55 to 2005–10

	1950–55	1955–60	1960–65	1965–70	1970–75	1975–80	1980–85	1985–90	1990–95	1995–00	2000–05	2005–10
Express transitioners:												
Algeria	1	2	2	2	2	2	2	4	4	5	5	5
Bahrain	1	2	2	2	4	4	4	4	4	5	5	5
Belize	2	2	2	2	2	2	4	4	4	4	4	5
Brunei Darussalam	2	2	2	4	4	4	4	4	4	5	5	5
Cape Verde	2	2	2	2	2	2	2	4	4	4	4	5
Costa Rica	2	2	2	4	4	4	4	4	5	5	5	5
Honduras	1	1	2	2	2	2	2	4	4	4	4	4
Iraq	1	1	2	2	2	2	2	2	4	4	4	4
Jordan	2	2	2	2	2	2	2	2	4	4	4	4
Kuwait	2	2	2	2	2	4	4	4	4	4	5	5
Libya	1	1	2	2	2	2	2	4	4	4	5	5
Mayotte	2	2	2	2	2	2	2	2	4	4	4	4
Mexico	2	2	2	2	2	4	4	4	4	5	5	5
Micronesia (Fed. States of)	2	2	2	2	2	2	2	4	4	4	4	4
Oman	1	1	1	2	2	2	2	2	2	4	4	5
Paraguay	2	2	2	2	4	4	4	4	4	4	4	4
Qatar	2	2	2	2	2	2	4	4	4	4	4	5
St. Vincent and the Grenadines	2	2	2	2	4	4	4	4	5	5	5	5
Saudi Arabia	1	1	2	2	2	2	2	2	4	4	4	4
Singapore	2	2	4	4	5	5	5	5	5	5	5	5
State of Palestine	2	2	2	2	2	2	2	2	2	4	4	4
Syrian Arab Republic	2	2	2	2	2	2	2	4	4	4	4	4
Tonga	2	2	2	2	4	4	4	4	4	4	4	4
United Arab Emirates	1	2	2	2	2	4	4	4	4	4	5	5
Viet Nam	2	2	2	2	2	4	4	4	4	5	5	5

Continued

Table A.1:
Continued

	1950–55	1955–60	1960–65	1965–70	1970–75	1975–80	1980–85	1985–90	1990–95	1995–00	2000–05	2005–10
Other DT Countries:												
Albania	2	2	3	4	4	4	4	4	5	5	5	5
Bangladesh	1	2	2	2	2	2	2	3	4	4	5	5
Benin	1	1	1	1	1	2	2	2	2	2	3	3
Bhutan	1	1	1	1	1	1	2	2	3	4	4	5
Bolivia	1	1	1	2	2	3	3	3	3	4	4	4
Botswana	2	2	2	2	2	2	2	3	4	4	4	5
Brazil	2	2	2	3	3	4	4	4	5	5	5	5
Cambodia	1	1	1	1	1	2	2	2	3	4	4	4
Cameroon	2	2	2	2	2	2	2	2	2	3	3	3
Central African Republic	1	1	1	1	1	2	2	3	3	3	3	3
China	1	1	1	3	3	4	5	5	5	5	5	5
Colombia	2	2	2	2	3	4	4	4	4	5	5	5
Comoros	1	1	1	2	2	2	2	2	3	3	3	3
Congo	2	2	2	2	2	2	2	3	3	3	3	3
Côte d'Ivoire	1	1	1	1	2	2	2	2	2	3	3	3
Djibouti	1	1	2	2	2	2	2	2	3	3	4	4
Dominican Republic	2	2	2	2	3	3	4	4	4	4	5	5
Ecuador	2	2	2	2	3	3	4	4	4	4	4	5
Egypt	1	2	2	2	3	3	3	3	4	4	4	4
El Salvador	2	2	2	2	3	3	3	4	4	4	5	5
Eritrea	1	1	1	1	1	1	1	2	2	2	3	3
Ethiopia	1	1	1	1	1	1	1	2	2	2	2	3
Fiji	2	2	2	3	4	4	4	4	4	4	4	5
French Polynesia	2	3	3	3	3	4	4	4	4	5	5	5
Gambia	1	1	1	1	1	1	2	2	2	2	3	3
Ghana	1	1	2	2	2	2	2	3	3	3	3	4
Grenada	2	2	2	3	3	4	4	4	4	5	5	5
Guatemala	1	1	2	2	2	2	2	3	3	4	4	4
Guinea	1	1	1	1	1	1	1	2	2	2	3	3
Guinea-Bissau	1	1	1	1	1	2	2	2	2	2	3	3
Haiti	1	1	1	2	2	2	2	3	3	3	4	4
Iran	1	1	2	2	2	2	2	3	4	5	5	5
Kenya	1	1	2	2	2	2	2	2	3	3	3	3
Kiribati	1	2	2	2	3	3	3	3	3	4	4	4
Lao People's Democr. Rep.	1	1	1	2	2	2	2	2	3	3	4	4
Liberia	1	1	1	1	1	1	2	2	2	2	3	3
Madagascar	1	1	1	1	2	2	2	2	2	3	3	3
Malawi	1	1	1	1	1	1	2	2	2	2	2	3
Malaysia	2	2	2	3	4	4	4	4	4	4	5	5

Continued

Table A.1:
Continued

	1950–55	1955–60	1960–65	1965–70	1970–75	1975–80	1980–85	1985–90	1990–95	1995–00	2000–05	2005–10
Maldives	1	1	1	1	2	2	2	2	3	4	5	5
Mauritania	1	1	2	2	2	2	2	2	3	3	3	3
Mongolia	2	2	2	2	2	2	3	3	4	5	5	5
Morocco	2	2	2	2	2	3	3	4	4	4	5	5
Myanmar	1	1	1	2	3	3	3	4	4	5	5	5
Namibia	1	2	2	2	2	2	2	3	3	4	4	4
Nicaragua	1	2	2	2	2	2	3	3	4	4	4	5
Pakistan	1	1	2	2	2	2	2	2	3	3	4	4
Papua New Guinea	1	1	1	1	2	3	3	3	3	3	4	4
Peru	1	2	2	2	2	3	3	4	4	4	5	5
Philippines	2	2	2	2	2	3	3	3	4	4	4	4
Republic of Korea	2	2	3	3	4	5	5	5	5	5	5	5
Réunion	2	2	2	3	4	4	5	5	5	5	5	5
Rwanda	1	1	1	1	1	2	2	2	2	2	3	3
Saint Lucia	2	2	2	2	3	4	4	4	4	5	5	5
Samoa	2	2	2	2	2	2	3	3	4	4	4	4
Sao Tome and Principe	2	2	2	2	2	2	2	3	3	3	3	4
Senegal	1	1	1	1	1	2	2	2	2	3	3	3
Solomon Islands	2	2	2	2	2	2	2	2	3	3	3	4
South Africa	2	2	2	3	3	3	3	4	4	4	5	5
South Sudan	1	1	1	1	1	1	1	1	2	2	3	3
Sudan	1	2	2	2	2	2	2	2	2	3	3	3
Suriname	2	2	2	3	3	4	4	4	5	5	5	5
Swaziland	1	1	2	2	2	2	2	2	3	3	4	4
Tajikistan	2	2	2	2	2	3	3	3	3	4	4	4
Thailand	2	2	2	2	3	4	5	5	5	5	5	5
Togo	1	1	1	2	2	2	2	2	2	3	3	3
Tunisia	1	1	1	2	2	3	3	4	4	5	5	5
Turkey	1	1	2	3	3	3	4	4	5	5	5	5
Turkmenistan	2	2	2	2	2	3	3	3	4	4	5	5
United Republic of Tanzania	1	1	1	2	2	2	2	2	2	3	3	3
Uzbekistan	2	2	2	2	2	3	4	4	4	4	5	5
Vanuatu	1	1	2	2	2	3	3	3	3	4	4	4
Venezuela	2	2	2	3	4	4	4	4	4	5	5	5
Western Sahara	1	1	1	1	1	2	3	3	4	4	5	5
Yemen	1	1	1	1	1	2	2	2	2	2	3	3
Zambia	1	1	2	2	2	2	2	2	2	2	2	3
Zimbabwe	2	2	2	2	2	2	2	3	3	4	4	4

Note: For a description, see the text.
Source: The authors' own analysis with data of the United Nations World Population Prospects, the 2012 revision (United Nations 2013).