

# Early riser, late bloomer: Contextualizing Turkish health achievements in the last 50 years *vis-à-vis* China and the global picture of development

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## Abstract

Where does Turkey's performance in the health dimension of the Preston Curve stand with regard to comparable countries on the development ladder? When one observes the chronological progression of health and wealth values embedded in the Preston Curve for developing countries, one sees a near monotonic increase across the board, with only a very small number of downwardly mobile countries. In the face of this near-universal increase in health and wealth values, it is necessary to adopt a more comparative perspective in order to situate the Turkish state's choices and performance within the general story playing out for developing countries in the second half of the 20th century. Utilizing just such a comparative framework, this article uses China's experience between 1960 and 2010 as an alternative through which to understand Turkey's development experience.

*Keywords:* Cross-country comparisons; Socioeconomic variables; Public health; Health economics; Health and economic development; Health and inequality

## Introduction

This paper discusses the main characteristics of Turkey's health development process in connection with the effects of structural changes made within the country's economic, social, and public health systems. Special emphasis is placed on discussing the factors that render the country-level health policy successful and on evaluating this success in terms of the country's long-term capability to prolong life expectancy and sustainably decrease the infant and adult mortality rate. Furthermore, the potential of these policies to affect the broader dimensions of human development and to interact with the corresponding processes and policies in other spheres of development will

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also be examined. In order to begin evaluating the success or failure of Turkey's health policies and human development path, a method of measuring and quantifying the process of development—most importantly, the health- and human-related dimensions of this process—must first be determined. To do this, the paper makes use of the simplest and most common historically and geographically comparable measures of health-related inputs, outputs, and technology. I believe that this is the most appropriate method of conducting an initial foray into this field of comparative development, especially since the paper places special emphasis on the trajectory of health parameters and outputs in the longer term.<sup>1</sup> In the paper, an effort will be made to link the occurrences in this very important dimension of health output with health achievement, and also to chart these occurrences in relation to events in the dimensions of health policy, income growth, and income equality.

The structure of the paper is as follows. First, I introduce the theoretical discussions on how to measure health development and how to relate development in a given country's health dimensions with development in the dimensions of the overall economic output. This theoretical discussion will support the dimensions and time period of the analysis as well as working to enrich the later discussion of the fundamental drivers and limitations of Chinese and Turkish development for the period under question. Next, the paper will proceed by providing a rationale for comparing the Chinese and Turkish experiences in creating a national health system, after which the decades contained in the period of analysis will be analyzed separately, from the 1960s to 2010, focusing on decade-specific characteristics and on the effects of health reforms and health developments. For this general period, I introduce the idea of the co-movement of countries' health and economic parameters. In line with the literature, I differentiate two more consistent sub-periods and show that there was significant variation between them. Finally, the paper concludes by addressing the utility of the convergence approach and with my conclusions regarding the main findings of the research.

One further explanation must here be provided in regard to the crucial comparator set<sup>2</sup> that allows me to situate the challenges encountered by and achievements made in Turkey in the different time periods of the dataset. In the aggregate group that has been chosen for comparison, I include the set of

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1 Many interesting methodologies have been created in the attempt to establish a functional relationship between the distribution of inputs and the resulting output levels; for more, see David B. Evans et al., "The Comparative Efficiency of National Health Systems in Producing Health: An Analysis of 191 Countries," GPE Discussion Paper Series No. 29, World Health Organization, 2000. <http://www.who.int/healthinfo/paper29.pdf>.

2 Information concerning the countries included in the dataset and the dimensions used in the comparison are provided in Appendices 2 and 3. The choice of countries is partially determined by the presence of continuous data on at least two of the dimensions for the 1960–2013 period.

countries that belongs to a group comparable to Turkey in terms of aggregate health levels and aggregate output levels in 1960. Concurrently with this macro comparison, I also undertake a more in-depth comparison of Turkey's development with that of China. There are several reasons for specifically choosing China in order to conduct this contrast. (i) Both countries have a similar prior history in terms of health development and health problems, with a shared developmental path from similar backgrounds; i.e., they were originally large empires with sizeable but poor populations with similar epidemiological issues, life expectancies, and mortality values. (ii) Both countries were initially characterized—especially before the 1980s—as rural-based economies and rural-weighted demographic structures, since a significant part of the economy and, more importantly, the population, resided in rural areas, as a result of which the health restructuring that was performed so as to improve the health outcomes of the general population became intrinsically linked to restructuring the health access of rural populations and the nature of rural health services.<sup>3</sup> (iii) Considering the progression of the two countries' health and economic values over time, both can be broadly placed in the “developing country” category,<sup>4</sup> with their main period of development occurring in the second half of the 20th century. The important shifts in the countries' economic and health systems allows a search for the “macro” effects of these changes similar to that seen in searches for the aggregate health values and outcomes of developing countries. (iv) The comparison found in this paper is especially motivated by the fact that China is used as a crucial comparator country in a considerable amount of current research on economic, political, and health development. The importance of China's development experience in these different dimensions stems from the following: (a) in many decades, China was the world leader in one or both of the crucial dimensions of health and economic development; and (ii) owing to its sheer size—initially in population and increasingly in economic output as well—the Chinese development experience forms a part of the global picture that must not be overlooked. (v) During their

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3 Abhijit Banerjee, Angus Deaton, and Esther Dufo, “Wealth, Health, and Health Services in Rural Rajasthan,” *American Economic Review* 94, no. 2 (May 2004): 326–330.

4 Turkey and China were both part of the (lower, mid-, higher) middle-income group during the 1960–2010 period, when the highest level of variations was created as a result of countries' policies and achievements; this also determined the health/economy path taken by each country. While the other parts of world income distribution are converging toward similar distributions of health and economy, in the part of the distribution to which Turkey and China belong, the area toward which they are converging depends on the country's long-term policy choices and priorities. See Giovanni Andrea Cornia and Leonardo Menchini, “The Pace and Distribution of Health Improvements during the Last 40 Years: Some Preliminary Results,” Development Studies Working Papers 194 (December 2004), [http://www.dagliano.unimi.it/media/WP2004\\_194.pdf](http://www.dagliano.unimi.it/media/WP2004_194.pdf) and David Mayer-Foulkes, “Convergence Clubs in Cross-Country Life Expectancy Dynamics,” World Institute for Development Economics Research (WIDER) Discussion Paper No. 2001/134 (November 2001), <https://www.wider.unu.edu/sites/default/files/dp2001-134.pdf>.)

most successful period of development, which occurred in the second half of the 20th century, both countries were defined by very important and radical transitions in their economic systems and concurrently—and more importantly for this paper—in their health organization, institutions, and infrastructure. Both countries' general economic development paths are characterized by an abrupt transition from a period of mild or radical "socialization" to a period of increased "marketization," privatization, and private expenditure.<sup>5</sup> The resulting development during the time period focused on here (i.e., 1960–2010) can be seen in related graphs, and the countries' relative life expectancy/economic performance can be discerned via an understanding of the specific channels by which the general process of marketization affected their health sectors and health system outcomes. Although the broad patterns are similar, the effects of the differences in the micro organization and institutionalization of the nationalization and privatization processes are well worth investigating, both in the Turkey-China subset and in relation to the broader developing country context.

In the comparative developmental framework established in this paper, the post-1980 period is considered a separate period with independent economic and development parameters; this is consistent with the international literature,<sup>6</sup> and such a perspective is widely used in the general development literature.<sup>7</sup> The further conceptualization of the post-2000 period as an independent period of health system periodization also conforms with a considerable amount of literature relating to the implementation of health transformation programs across the developing world. In the case of the health reforms in the post-1980s period, dimensions other than macro health outputs, such as life expectancy and infant mortality, have also been analyzed; hence, for this specific time period, Turkish successes and limitations will be evaluated using a multidimensional framework.

In this study, I focus particularly on the effects of health policy and the development of health parameters, as the last 30 years of the economics literature

5 Fikret Şenses, "Neoliberal Küreselleşme Kalkınma İçin Bir Fırsat mı, Engel mi?" Economic Research Center, ERC Working Paper in Economic 04/09 (August 2004), <http://www.erc.metu.edu/menu/series04/0409.pdf> and Gerald Bloom, "Health Sector Reform: Lessons from China," *Social Science & Medicine* 45, no. 3 (August 1997): 351–360.

6 In the general comparative public health literature that concentrates both on individual country studies (e.g., Giovanni Andrea Cornia, Stefano Rosignoli, and Luca Tiberti, "Did Globalisation Affect Health Status? A Simulation Exercise," *Journal of International Development* 21, no. 8 [November 2009]: 1083–1101) and on cross-country analysis (e.g., Omar B. Ahmad, Alan D. Lopez, and Mie Inoue, "The Decline in Child Mortality: A Reappraisal," *Bulletin of the World Health Organization* 78, no. 10 (2000): 1175–1191), it is widely corroborated that the post-1980s period is driven by different health development parameters.

7 Jin Ma, Mingshan Lu, and Hude Quan, "From a National, Centrally Planned Health System to a System Based on the Market: Lessons from China," *Health Affairs* 27, no. 4 (2008): 937–948.

has largely overlooked the independent and self-sustaining characteristics of health-related development.<sup>8</sup> The Turkish health system, which forms the main subject of the paper, has experienced a 30-year transformation process designed to match its health development with its economic development. In the process of reaching these health goals, important health challenges have been and are currently still being faced by the Turkish healthcare system. An important example of this, and indeed the most glaring weakness of the system, was evidenced by infant mortality figures, which until recently had been comparable to those of a developing country with a much lower per-capita income level.<sup>9</sup>

Another goal of this paper is to create a comparative framework<sup>10</sup> involving the greatest possible set of comparator countries (a maximum of 88) for the purpose of situating, understanding, and comparing with similar countries the dynamics of Turkey's health development, economic development, and health policy in the post-1960 period.<sup>11</sup> This period is divided into two shorter periods, taking as the dividing point the structural break that occurred in the midst of the 1980s, a point in time chosen because, for the majority of developing countries, it represents a major break<sup>12</sup> in terms of the structural parameters related to health and economics, as well as terms of the relation between the dimensions of health and the economy.<sup>13</sup> In addition, for certain parts of the developing world—such as the post-Soviet republics<sup>14</sup> and sub-Saharan Africa<sup>15</sup>—this period marked a structural break in the development of macro health values. In investigating the health and economic systems of Turkey and the other comparable developing countries chosen, I attribute special importance to the effects of marketization<sup>16</sup> and the opening of the global health market that occurred in the post-1980 period. In the analysis here, which is consistent with prior research in

8 In his pioneering work, Sen has shown that the effect that development in the economic dimension has on the health dimension is neither linear nor consistent; see Amartya Sen, "The Economics of Life and Death," *Scientific American* 268, no. 5 (May 1993): 40–47.

9 Cornia and Menchini, "The Pace and Distribution of Health Improvements."

10 The importance of this comparative framework has recently been shown in Sanjay G. Reddy, "Wealthier and Healthier? China's Recent Health Achievements in Comparative Perspective," SSRN, <http://dx.doi.org/10.2139/ssrn.918623>, where again China was used as a crucial comparator country, with a large set of developing countries also being used for purposes of comparison.

11 The vast majority of developing countries experienced the most important and noticeable improvement in their health and economy values during the 1960–2010 period, which is regarded as the heyday of development for the majority of the world's population.

12 For a thorough investigation of the manner in which the period of the 1980s functioned as a structural break for the health values of China, see Cornia, Rosignoli, and Tiberti, "Did Globalisation Affect Health Status?"

13 Cornia and Menchini, "The Pace and Distribution of Health Improvements."

14 Bernd Rechel and Martin McKee, "Health Reform in Central and Eastern Europe and the Former Soviet Union," *The Lancet*, 374, no. 9696 (October 2009): 1186–1195.

15 Cornia and Menchini, "The Pace and Distribution of Health Improvements."

16 Ma, Lu, and Quan, "Lessons from China."

this field,<sup>17</sup> the post-1980 period is identified, analyzed, and differentiated as an “independent” period of development, especially within the crucial context of the development of health parameters.<sup>18</sup>

Thus roughly dividing Turkish health development into two different periods for the purposes of evaluation, I reach the following preliminary conclusions. Analysis of the overall characteristics of the Turkish health system and the Turkish health-economy nexus must begin with the 1960s, a period that marked the beginning of the health system’s transformation from a mostly private, particularized, consumer-oriented, and urbanized health system into a public, more nationalized system. Furthermore, this study plots the development of life expectancy values, beginning with the 1960–1980 period, taking this as an important threshold period during which the process of increasing both health capacity and coverage and the system’s rural inclusivity was advanced. Although this process was mainly targeted toward decreasing macro rural-urban inequality in regard to health values, I will investigate whether this reform initiative also had an effect on the national health development values measured by this paper.

In terms of transformation, and in addition to the post-1980 period—which created new urban and treatment-biased priorities for the health system—the post-2000 period represents another important sub-period, as during this era the priorities and mode of organization achieved a new level of complexity. Turkey began this period with increased marketization, an increased proportion of the public budget allocated to health, and increased total health expenditure, and this was further accompanied by the prioritization of an increase in population coverage.

This paper reveals a long-standing pattern in Turkish development, with specific importance accorded to the dichotomy of health vs. economic development; in analyzing this pattern, the following special characteristics become evident: (i) Turkey had a 50-year development period during which health fell behind economic achievements; (ii) the health dimension began to catch up with other dimensions of development in the post-1980s period, making further progress in the 1990s; (iii) the Turkish health system has created outputs that vary only minimally, reporting consistent but non-impressive growth rates every decade from 1960 onward; and (iv) the general process of Turkish development relates to continuity rather than to structural change.

17 Focusing on the post-1980 period as an independent period for health system parameters is very common in the health literature that chronicles the health values of developing countries, and is also a well-established practice in the international health literature; see Timothy Besley, Miguel Gouveia, and Jacques Drèze, “Alternative Systems of Health Care Provision,” *Economic Policy* 9, no. 19 (October 1994): 199–258.

18 The output data showing the parameters of health are summarized in Appendix 3.

This final point becomes especially clear through analysis of the comparative framework inasmuch as contrasting Turkey's performance with that of other developing countries shows that, on average, the other countries have exhibited much more uneven development patterns, especially in regard to health. This difference in continuity is especially pronounced in comparison with the pattern seen in China.

Overall, especially as compared to the Chinese case, my conclusion is that Turkish development in terms of independent health policy innovations that have had an aggregate effect on health outcomes can be characterized by a "following" rather than a "leading" pattern. Additionally, I also find that Turkey represents an average success story among developing countries, being moderately successful in both economic and health development over the period studied (1960–2010), with no clear globally exceptional growth in either of the dimensions—which is quite unlike the case of China.

Two characteristics define Turkish health-economy development in the 1960–2010 period: (i) a lack of serious medium- or long-term downturns in health or economic development; and (ii) the impression of disjointed health and economic development, as there is no evidence to support the existence of a strong correlation in the growth rates of these two dimensions over any significant medium- or long-term period in Turkish history. The importance of these results will be discussed in the final section, as they relate to both global and Turkish development.

### **Introduction to the measurement, relation, and differentiation of health and economic development**

In recent development studies, one of the most important innovations has been Amartya Sen's multidimensional and interactional approach to development, which treats overall economic welfare as a process jointly determined by the independent dimensions of social, health, economic, and political development.<sup>19</sup>

One of the main debates relating to the analysis of development concerns the most appropriate method of measuring and standardizing the comparative development of countries. Accurately measuring achievements in development is critical for an understanding of their relative achievements as well as of aspects of development that are yet to be accomplished. Consequently, the use of long-run data is becoming increasingly popular, both for answering questions concerning Turkish economic and industrial development<sup>20</sup> and for analyzing

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19 Amartya Sen, *Development as Freedom* (New York: Knopf Publishing Co., 1999).

20 A very good example of the use of long-run data to analyze Turkish industrialization from a comparative perspective can be seen in Erol Taymaz and Ebru Voyvoda, "Marching to the Beat of a

interesting new health development work in developing country geographies.<sup>21</sup> Development measures calculated in this fashion are crucial for achieving the goal of tracking development in a satisfactory manner.

When measuring the evolution of long-run health capacity and health achievement, it is important to remember that health-related output variables generally remain quite stable over time. Consequently, quite large and sustained macro-level changes in the health system dimension, as well as in other dimensions, are required in order to create significant shifts in the health output. Even with such changes, the aggregated and macro nature of the most regularly used health variables necessitates the tracking of long-run averages (ranging from decadal to bicentennial) in order to truly understand occurrences in the health variable dimension.

In the health development dimension, the crucial concepts that have become a matter of concern in the recent literature on economic development are represented by the variables of life extent and life quality. In previous literature, these measures, which are related to life improvements classified as human development, have mainly been measured by improvements in life expectancy and quality and decreases in related mortality rates. In this paper, however, the main measure of life extent and life quality that will be focused on is the simplest variable; namely, adult life expectancy at birth (which is also the focus of the globally collected Human Development Index measure). This measure will allow me to collect, conceptualize, and compare achievements in the area of life development both over long periods of time and for the largest possible set of countries. Another important advantage of this measure is that it is a composite variable that collects information concerning the mortality risks that citizens of a given country face at different ages, thus capturing the aggregate effect of all health risks and the effectiveness with which the health system addresses these risks over the life cycle of a single individual.

Of human development variables, life expectancy and life improvements were shown by Sen to be independently important for sustainable long-run development, and also to be independently determined by a combination of different social, political, and economic parameters.<sup>22</sup> In this context, it becomes especially important to investigate the trajectory of human development by using life expectancy tables and changes in the life expectancy dimension. Life expectancy instruments, by focusing on crucial variables relating to health

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Late Drummer: Turkey's Experience of Neoliberal Industrialization since 1980," *New Perspectives on Turkey* 47 (Fall 2012): 83–113.

21 The work of Reddy in charting the long-run development of mortality figures has been very important for this current work; see Sanjay G. Reddy, "Death in China: Market Reforms and Health," *International Journal of Health Services* 38, no. 1 (2008): 125–141.

22 Sen, *Development as Freedom*.



development, allow a broader point to be made concerning the characteristics of, and differences in, the long-run development paths taken by different countries in regard both to the crucial dimension of human development and to the health capacity that is necessary to make this development sustainable.

Another important question that has arisen from research relating to sustainable human development concerns the degree of correlation and causation between the dimensions of health development and economic development. Starting from the extreme position that changes in the economic dimension directly cause or create opportunities for health development,<sup>23</sup> the economic literature in the field has since evolved to a more nuanced position, with many varying explanations being provided in an attempt to pinpoint the exact contours of the health-wealth relationship. Although the relationship between economic and health developments has been shown to exist in both micro<sup>24</sup> and macro dimensions, there is also a growing interest in showing the non-linearity<sup>25</sup> and complexity of the relationship,<sup>26</sup> as well as the potential for certain other crucial variables—such as at the societal and political level<sup>27</sup>—to influence the extent to which economic variables and development levels can in turn influence a given country's health equilibrium.<sup>28</sup>

In this study, a more concentrated effort to relate the dimensions of health and economic development has been undertaken via the application of the Preston Curve<sup>29</sup>, which has been found to be indicative of global development in the dual dimensions of aggregate health and the aggregate economy. In order to understand

23 This position is most famously defended in Lant Pritchett and Lawrence H. Summers, "Wealthier is Healthier," *The Journal of Human Resources* 31, no. 4 (Autumn 1996): 841–868.

24 David M. Cutler, Adriana Lleras-Muney, and Tom Vogl, "Socioeconomic Status and Health: Dimensions and Mechanisms," in *The Oxford Handbook of Health Economics*, ed. Sherry Glied and Peter C. Smith (Oxford: Oxford University Press, 2011): 124–163 and Angus Deaton, "Policy Implications of the Gradient of Health and Wealth," *Health Affairs* 21, no. 2 (March–April 2002): 13–30.

25 Angus Deaton, "Health, Inequality, and Economic Development," *Journal of Economic Literature* 41, no. 1 (2003): 113–158.

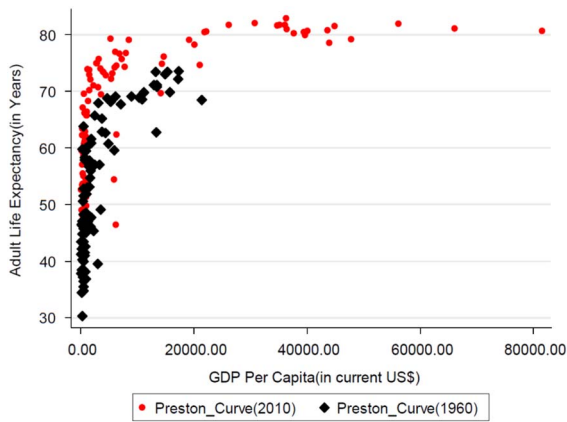
26 Anne Case and Angus Deaton, "Health and Wealth among the Poor: India and South Africa Compared," *American Economic Review* 95, no. 2 (May 2005): 229–233.

27 Vicente Navarro and Leiyu Shi, "The Political Context of Social Inequalities and Health," *Social Science & Medicine* 52 (2001): 481–491.

28 See especially Navarro and Shi, "The Political Context of Social Inequalities and Health" for the importance of the political dimension; Sudhir Anand and Martin Ravallion, "Human Development in Poor Countries: On the Role of Private Incomes and Public Services," *The Journal of Economic Perspectives* 7, no. 1 (Winter 1993): 133–150 for the importance of public service investments; and Sen, "The Economics of Life and Death" for the importance of social inequalities.

29 Preston Curves are graphs that are frequently used in the health and development literature and that, importantly, track not only the time-linear trends in the relationship between income per capita and life expectancy values at the level of the individual country, but also the significance of the cross-sectional relationship between these dimensions; see Samuel H. Preston, "The Changing Relation between Mortality and Level of Economic Development," *Population Studies: A Journal of Demography* 29, no. 2 (July 1975): 231–248.

Figure 1: Preston Curves for 1960 and 2010

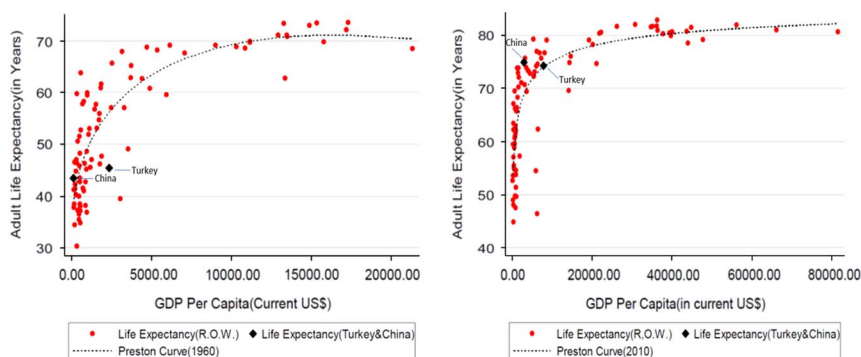


the meaning of this curve in regard to Turkish health development, we must ask fundamental questions concerning the collective movement of the countries in question, owing to the fact that such factors cause shifts in the entire curve. A general upward trend represents an improving level of technological development within the health field, which allows the health levels of the countries to increase independently of economic levels. Illustrating this, Figure 1 shows the movement of the Preston Curve for the world distribution of countries from 1960 to 2010.

The overall curve allows us to compare the scale of all achievements in health over time to achievements in the economic dimension of development, which is measured by the overall production (per capita) level. The global effects of development on the dimensions of health and economy can be seen in the increases in global means represented in Table A1-1 in Appendix 1. Following an initial examination of the aggregate data for health and wealth, this study will proceed to focus on the differing time-linear progression of the specific countries of analysis—i.e., China and Turkey—within the Preston Curve. The initial position of these two countries on the curve represents the respective positions of these countries in 1960 in terms of the health-economy continuum (see Figure 2). From this graph, it can be seen that both countries began their development periods as relatively poor and unhealthy nations. The main difference between them is that China was more successful in terms of health relative to both Turkey and the average country's performance, while Turkey was accordingly less successful as compared to both China and the average country's performance.<sup>30</sup>

30 In accordance with the general principles of the Preston Curve, the economic achievements of countries are measured with the help of GDP per capita, while the achievements of countries in the health

Figure 2: Relative Positions of Turkey and China on the Preston Curve (1960-2010)



The dynamic movement of Turkey along the general Preston Curve tells a different and more individually influenced story, one that can be traced by comparing the relative positions of China and Turkey in Figure 2. Turkey's changing position on the curve suggests that there was a bidirectional increase in both health and economic values in the country during the second half of the 20th century, a change that happened concurrently with global increases in the values of these indices. However, as the second half of the 20th century marks the highest and most consistent period of success for the largest group of developing countries (see Figure 1), this picture does not show clearly how Turkey's health system improved in comparison to countries with similar economic development, health development, and state capacity.<sup>31</sup> However, a glance at Figure 2—which illustrates a survey and evaluation<sup>32</sup> of the relative positions of China and Turkey—shows that, although the relatively high performance of China in the health dimension remains constant compared to both Turkey and the average from 1960 to 2010, Turkey's relative performance in the health dimension as compared to the world average suggests

dimension are measured using, among other factors, analysis of increases in the adult life expectancy data.

- 31 As can be seen in Figure 1, although the Preston Curve has retained its shape over the last 50 years, it has consistently moved upwards and to the left, and thus represents a global improvement in economic and health values (see Muhammad Jami Husain, "Revisiting the Preston Curve: An Analysis of the Joint Evolution of Income and Life Expectancy in the 20th Century," working paper, Keele Management School, Keele University, 2011. [https://www.keele.ac.uk/media/keeleuniversity/ri/riscsci/docs/economics/workingpapers/LeY\\_KeeleEconWP\\_JamiHusain.pdf](https://www.keele.ac.uk/media/keeleuniversity/ri/riscsci/docs/economics/workingpapers/LeY_KeeleEconWP_JamiHusain.pdf)), with the life expectancy level increasing across all income levels as time progresses (see David E. Bloom and David Canning, "Commentary: The Preston Curve 30 Years on: Still Sparking Fires," *International Journal of Epidemiology* 36, no. 3 (June 2007): 498–499).
- 32 Both China and Turkey have passed through the high slope of the curve and, having experienced epidemiological transition, have moved their societies to a new equilibrium where further improvements in life expectancy can only be obtained with great effort.

that, during the same period, Turkey managed to alleviate at least some of its lag in this regard. It should also be noted that, at the final period of analysis, Turkey is situated right on the Preston Curve, whereas in 1960 it was underneath it, which suggests a comparatively better relative performance in health as compared to the economy over the same period. Of course, Turkey's final position on the curve also suggests that the previous five decades can be mainly characterized by its attempting to catch up to the world in terms of health, as opposed to moving ahead, innovating, and overtaking the global leaders.

Despite the above findings, analysis that relies solely on data from the Preston Curve is limited for two reasons. Firstly, although a cursory examination of the curve might suggest a certain positive co-movement between the dimensions,<sup>33</sup> it is just as likely that both of the dimensions of health and economy increased completely independently of one another. Secondly, the general upward movement in the entire curve for the period between 1960 and 2010 might be interpreted as an independent effect that greatly influenced the health dimension but did not affect the economic dimension. Sen offered an explanation for this independent movement of the health dimension, postulating that the results of the curve are driven mainly by support-related mechanisms rather than growth-mediated processes.<sup>34</sup> In essence, one of the goals of this paper is to differentiate these two processes in terms of their importance for understanding the history of the Chinese and Turkish health systems.

Considering the most macro representation of economic development, which is only weakly and non-linearly related to health development, it proves difficult to differentiate individual country narratives in terms of economic development and health development. As a result, in order to situate Turkish development in its appropriate historical and geographical context, this study will compare the development of China and Turkey in regard to these same dimensions, coupling this with an analysis that compares and contrasts Turkish development with two different sets of comparator countries. One of these sets is composed of countries that shared the same level of health development as Turkey at the beginning of the different periods in question, whereas the other set is made up of countries that were at the same level of economic development as Turkey.

The main contribution of the paper will be the provision of a multi-dimensional, long-term perspective. This approach shows the value of using a

33 See Bloom and Canning, "The Preston Curve 30 Years On."

34 In Sen's basic taxonomy, countries that enjoy higher life expectancies and life capacities through generally higher than average growth rate periods are said to be experiencing growth-mediated processes. On the other hand, countries that are experiencing independent increases in human development irrespective of the growth rate in economic production are said to be going through support-related processes.

large dataset of countries over a long period of time in order to obtain information concerning countries' health and income development. Conducting the analysis using the simplest dimensions of health and economics creates a comparative balance sheet with which to evaluate how countries have fared over the last 50 years, which was the most successful era of development for the majority of the countries analyzed. Furthermore, it should be noted that these countries were classified under the "developing" label during at least some, if not all, of the periods covered by this dataset. One of the main advantages of the approach taken in this study is that it provides a unique and novel periodization for the development of the public health system and of infrastructure and structural change in Turkey.

Dividing the analysis into an outcome evaluation and a system evaluation, the result is a bifurcated paper that fulfills two purposes. Firstly, it creates a narrative of the structural changes in Turkey's health system and compares this with structural changes in China's health sector. Secondly, the paper also analyzes changes in the social and economic dimensions of Turkey's and China's development, situating their individual development on the Preston Curve that reflects the overall global picture.

In this context, and in regard to the important discussion relating to the health outcome dimension, the Turkish figures show a continuity that is almost unparalleled within the large developed and developing countries dataset, which makes Turkish health development unique in regard to its long-run development pattern. In stark contrast to this, the Chinese health system shows significant discontinuity,<sup>35</sup> with considerable—and in fact higher than the global average—health progress achieved completely independently of the economic dimension during the pre-1980 period, followed by considerable economic progress achieved independently of the health dimension during the post-1980 period<sup>36</sup>. This difference of experience makes questions relating to support-led health development vs. growth-mediated health development much more pertinent. One point of contention raised by this paper's findings is that both China's and Turkey's development paths in terms of health represent an example of support-led development, but the fundamental drivers and limiters of support-led development differ for the two countries, as they generated the most success in different decades.

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35 One of the more important points of this paper is that the initial distinction between the post-1980 and pre-1980 period—which is reflected in the section titles—applies to the Chinese case, with planning features more visible in the pre-1980 period and a decrease in public involvement and coordination more visible in the post-1980 period. However, this discontinuity—which has also been found to apply to the Turkish economy in general, as per Roger Owen and Pamuk Şevket, *A History of Middle East Economies in the Twentieth Century* (London: I.B. Tauris, 1998)—does not apply to the transitions in the Turkish health economy.

36 Jean Drèze and Amartya Sen, *Hunger and Public Action* (Oxford: Oxford University Press, 1991).

This mode of research also provides an opportunity to connect the existing literature on public health in Turkey to the literature summarizing Turkey's pattern of development in other dimensions,<sup>37</sup> to the global empirical literature on the health-wealth development relationship,<sup>38</sup> and to the regularly discussed and cited literature on China's development challenges and achievements.<sup>39</sup>

### **Continuities and discontinuities in the health system and the health-economy relationship in the planned economy period (1960–1980)**

#### *The crucial dimensions of health development for Turkey and China*

In this section, in line with the paper's research methodology and in order to track Turkey's and China's trajectory across different dimensions while still applying the greatest possible amount of information concerning the aggregate health characteristics of the population, I will initially use the life expectancy variable. This is because, since this represents an overview-style variable, life expectancy is reliable and does not differently evaluate the health achievements of different age groups in the population, which gives this variable an advantage over other measures of mortality and life quality that are equally regularly applied.<sup>40</sup> This, in fact, is one of the main reasons life expectancy is often applied in long-term cross-country comparisons.<sup>41</sup> (See Figure 3 for the development of life expectancy during these periods.)

Furthermore, this project is also indebted to the newly recognized importance of the use and analysis of long-term data. In order to confirm the advantages of using long-term data to analyze the long-term development patterns of different dimensions and to compare countries' development paths, this study uses the health development of two large countries—namely, China and Turkey—as a test case. Through this analysis, the periodization and the geographical comparisons applied will allow different variables that influence the health equilibriums of the societies in question to be simultaneously controlled using time and fixed-factor effects.

37 Taymaz and Voyvoda, "Marching to the Beat of a Late Drummer."

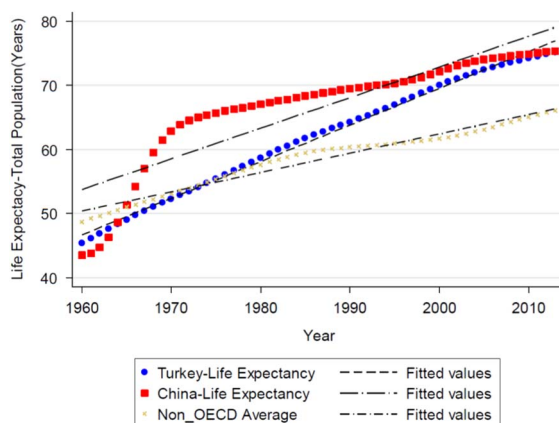
38 See Deaton, "Policy Implications of the Gradient of Health and Wealth"; Michael Marmot, "The Influence of Income on Health: Views of an Epidemiologist," *Health Affairs* 21, no. 2 (2002): 31–46 and Moshe Semyonov, Noah Lewin-Epstein, and Dina Maskileyson, "Where Wealth Matters More for Health: The Wealth-Health Gradient in 16 Countries," *Social Science & Medicine* 81 (March 2013): 10–17.

39 David Blumenthal and William C. Hsiao, "Globalization and its Discontents: The Evolving Chinese Health Care System," *New England Journal of Medicine* 353, no. 11 (September 2005): 1165–1170.

40 The best-known disadvantage of life expectancy—namely, its inability to focus on the specific health characteristics of a cohort—is relatively unimportant for this study, as this paper does not focus on the health of specific cohorts of the Turkish population, but rather on the change in the general health level of the Turkish population between 1960 and 2010.

41 Reddy, "Death in China."

Figure 3: Life Expectancy Achievements of Turkey and China (1960–2010)



This comparison of countries that faced similar health challenges and constraints over similar periods of time, while also differentiating in regard to their respective achievements, allows for the control of the specific effects of changing health technology and health knowledge and information. This is because, among countries with similar levels of health development, developments in universal knowledge and technology are expected to create similar opportunities for the countries in question to improve health outcomes, and controlling for this effect in turn results in a clearer investigation of the other determinants of the health system,<sup>42</sup> as well as of the society-wide factors that influence health equilibrium in the aggregate.

The performance of a given country's health sector and the characteristics and condition of its public health system are driven by parameters other than its economic structure, and these health-specific parameters must be examined in order to understand the independent dimension of health development. Analysis of the social, political, and economic correlates of health development forms the basis of an important new literature, one that has now become still more relevant as a result of Sen's seminal contribution.<sup>43</sup> In this new literature, the state's health capacity, the social and economic dimensions relating to inequality, the social and economic dimensions relating to poverty, and the generalized dimension of economic development are all widely accepted as being the crucial determinants of the aggregate health equilibrium in a society. Within this general conceptualization, such work joins a growing amount of literature that focuses on the effects of marketization and market reforms on

42 Reddy, "Wealthier and Healthier?" and Reddy, "Death in China."

43 Sen, "The Economics of Life and Death."

both the broader spheres of development and on the specific dimension of health development.

The findings of this new strand of literature also contribute to one of the most frequently mentioned development-related discussions on the topic of the relationship between health and wealth. Specifically, the new literature emphasizes how this relationship is not as simple as it seems, with the variety of institutional health “development” that has paved the way for long-run economic development and growth, not to mention the scale of the economic development in question, also being crucial. The present paper constitutes a new examination of the relationship between economic, social, and health development: it situates the Turkish case of historical development *vis-à-vis* Chinese development within this three-dimensional relationship, and furthermore situates both of these countries’ experiences within the broader historical context of global development.

As has already been discussed, in developing countries the creation of truly national health systems generally began in the second half of the 20th century. As Sen and Jean Dreze have emphasized,<sup>44</sup> this creation of health systems occurred in conjunction with the health delivery and health provision developments advanced by countries via a complex set of political and economic breakthroughs. This paper will chart the effects of the known policy breakthroughs on the important health output variables over a 50-year development schedule, attempting to determine which policy breakthroughs have been effective in creating true and lasting effects on countries’ development of health outcomes and health systems.

In order to chart and discuss health delivery systems, what is required is a matrix of dimensions<sup>45</sup> with which to evaluate the changes that occurred in the different dimensions of the health systems in question. In the literature that includes the primary health outputs (i.e., mortality and life expectancy), the main indicators plotted by health economists relate to population coverage, access, provision, and expenditure, which are applied in order to understand and compare the effectiveness of health systems.<sup>46</sup> Initially, to compare both Turkey and China, an all-encompassing comparative framework will be

44 Jean Drèze and Amartya Sen, *An Uncertain Glory: India and its Contradictions* (London: Penguin Books, 2013).

45 Further information concerning the dimensions of analysis and the indicators used to capture changes in these dimensions is provided in Appendix 3.

46 As a result of data gaps, the important dimensions of health cannot all be homogeneously evaluated for either China or Turkey, and as such this study focuses on the health outputs and expenditures of all sources over the entire time span in question; however, the other dimensions *are* included whenever continuous and reliable data can be found, which in most cases is limited to the post-1980 period and, in some cases, to the post-1990 period.



established for the most basic health outputs and health expenditure items, and this will then be applied to these countries, as well as to their developing country counterparts.

However, especially for the post-1980 period,<sup>47</sup> I will also focus on the primary dimensions of changes in health-system coverage that have been regularly used in analysis of universal coverage dimensionality. The main dimensions focused on will be: (i) change in the populations served by the health system;<sup>48</sup> (ii) change in the scope and range of treatments offered by the health system; and (iii) change in the proportion of costs covered by public sources in the public system. All primary reform movements, for the health reforms of both China and Turkey, will be charted to this matrix. If we consider the effects of the health reforms and/or institutional changes implemented in both Turkey and China during the overall period of 1960–2010, there is a general movement toward increased universality, with the only exception being the shift toward market capitalism that occurred in China with the 1978 reforms that abolished the rural health system and involved significant decreases in the first and third dimensions<sup>49</sup> of coverage,<sup>50</sup> which in turn drastically slowed the movement toward universality.

Using the parameters utilized by previous health-related literature for the classification of different health systems,<sup>51</sup> Turkey's development process in terms of its health systems and health values can be partitioned into two general periods that share similar structural parameters, with the first period stretching approximately from 1960 to 1980 and the second from 1980 to 2010. China shares a similar periodization, but the main difference is that at the level of the macro dimensions of health achievement, the Turkish process shows greater continuity both between and within these two periods.

The first period, from 1960 to 1980, was when the modern Turkish health system emerged from its earlier dual, primitive, and highly unequal system. The dual system provided continuous urban and private health care coupled with a discontinuous, campaign-oriented, protectionist<sup>52</sup> health system that aimed to

47 The reason for which the post-1980 period has been selected for this analysis is dictated by the data; in other words, these data are comparable and reliable.

48 This will be discussed in terms of the proportion of the population that has access to the primary and secondary levels of the health system, without differentiating between the levels.

49 For further information concerning the dimensions of coverage, see Appendix 3.

50 Judith Banister and Xiaobo Zhang, "China, Economic Development and Mortality Decline," *World Development* 33, no. 1 (2005): 21–41.

51 In classifying the different health systems around the world, the financing scheme, provision character, and inclination of the system to prioritize either preventative or treatment-related health is commonly used to individually characterize and systematize health systems.

52 Recep Akdur, "Türkiye'de Sağlık Örgütlenmesinin Gelişimi," *Toplum ve Hekim* 5, no. 28 (1980): 36–43.

control rural and urban epidemics whenever they became fully fledged.<sup>53</sup> During this period, this dual system slowly and haltingly<sup>54</sup> moved toward becoming an integrated health system,<sup>55</sup> with a fixed infrastructure investment all across the country and a more equal geographical distribution of health workers and hospitals.<sup>56</sup> In 1961, the Socialization Law (No. 224) was passed in an attempt to create a rural/peripheral counterpart for the urban center-oriented public health system,<sup>57</sup> this law stipulated the creation of a peripheral health workforce equipped with the technology and infrastructure necessary to meet the demands and needs of the rural population, at least in regard to the primary level of healthcare. This focus on bolstering the health condition of the rural population was critical because at the time the majority of the population lived in rural areas.<sup>58</sup> The same was also true of China, where changing rural health outcomes was of fundamental importance for improving national health and solving the existing health inequalities in the country<sup>59</sup> and was thus a conscious priority in post-1960 health reforms.

In the 1980–2000 period, Turkey crossed another threshold in moving toward a universalized system, producing a health infrastructure that covered the entire country and fully integrating the protective first-stage health system. In a related vein, a national initiative—implemented on an unprecedented scale—was undertaken to immunize children in the general population against the most common early-age diseases.<sup>60</sup> The effectiveness of this preventative national initiative in limiting the scale and pace of epidemics is quite clear, and can be observed in the vaccination level for DPT (diphtheria, tetanus and pertussis) seen in Figure 4 below, while Figure 5 shows the initiative's effect at the output level.

In regard to the social dimension, the early 1980s in particular witnessed a massive increase in the growth rate of the urban population, with, for the first

53 For a detailed account of the characteristics of the pre-1960 Turkish healthcare system, see Halis Akder, "Forgotten Campaigns: A History of Disease in Turkey," in *Turkey's Engagement with Modernity: Conflict and Change in the Twentieth Century*, ed. Celia Kerslake, Kerem Öktem, and Philip Robins (Houndmills: Palgrave Macmillan, 2010): 210–235.

54 Ayşen Bulut, "Türkiye'de Sağlık Reformunun Tarihçesi," in *Avrupa'da ve Türkiye'de Sağlık Politikaları*, ed. Çağlar Keyder, Nazan Üstündağ, Tuba Ağartan, and Çağrı Yollar (İstanbul: İletişim Yayınları, 2007): 111–124.

55 Nusret Fişek, "Nusret Fişek İle Söyleşi," in *Prof. Dr. Nusret Fişek'in Kitaplaşmamış Yazıları – III* (Ankara: Türk Tabipler Birliği Yayınları, 1983).

56 Bulut, "Türkiye'de Sağlık Reformunun Tarihçesi"; Ayşe Akın, "Türkiye'de Sağlık Hizmetlerinin Sosyalleştirilmesi Uygulamalarından Örnekler, İzlenimler," in *Türkiye'de Sosyalleştirmenin 50 Yılı*, ed. Figen Şahpaz and Eriş Bilaloğlu (Ankara: Türk Tabipler Birliği Yayınları, 2012): 95–104; and Çağatay Güler, "Etimesgut Örneği," in *Türkiye'de Sosyalleştirmenin 50 Yılı*, ed. Figen Şahpaz and Eriş Bilaloğlu (Ankara: Türk Tabipler Birliği Yayınları, 2012): 83–94.

57 Akdur, "Türkiye'de Sağlık Örgütlenmesinin Gelişimi."

58 See Figure 6.

59 Vicente Navarro, ed., *The Political Economy of Social Inequalities: Consequences for Health and Quality of Life* (New York: Baywood Publishing Co., 2002).

60 Akın, "Örnekler, İzlenimler."

Figure 4: Immunization Changes for DPT (Turkey, China and OECD Average)

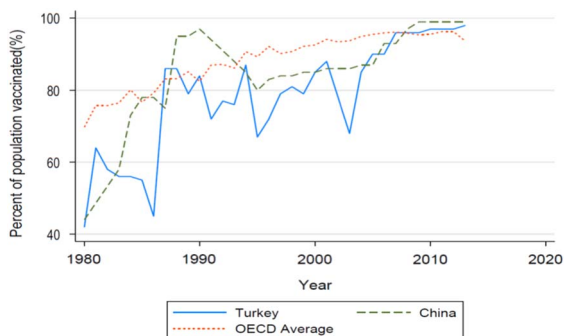
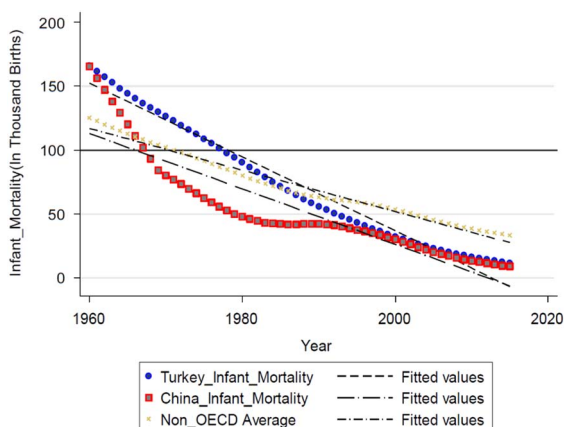


Figure 5: Infant Mortality Achievements of Turkey and China (1960–2010)



time in Turkish history, the majority of the population living in urban areas. A similar social and economic change occurred in China, with increased urbanization and marketization, although, as will be discussed below, the rates and directions of the changes implemented in some of the health indices were significantly different than those found in the Turkish system.

The most recent period of study, from 2000 to 2010, witnessed a significant transformation in the parameters of the national health system in connection with the marketization, coverage, and utilization of the health service.<sup>61</sup> Consequently, an increased level of health expenditure, health access, and

61 Gülbiye Yenimahalleli Yaşar, "Türkiye'de Sağlık Güvencesi: Neredeyiz?" in *Türkiye'de Sağlık Siyaset ve Piyasa*, ed. Gülbiye Yenimahalleli Yaşar, Asuman Göksel, and Ömür Birler (Ankara: NotaBene Yayınları, 2015): 85–124.

healthcare use became new and quickly well-established characteristics of the system. As the cumulative effect of the changes made over all the time periods in question began to make itself felt, the causes of the majority of deaths shifted from infectious to non-contractible diseases,<sup>62</sup> and accordingly the main challenges facing the health system changed. During this period, between 65 and 75 percent of the population lived in urban areas, with the majority of the health supply and demand being created and met in these areas.

In this latest period, certain measures of the inputs and outputs of Turkey's health system converged for the first time with the Organisation for Economic Co-operation and Development (OECD) average, with the averages of these variables first equaling and then overtaking the values for the countries on the lowest rungs of the OECD ranking.<sup>63</sup> In the following two sections, I will situate this history of health achievements in its proper context, considering the development of comparable countries (mostly outside the OECD set of countries) and country sets in terms of the relevant health inputs, health organization and coverage, and health output indices, whenever the data permits.

### The initial bidecadal period of health development in Turkish and Chinese history (1960–1980)

The 1960–1980 period was a critical period of investment, development, and outlay for both the Chinese and Turkish health systems, a time when both countries began transitioning from a more partitioned, unequal, underinvested, and underresourced state to more national, equal, and specialized treatment- and population-based health systems. This section will not only focus on the set of reforms and initiatives that started these modernization initiatives, but also examine to what extent these reforms and systemic characteristics truly changed the underlying health outcomes and health outputs, as measured at the level of national health aggregates.

62 For Turkey's transition, see Sabahat Tezcan and Dilek Aslan, "Mortality Trends and Causes in Turkey between 1960–2000," paper presented at the 16th World Congress of Epidemiology, Montréal, August 18–22, 2002 and Aysit Tansel, "Health System of Turkey," in *World Health Systems: Challenges and Perspectives*, ed. Bruce J. Fried and Laura M. Gaydos (Chicago: Health Administration Press, 2012): 381–407. For China's corresponding transition, see Lincoln Chen and Ling Chen, "China's Exceptional Health Transitions: Overcoming the Four Horsemen of the Apocalypse," in *Medical Transitions in Twentieth Century China*, ed. Bridie Andrews and Mary Brown Bullock (Bloomington: Indiana University Press, 2014): 26–55.

63 Organisation for Economic Co-operation and Development (OECD), "OECD Health Statistics 2014: How Does Turkey Compare?" (Paris: OECD, 2014).

*The 1960s: The genesis of a new public health approach*

At the beginning of their development processes, both Turkey and China were developing countries defined by unidimensional health institutions and policies that were positioned to control disease levels during important epidemics, a practice entirely in conformance with most health systems in developing countries. Such a priority is understandable since most morbidity and mortality in the Turkish and Chinese populations at the beginning of this period were caused by communicable diseases;<sup>64</sup> consequently, the state, the health infrastructure, and health policies aggressively targeted disease at this level. As a direct result of this unidimensional policy, the focus of health efforts in China and Turkey vacillated between rural and urban areas depending on which disease was being targeted at the time. For instance, tuberculosis (a largely urban disease) necessitated a primarily urban approach and urban investment, whereas when the targeted disease was malaria (which is largely rural), the majority of investment and emphasis were placed on rural areas and populations. Thus, the rural-to-urban health investment ratio and the direction of the emphasis of the public health system were determined by the nature of the targeted disease and not by the state.<sup>65</sup>

For both China and Turkey, the 1960s were defined by a significant shift in health policy<sup>66</sup> and a significant structural break in terms of health development, which is especially visible and significant when considering the national data (as seen in Figures 3 and 4) as well as the global health ranking for China.<sup>67</sup> For instance, the practice of targeting a single disease came to be replaced by a multidimensional approach that targeted healthy as well as sick populations. In addition to this primary innovation, which was implemented in Turkey particularly, both countries turned toward more planning-based, proactive approaches in regard to the economy,<sup>68</sup> coupling this with similar measures in the dimension of health institutions and placing great emphasis on health-conscious, primary care-based health care that

64 For Turkey, see Tezcan and Aslan, "Mortality Trends and Causes in Turkey"; for China, see Chen and Chen, "China's Exceptional Health Transitions."

65 For this period of public health development in Turkey, see Akder, "Forgotten Campaigns" and Kyle T. Evered and Emine Ö. Evered, "Governing Population, Public Health, and Malaria in the Early Turkish Republic," *Journal of Historical Geography* 37, no. 4 (October 2011): 470–482. For China, see Ka-che Yip, "Disease, Society, and the State: Malaria and Health Care in Mainland China," in *Disease, Colonialism, and the State: Malaria in Modern East Asian History*, ed. Ka-che Yip (Hong Kong: Hong Kong University Press, 2009): 103–120 and Nancy Krieger, *Epidemiology and the People's Health: Theory and Context* (Oxford: Oxford University Press, 2011).

66 Daqing Zhang and Paul U. Unschuld, "China's Barefoot Doctor: Past, Present, and Future," *The Lancet* 372, no. 9653 (November 29, 2008): 1865–1867.

67 The China effect was significantly different from the global mean at this level, and clearly ranked second in the world average.

68 Owen and Şevket, *A History of Middle East Economies*.

targeted population-level health outcomes and health-deprived populations,<sup>69</sup> as well as geographies themselves.<sup>70</sup>

The targeting of the healthy population also led both countries' rural areas—which were home to a significant proportion of the population and featured lower health values and higher rates of mortality and communicable disease—to become important arenas for increased health expenditure, health investment, and health targeting; one notable example from China of such targeting was the Four Pests Campaign, named after the aggressive targeting of disease vectors that affected primarily rural populations. Viewed in this light, China's "rural cooperative medical system" (implemented continually in the period between 1960 and 1978<sup>71</sup>) and the associated "barefoot doctors' program" (innovated and implemented from 1968 to 1978<sup>72</sup>), as well as Turkey's "socialization program" (begun in 1961 and reaching a national level in 1983<sup>73</sup>) represented a radical rural-based reorientation of health policy and health planning in the developing country health landscape. The main contribution of this movement was that these two countries gained an advantage<sup>74</sup> over the majority of their neighbors in the developing country group (as seen in Figures 3 and 4), which in the 1970s began to follow a similar primary care-oriented, deprivations-based path.<sup>75</sup>

In the health values and mortality figures of the 1960s, there is a pronounced improvement in both countries, though the Chinese improvement is much more significant and becomes even more striking when examined from a world-historical perspective. For instance, although in the 1960s Turkey's life

69 Ragıp Üner and Nusret Fişek, *Sağlık Hizmetlerinin Sosyalleştirilmesi ve Uygulama Plânı Üzerinde Çalışmalar* (Ankara: Sağlık ve Sosyal Yardım Bakanlığı Yayınları, 1961) and Necati Dedeoğlu, "Bir Yasanın Hikayesi," *Toplum ve Hekim* 17, no. 2 (March–April 1994): 59–60.

70 Though not implemented, the original socialization plan passed as a law in 1961 involved initiating the modernization of the Turkish health system from east to west, and thus initially targeting more deprived provinces, which represented an exact reversal of the direction of the long-standing health inequalities in the Turkish health system; see Akın, "Örnekler, İzlenimler."

71 Huazhang Li et al., "The Development and Impact of Primary Health Care in China from 1949 to 2015: A Focused Review," *The International Journal of Health Planning and Management* 32, no. 3 (2017): 339–350.

72 Leyu Shi, "Health Care in China: A Rural-Urban Comparison after the Socioeconomic Reforms," *Bulletin of the World Health Organization* 71, no. 6 (1993): 723–736.

73 Fişek, "Nusret Fişek İle Söyleşi" and A. Hamdi Aytekin, "Sağlık Hizmetlerinin Sosyalleştirilmesi ve Muş Deneyi," in *Türkiye'de Sosyalleştirilmenin 50 Yılı*, ed. Figen Şahpaz and Eriş Bilaloğlu (Ankara: Türk Tabipler Birliği Yayınları, 2012): 79–82.

74 For the Turkish case, see Necati Dedeoğlu, "Dünya Sağlık Örgütü, Alma-Ata, Temel Sağlık Bakımı Kavramı ve Sosyalleştirme," in *Türkiye'de Sosyalleştirilmenin 50 Yılı*, ed. Figen Şahpaz and Eriş Bilaloğlu (Ankara: Türk Tabipler Birliği Yayınları, 2012): 29–36; Akın, "Örnekler, İzlenimler"; and Aytekin, "Muş Deneyi."

75 Zafer Öztekin and Nevzat Eren, "Sağlık Yönetimi," in *Halk Sağlığı: Temel Bilgiler*, ed. Çağatay Güler and Levent Akın (Ankara: Hacettepe Üniversitesi Yayınları, 2006) and Jon Rohde et al., "30 Years after Alma-Ata: Has Primary Health Care Worked in Countries?" *The Lancet* 372, no. 9642 (September 13, 2008): 950–961.

expectancy rate increased to achieve its highest rate ever as compared to preceding and succeeding decades, Chinese performance in the 1960s was the most impressive health performance in a “global” sense, as is revealed when the country’s improvement is compared to the development of all 88 countries across all five decades of data. The appropriateness and efficiency of the Chinese health investment is evidenced by the fact that the country’s infant mortality rate decrease was the fourth highest among all countries in the 1960s, as well as being the second highest in Chinese history. On the other hand, the Turkish improvement in life expectancy was not coupled with a higher-than-average performance of the overall health system, as is revealed when achievements in infant mortality are also included in the overall measure for health achievement; for Turkey, the decrease in infant mortality, in terms of absolute value, was actually most pronounced between 1960 and 1970. Inasmuch as infant mortality represents a measure of the modernization and homogenization of the health system, it appears that China achieved much better improvements in life expectancy than Turkey via its modernization and increased homogenization, whereas Turkey achieved improvements in its total development values (i.e., life expectancy and GDP) without actually modernizing and homogenizing its health service sector,<sup>76</sup> which can be assumed to limit the long-term sustainability of the health development in question.

In order to compare health development in Turkey and China with general world development in this regard, I make use of the clustering methodology, which can capture the manner in which the clusters that include China and Turkey changed over the 1960–2010 period. This approach allows for an examination of the general picture presented by the Preston Curve and for a specific consideration of countries similar to Turkey and China in terms of global health and macroeconomic measures. An advantage of using the long-run approach is that it allows for the formation of a group whose development is comparable to that of Turkey and China, which can be achieved by using and clustering the long-run cross-country sample. Additionally, the same

76 The limitations on Turkey’s health development and the protracted growth of its health system have generally been noted in the previous literature, and have been linked to low investment, the transfer of low skilled labor to underserved areas, low coordination, and low commitment to changing the characteristics of the Turkish health system via the Socialization Law; see Fişek, “Nusret Fişek ile Söyleşi”; Dedeoğlu, “Bir Yasanın Hikayesi”; Necati Dedeoğlu, “224 Sayılı Yasanın Dünü, Bugünü, Yarını,” in *224 Sayılı Yasada Dün-Bugün-Yarın* (Adana: Adana Tabip Odası Yayını, 1997): 70–75; Ata Soyer, “Otuz Yıl Önce Tıp Öğrencilerinin Yaptığı Bir Araştırma Nedeni İle ‘Sosyalizasyon ve Doğru’,” *Toplum ve Hekim* 16, no. 2 (March–April 2001): 130–135; Akın, “Örnekler, İzlenimler”; and Sibel Kalaça, “Sağlık Hizmetlerinin Sosyalleştirilmesi Hakkındaki Kanun ve Beş Yıllık Kalkınma Planları,” in *Türkiye’de Sosyalleştirilmenin 50 Yılı*, ed. Figen Şahpaz and Eriş Bilaloğlu. Ankara: Türk Tabipler Birliği Yayınları, 2012. 65–75.

methodology can also be used to identify periods of particular success and convergence in regard to Turkish and Chinese development.

In the following part of the analysis, I will ask whether successful periods of economic development intersect with successful periods of health development, and also whether countries with the same level of health development share similar economic characteristics; in other words, I will investigate whether the dimension of health development is truly independent of the dimension of economic development. Similarly, the relative independence of the health development of Turkey and China will be investigated via the overall developing country dataset in order to be able to understand the extent to which the same characteristics of development hold true for other, similar countries. In order to achieve these aims, I have applied a clustering<sup>77</sup> in regard to the global health values for the time period in question, as well as an independent clustering approach in regard to the global economic values. The results for the health values, disaggregated for the decades, are presented in Table A1-2, together with the income per capita values for the same set of countries in Table A1-3.

When applying this clustering approach to the health data from the 1960s, the health cluster of Turkey and China can be identified as a single set, with a majority of the countries around the world located at a higher position in the world distribution. It is therefore clear that the health development characteristics of the reforms of the 1960s pushed China into a position as a forerunner, advancing its health variables in a period when its economic variables were stagnating, whereas Turkey experienced a much more controlled improvement in both the health and economy dimensions.

### *The 1970s: Two countries in interregnum*

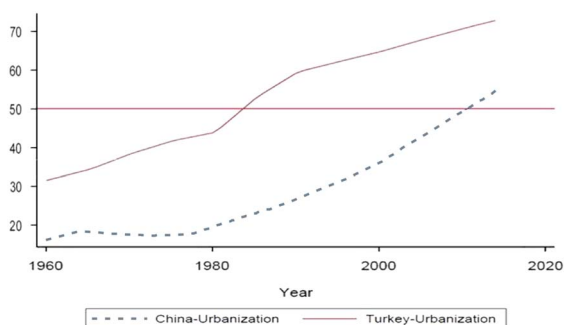
In the 1970s, the modernization of Chinese health proceeded with priorities similar to those of the previous decade, with lower infant mortality rates illustrating the main achievements in regard to the development of life expectancy; this is especially notable given that the country still had a comparatively low GDP per capita, situated in the lowest 5 percent of global GDP per capita distribution (for the relative position of the Chinese to the Turkish economy, see Figure 3).<sup>78</sup> Turkey's development, meanwhile, proceeded in a more lackluster manner: it went on transforming its health system by increasing its rural orientation and continuing to target healthy members of the population, as well as by increasing the number of protective health measures conducted,

77 For further information on the methodology and utility of the clustering methodology, see Appendix 4.

78 Charles Kenny, "What's Not Converging? East Asia's Relative Performance in Income, Health, and Education," *Asian Economic Policy Review* 3, no. 1 (June 2008): 19–37.



Figure 6: Urbanization Rate (%) for Turkey and China\*



\* The 50-percent horizontal line represents the threshold where the majority of national population lives in cities.

which were generally supported by large-scale vaccination programs.<sup>79</sup> In this regard, it is important to remember that, until the beginning of the 1980s, the majority of the Turkish population lived in rural areas, as can be seen in Figure 6, and also that the Chinese urban population did not gain parity with its rural population until the middle of the 2000–2010 period. The main problem for both countries was that the health system that was tasked with achieving this transformation had not yet reached national scale,<sup>80</sup> and as a result there were great differences between different provinces, as well as between rural and urban areas, in terms of medical insurance coverage, health technology, health expenditure, and modes of treatment.<sup>81</sup> In Turkey, coverage-related problems remained serious, for rural areas especially but also in aggregate. China, however, was much more successful in this sense: by the time of the 1978 cutoff, when the health and economic system began to undergo complete transformation, the country had nearly closed the coverage gap between urban and rural areas, and its total coverage was close to the OECD level of coverage, as can be seen in Figure 7.<sup>82</sup> Additionally, China had also begun by this time to provide

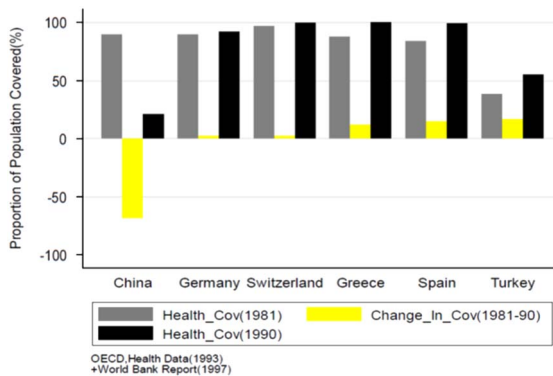
79 Turkey's health development was also protracted geographically, beginning with the targeting of one province, then seven, before finally being implemented homogeneously for all 65 provinces by 1983, though this last measure had initially been planned for completion by 1977; see Akin, "Örnekler, izlenimler").

80 The case for China is summarized in Xinzhong Yu, "Epidemics and Public Health in Twentieth-Century China," in *Medical Transitions in Twentieth Century China*, ed. Bridie Andrews and Mary Brown Bullock (Bloomington: Indiana University Press, 2014): 126–155, while the case for Turkey is summarized in Akdur, "Türkiye'de Sağlık Örgütlenmesinin Gelişimi."

81 Blumenthal and Hsiao, "Globalization and its Discontents."

82 By 1975, medical insurance coverage—supported by China's rural cooperative medical system, government, and state enterprises—had reached close to 90 percent of the population, covering nearly all of the urban population and 85 percent of the rural; see Judith Banister and Xiaobo Zhang,

Figure 7: Health Insurance Coverage as a Percentage of Population



basic curative and preventative healthcare services to the massive Chinese population at low cost.<sup>83</sup> For Turkey, these values, along with the low level of public investment in health as compared to the OECD average, suggest that even though China's and Turkey's pre-reform public health initiatives may indeed have been moving in the same direction, the inputs and state commitment applied by China so as to address the problem were far more substantial and, consequently, achieved considerably more success.

When we compare the health development in Turkey and China with general development around the world—a comparison made possible through an application of the advantages of the clustering methodology—we observe that both Turkey and China began the 1960–1980 period in the same health-related class; the other members of Turkey's initial and ultimate classes can be seen in Table A1-2. They were also both in a similar economic situation. In regard to health values, they both belonged to Class 2, whose characteristics are shown in Table A1-2, while in terms of economic values, China belonged to Class 1 and Turkey to Class 2, with these characteristics being shown in Table A1-3. As a result, both countries essentially faced the same kinds of health challenges and had at hand similar fiscal means with which to address these challenges. The end of the period in question sees China, through the unique and independent growth it achieved in the health dimension, join countries with a much higher level of socioeconomic development. By the same point,

"China, Economic Development and Mortality Decline," *World Development* 33, no. 1 (2005): 21–41. On the other hand, Turkey's health/insurance system, supported by a low level of public funds, covered only 38.3 percent of its population by 1980, and even this was strongly biased toward the urban population.

83 For both the advantages and disadvantages of this mode of coverage, see World Bank, "China 2020: Financing Health Care" (Washington, DC: World Bank Publications, 1997), 1.

Turkey had joined the middle of the distribution and possessed health and economic achievements similar to those of other countries in the same income bracket, but with lower health values than its competitors in this regard. In sum, during the 1960–1980 period, although China and Turkey experienced no change in their income groups, China moved to Class 4 (with the upgrade occurring primarily due to a radical shift in the 1960s), while Turkey experienced a more modest upgrade that brought it into Class 3 (with the upgrade, again, occurring mainly in the 1960s). It is noteworthy that, for both countries, their critical period of health improvement occurred without any noticeable improvement in economic outcomes, a fact that backs up the theory that support-led health development was implemented in both countries. The problem of coordinating, as well as committing to, a national policy with a definite direction—a problem that was in fact a common issue for global economies in the 1970s<sup>84</sup>—may also have constituted a significant limitation for Turkey in connection with its attempts to revamp its health policies and health systems.

### **Continuities and discontinuities in the health system and health-economy relationship in the age of structural adjustment (1980–2010)**

*The 1980s: Two sides of the same coin? Similar and differing effects of the marketization processes*

This section will begin by broadly differentiating the relevant periods of health development: the main difference between the pre- and post-1980s for the Turkey-China comparison is that, following the rate of nationwide reforms conducted during the 1980s, the rate of the health system's completion and of coverage increase, as well as the fight against health inequality, became (unlike the pre-1980s situation) biased in favor of Turkey, with the possible exception of the post-2000 period.<sup>85</sup>

The predilection of both countries' health systems to ameliorate the existing level of regional, economic, and urban-rural inequalities strengthened in the post-1980s era. For Turkey, this occurred particularly in the 1990s, whereas for China the process was intermittent and only truly gained momentum at the

84 Owen and Şevket, *A History of Middle East Economies*.

85 As will be seen, this represents an exceptional period, not because Turkey's rate of reform has slowed, but rather because the Chinese rate of reform has significantly increased in terms of rural directionality and the removal of inequalities; see Baoping Shang and Eva Jenkner, "The Challenge of Health Care Reform in Estonia, Hungary, China, Chile, and Mexico," in *The Economics of Public Health Care Reform in Advanced and Emerging Economies*, ed. Benedict Clements, David Coady, and Sanjeev Gupta (Washington, DC: International Monetary Fund, 2012).

end of the first decade of the 2000s through the adoption of a back-to-basics approach to combatting rural-urban inequality.

In the 1980s, both countries experienced a similar period of liberalization/marketization in regard to their macroeconomic parameters, as well as a greater external orientation of their overall economies;<sup>86</sup> this process, however, produced differing consequences in regard to the countries' health dimensions. For China in particular, this period represented a complete departure<sup>87</sup> from the health-economic development mix<sup>88</sup> that it had already chosen and committed to in the pre-1980s period.<sup>89</sup>

The new health-economic development mix that China had selected was much more heavily weighted toward urban economic and health development,<sup>90</sup> and it also involved a combination of a huge drop in the coverage of publicly available health insurance schemes (a measure that had a great impact on rural health parameters),<sup>91</sup> the creation of new health inequalities,<sup>92</sup> and a mix of health policies<sup>93</sup> that significantly impeded sustainable health development, as evidenced by the fact that this period saw the smallest decrease in infant mortality among all the decades under study. This decrease was also, in terms of absolute value, quite small compared to that of countries at similar levels of economic and health development.<sup>94</sup> One potential explanation for the fact that such a sudden and significant policy reversal at the level of health institutions did not lead to a health disaster at the level of output<sup>95</sup> is that the quite historic (both for China and globally) level of increase in the country's

86 Owen and Şevket, *A History of Middle East Economies*.

87 No other country has undergone as dramatic a health care reform as China; see Qingyue Meng et al., "One Country, Two Worlds: The Health Disparity in China," *Global Public Health: An International Journal for Research, Policy and Practice* 7, no. 2 (2012): 124–136.

88 Deaton has stated that the Chinese health-economic performance from the pre-1970 to the post-1970 period underwent one of the largest structural shifts ever witnessed in the developing country dataset; see Angus Deaton, *The Great Escape: Health, Wealth, and the Origins of Inequality* (Princeton: Princeton University Press, 2013).

89 Table A1-4 provides evidence that China experienced a structural break while Turkey experienced structural continuity. The table shows that, for Turkey, the relationship between economic and health development remained generally constant in both the pre- and the post-marketization reform era; in the case of China, however, this relationship shifted onto an entirely new axis in the post-reform era.

90 Shi, "Health Care in China."

91 Pi-Chao Chen and Chi-Hsien Tuan, "Primary Health Care in Rural China: Post-1978 Development," *Social Science & Medicine* 17, no. 19 (1983): 1411–1417.

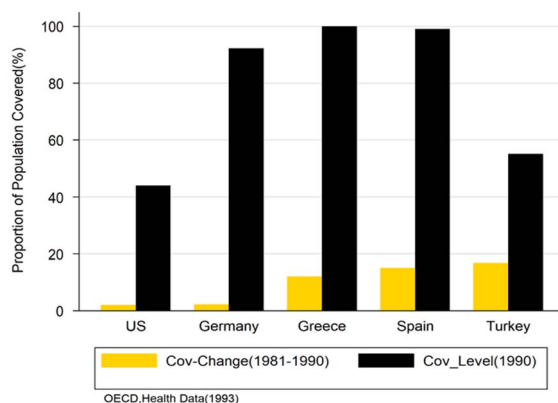
92 Ma, Lu, and Quan, "Lessons from China" and Navarro, *The Political Economy of Social Inequalities*.

93 Meng et al., "One Country, Two Worlds" and Winnie Yip and William C. Hsiao, "The Chinese Health System at a Crossroads," *Health Affairs* 27, no. 2 (March–April 2008): 460–468.

94 Reddy, "Death in China."

95 An example of such a health disaster in regard to outputs would be the health breakdowns that Russia suffered in the 1990s following the collapse of the Soviet public health system; see Vladimir M. Shkolnikov et al., "Mortality Reversal in Russia: The Story So Far," *Hygiea Internationalis: An Interdisciplinary Journal for the History of Public Health* 4, no. 1 (December 2004): 29–80.

Figure 8: Insurance Coverage as a Percentage of Population (without China)



economic development buttressed the private funds allocated to health at a time when public funds and services were hitting historic lows; see Figure 7 for the extent of the drop in social insurance coverage.

Turkey's development followed a different path for two reasons. First, at the beginning of the 1980s, although the liberalization/marketization process was implemented in other sectors, the health system went largely untouched.<sup>96</sup> The Socialization Law remained in force—at least in terms of defining the macro parameters of the health system<sup>97</sup>—and consequently, during this period the health system was able to substantially increase its insurance coverage of the population (see Figure 8) and, due to its highly heterogeneous quality, was also able to continue its progress toward achieving national coverage. The Socialization Law's bias toward prioritizing protective medicine, along with the medical infrastructure that had been built across the country during the 1960–1980 period, meant that any new vaccination drive increased the proportion of the Turkish population that was covered and protected against first-stage epidemic diseases. Thus, for the first time, the preventative arm of the Turkish health system was able to provide preventative medicine to the majority of the Turkish population (see Figure 4).

The second reason for the increase in coverage during this period was that Turkey's now more urbanized society was able to improve access to the health system via an expansion of its social insurance system.<sup>98</sup> Certain limitations did,

96 The effect on the macroeconomy was much more powerful in China, owing to the fact that the embeddedness of the health system there meant that the changing economy and society influenced the functioning of the health system; this, however, was not the case in Turkey, where the reformers initially gave little prioritization to the transformation of the health system.

97 Akin, "Örnekler, İzlenimler."

98 As a result of the implementation of two sets of laws (in 1983 and 1985), workers in the agricultural sector and those who were self-employed were protected from health risks, a measure that was at

however, exist in relation to this coverage development, and two points must be made in this regard. First, even with a significant increase in rates of access to the healthcare system—the highest, in fact, in the OECD dataset—the official overall social coverage rates of Turkey’s public health and insurance systems nevertheless remained well below those of all other OECD countries (with the exception of the United States, which differs from all other countries due to the low priority given to “social” protection there). And second, this coverage was highly unequal and heterogeneous in quality, as it was subject to differences from city to city and region to region, as well as among different levels of employment,<sup>99</sup> both at the level of access and at the level of service (though this latter is unfortunately not as measurable).

However, although the health system change in Turkey was not momentous and the high levels of inequality in the Turkish healthcare system in the rural/urban, regional, and income dimensions remained largely unchanged, Turkey’s health achievements in relation to both the infant mortality and life expectancy dimensions did manage to surpass China’s achievements in this regard. There is, though, a caveat, as this was based more on the significant slowdown in Chinese healthcare output rather than on the Turkish system’s own acceleration, as evidenced by the fact that Turkey’s improvements were surpassed by many other countries during the same period. Furthermore, clustering analysis suggests that Turkey’s position relative to its health neighbors stayed constant, which shows that the country’s health output grew at a level that was only slightly higher than the average level for developing countries.

### *The 1990s: The genesis of a new public health approach*

The 1990s was a period of strengthening and reform in Turkey’s public health,<sup>100</sup> with the ongoing national project initiated by the nationalized public health system coming to fruition, vaccination rates reaching over 80 percent for the majority of targeted diseases, and similarly satisfactory achievements in mortality ratios. In China, the 1990s were a period of government-driven stabilization and featured an ongoing effort to raise health development to a

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least partially supported by state funds. Moreover, with the establishment of the Social Assistance and Solidarity Fund (*Sosyal Yardımlaşma ve Dayanışma Fonu*) in 1986, a new health financing opportunity was provided for the urban and rural poor across the entirety of Turkey. This is an example of an increase in the fifth dimension of access/financing, for which see the data indicators subsection in Appendix 3.

99 Ayşe Buğra and Çağlar Keyder, “The Turkish Welfare Regime in Transformation,” *Journal of European Social Policy* 16, no. 3 (2006): 211–228.

100 The reform now prioritized marketization over socialization, and also targeted primarily urban health outcomes and the treatment arm of health services over investment in preventative care, as well as rural health outcomes, which had been the main feature and original intent of the Socialization Law; see Kalaça, “Sağlık Hizmetlerinin Sosyalleştirilmesi Hakkındaki Kanun”.

level that would match the burgeoning economic development. However, although the decrease in mortality was greater than it had been in the 1980s, the decade also saw increases in the divergence between rural and urban health values,<sup>101</sup> in inequality among social groups,<sup>102</sup> and in limitations to the rural provision of health services<sup>103</sup> and rural access to health institutions,<sup>104</sup> all of which had a dampening effect on life expectancy and healthy population values.

The changes that occurred in the Turkish health system can be described by two main features. First, the state increased its involvement in the funding side of the health equation (see Figure 9), such that it became at least comparable to the other countries in Turkey's health and wealth neighborhood, although significant gaps still remained with regard to the OECD average, as can be understood from Figure 9. And second, Turkey was able to extend its social insurance umbrella so as to cover both the unemployed and the rural employed.<sup>105</sup> The health development path for this decade would be determined by whether the increases in expenditures, inputs, and organization on the supply side would be able to meet the greater demand on health that was emerging as a result of the greater access to health care that the state had begun to provide.

As compared to the Chinese case, the Turkish healthcare system's main direction again was different both in the macro dimensions (where it was improving rather than dormant), and in the critical micro dimension of health inequality. The reasons for the Turkish upgrade in health values and health system output during this period—which in the macroeconomy was associated with stagnation and recurring financial crises—appear to be fivefold: (1) increase in state funds allocated to social expenditure,<sup>106</sup> (2) increase in the focus on combatting longstanding inequalities in the health system via expansion of the coverage of the social insurance regime, (3) increased coverage

101 Xiaobo Zhang and Ravi Kanbur, "Spatial Inequality in Education and Health Care in China," *China Economic Review* 16, no. 2 (2005): 189–204.

102 Meng et al., "One Country, Two Worlds."

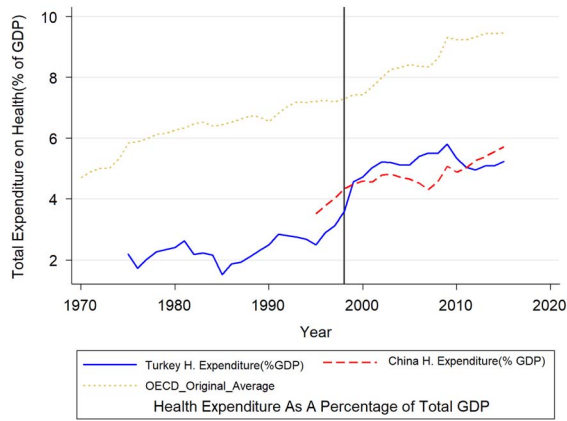
103 Ajay Tandon, Juzhong Zhuang, and Somnath Chatterji, "Inclusiveness of Economic Growth in the People's Republic of China: What Do Population Health Outcomes Tell Us?" *Asian Development Review* 23, no. 2 (December 2006): 53–69.

104 M. Ramesh and Xun Wu, "Health Policy Reform in China: Lessons from Asia," *Social Science & Medicine* 68, no. 12 (June 2009): 2256–2262.

105 The Green Card system instituted in 1992 had already included 1.7 million additional people in the Turkish health system by 1995. Today, it remains the primary mechanism for the Turkish state to expand its coverage umbrella, with some 12,351,000 people covered by the public insurance scheme via this channel; see Yenimahalleli Yaşar, "Türkiye'de Sağlık Güvencesi: Neredeyiz?"

106 David Coady and Kenishiro Kashiwase, "Public Health Care Spending: Past Trends," in *The Economics of Public Health Care Reform in Advanced and Emerging Economies*, ed. David Coady, Benedict J. Clements, and Sanjeev Gupta (Washington, DC: International Monetary Fund, 2012).

Figure 9: Total Health Expenditure (government expenditure on health + out-of-pocket expenditure) Profiles of Turkey and the Rest of World (1970–2010)



\*The average is for countries who are founding members of the OECD, not including Turkey.

toward the urban and rural poor<sup>107</sup> as well as toward underserved areas of the country, (4) a build-up in terms of hospitals and doctors<sup>108</sup> (see Figures 10 and 11), and (5) a continuing reorganization of the health workforce that sent a greater number of younger doctors into underserved areas of the health system, especially in the first half of the 1990s.<sup>109</sup>

As Figure 12 shows, these noticeable improvements and changes in the health system in the direction of both more homogenous public coverage and of greater service provided to underserved parts of the Turkish health system meant that health inequality values—as measured by infant mortality differences between individuals and households with different regional, gender, income, and rural/urban characteristics—initially began to concurrently decrease in the different dimensions for the Turkish health system. Figure 12, for instance, shows that, in the majority of the inequality dimensions, 1998 represents the lowest values measured for the post-1980 period. This movement toward decreased health inequalities in the different dimensions was very different than the direction witnessed in the majority of the world's developing countries in the 1980s and 1990s,<sup>110</sup> and it can be conjectured that the different path Turkey was taking in the

107 Buğra and Keyder, "The Turkish Welfare Regime in Transformation."

108 Bulut, "Türkiye'de Sağlık Reformunun Tarihçesi."

109 As one can see from the inequalities graph, the greatest achievements in terms of decreasing inequalities in the health output dimension in the entire dataset were achieved in the 1993–1998 time period.

110 Cornia and Menchini, "The Pace and Distribution of Health Improvements."



Figure 10: Hospital Bed Numbers per 1,000 population (1980–2013)

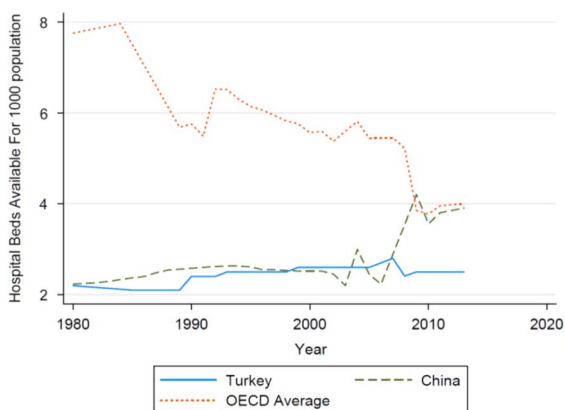
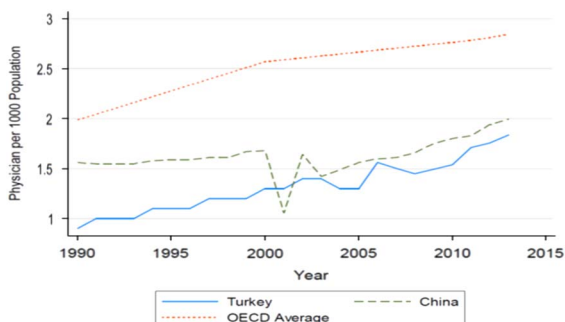


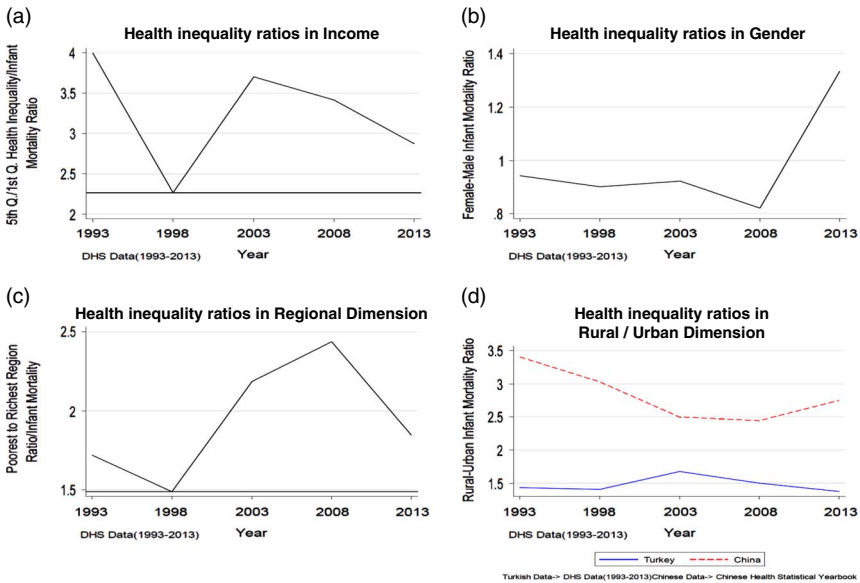
Figure 11: Physician Per Population Ratios for Turkey, China and OECD Average (1990–2013)



inequalities dimension, as seen in Figure 12, was also partially fueling their higher than average rate of improvement in mortality values.

What seems to be clear is that, under its chosen financing and coverage scheme, the Turkish state did not choose to prolong these important health gains, and this led indefinitely to higher health costs within its public budget. As the government brought the increased level of public health expenditure under control (as evidenced by Figures 9 and 13), this meant that the coverage newly provided to a new part of the population would not be sustainable (see Figure 13 for the sustainability problem in regard to public funds), and, as a result, this public coverage window would either have to be closed or else be financed with hidden private funds. Moreover, the social security crisis decreased at least one part of the covered population's quality and access to

Figure 12: Health Inequality Graphs in the Different Dimensions



pharmaceutical products quite sharply.<sup>111</sup> All of this culminated in the fact that all those health inequalities that had initially subsided in the first half of the 1990s reached their minimum position in 1998, and then began an incline in the 1998–2003 period, as seen in Figure 12.

When the clustering methodology is used to compare the health development in Turkey and China with general world development, it is observed that, in the 1980–2000 period, the relative position of China in terms of health development remained stable, with the country remaining in Class 4; this, in turn, meant that other developing countries were able to equal its level of health development, with Turkey prominent among such countries. Here, special emphasis should also be placed on the 1990–2000 subperiod, when Turkey upgraded to Class 4 in terms of health development.

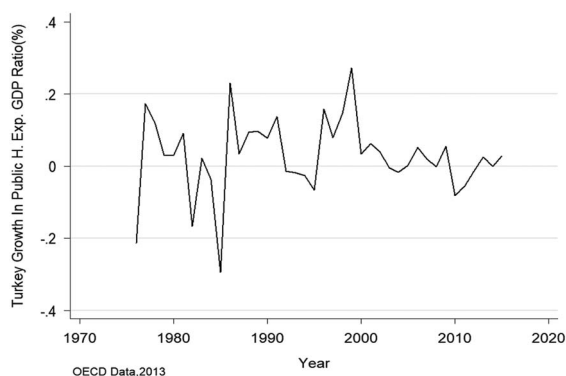
### *The 2000s: The final chapter of health and development*

Turkey's Health Transformation Program (*Sağlıkta Dönüşüm Programı*), which to a great extent determined the changes in the health system's features in the first decade of the 21st century,<sup>112</sup> must be understood—partly as a

111 Çağlar Keyder, "Giriş," in *Avrupa'da ve Türkiye'de Sağlık Politikaları*, ed. Çağlar Keyder, Nazan Üstündağ, Tuba Ağartan, and Çağrı Yollar (İstanbul: İletişim Yayınları, 2007).

112 Rifat Atun et al., "Universal Health Coverage in Turkey: Enhancement of Equity," *The Lancet* 382, no. 9886 (July 6, 2013): 65–99.

Figure 13: Increases in Public Health Expenditure for Turkey as a % of GDP



result of this analysis—as a culmination of the opportunities and limitations that had characterized the Turkish healthcare system for the previous 40 years. The increases in coverage and health services (in terms of both prevention and treatment) that were offered by the system, along with the concurrent increase in available public health funds,<sup>113</sup> made a higher level of organization and management necessary to bring the Turkish healthcare system into the 21st century. On the other hand, the Green Card (*Yeşil Kart*) system's incomplete integration into the protective umbrella also made the expansion of the system rather tenuous, with the system's ability to provide homogenous and high-quality health service seeming increasingly in doubt.

Faced with these challenges and opportunities, Turkish state administrators made it a political priority to increase health services and health coverage (see Figure 15),<sup>114</sup> and as a result they were able to honor their commitment through the help of a high level of public infusion of funds into the system: as seen in Figure 14, the public share of total funds going into health expenditure grew during the 2000s,<sup>115</sup> with the increased infusion coming partly from the state's greater ability to allocate more funds due to the fact that the economy was emerging from crisis. Accordingly, the coverage of the healthcare system continued to grow apace, as seen in Figure 15.

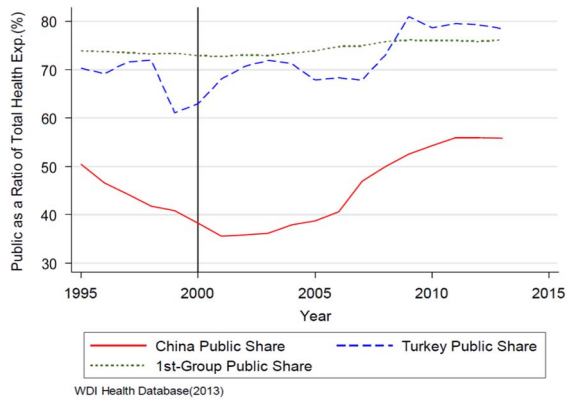
Seen from this perspective, the Turkish healthcare system shows more continuity than one is accustomed to, with the 1980s increase in preventative care creating the framework of the increase in preventative care capabilities

113 The Turkish increase in the public share can be seen in Figure 14.

114 Keyder, "Giriş."

115 As well as the public share (as seen in Figure 14), the absolute size of the public expenditure also grew, though at a slightly slower rate as compared to the 1995–2000 period (as seen in Table A1-5 and Figure 13); this pace, however, was a steadier and thus more manageable one.

Figure 14: Share of Public Expenditures in Total Health Expenditures for China, Turkey and the 1st Group Countries Average\*, 1995–2013



\*The countries in the 1st Group are listed in Table A1-9.

of the 1990s, and the 1990s reform ideas and level of funds and coverage establishing the benchmark of the 2000s, with increased implementation, stronger government commitment, and, since the second half of the 1990s,<sup>116</sup> continuously expanding public expenditure establishing a consistent and growing pattern in the health system, thereby enabling it to achieve virtual parity with OECD countries in terms of infant mortality. Nonetheless, the costs of achieving these health goals have been remarkably high, largely because the Turkish system has been forced to leap many critical hurdles in the post-1980 economy, with the Turkish system in this period seeming to be characterized by much higher overhead costs and higher payments to technology. As a result, the level of life expectancy and infant mortality that Turkey has been able to reach for every dollar it has spent on health pales in comparison with not only China, but also Sri Lanka, Vietnam, and Thailand,<sup>117</sup> which are also Turkey's health neighbors.<sup>118</sup>

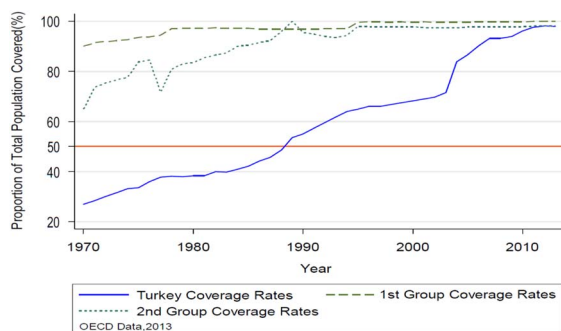
In terms of the dimension of health inequalities, although for the most part the inequality level has not returned to the level of the 1998 period, as seen in Figure 12, there were nevertheless significant decreases in inequalities for the 2008–2013 period. Here there is also significant continuity with the story of

116 Coady and Kashwase, "Public Health Care Spending: Past Trends."

117 All of these countries have a much more well-developed and well-established preventative care core in their economy, which is something that these states have consistently prioritized throughout the decades.

118 Dan Chisholm and David B. Evans, "Improving Health System Efficiency as a Means of Moving towards Universal Coverage," World Health Report (2010) Background Paper, No 28. <http://www.who.int/healthsystems/topics/financing/healthreport/28UCEfficiency.pdf>.

Figure 15: Proportion of Total Population Covered by Social Insurance



1st and 2nd Group countries are listed in Table A1-9.

the 1990s. The 2008–2013 period is when the Green Card system led to a substantial increase in the coverage of the health system—with the coverage window expanding by some 3 million people between 2009 and 2013—in addition to delivering a higher quality of health care to the newly covered population as compared to the case in the 1990s. Figure 16 makes clear how this variety of increased coverage—i.e., that achieved through the Green Card system—can create convergence dynamics, as the figure shows that the majority of the new Green Card holders hail from areas<sup>119</sup> with lower aggregate health values (at the provincial level).

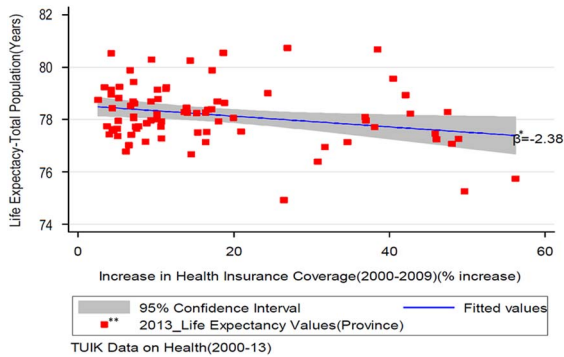
All these achievements at the macro level came at high cost, and the historical pattern of rural-urban and regional differences remained relatively unchanged.<sup>120</sup> Moreover, the fact that the level of health coverage reached by Turkey after 55 years of continuous health development was reached by China in just the period between 1960 and 1975 should make us reconsider the claims that Turkish health achievements in this decade were unprecedented. Turkey's systemic ability to identify and target underserved areas especially, as well as to fashion large increases in health levels at a low level of cost, still seems to be lacking as compared to the Chinese case.

As a case in point, the Chinese achievements in regard to infant mortality figures improved impressively in the 2000s. In the area of policy, reorienting the

119 This effect is already well known by researchers in the field to exist at the individual level; see, e.g., Çağlar Keyder and Nazan Üstündağ, "Doğu ve Güneydoğu Anadolu'nun Kalkınmasında Sosyal Politikalar," in *Doğu ve Güneydoğu Anadolu'da Sosyal ve Ekonomik Öncelikler*, ed. Ethem Yenigün (İstanbul: TESEV Yayınları, 2006): 90–148 and Erdem Yörük, "The Politics of the Turkish Welfare System Transformation in the Neoliberal Era: Welfare as Mobilization and Containment" (Ph.D. dissertation, The Johns Hopkins University, 2012). Figure 16, however, shows that a similar result holds at the provincial level as well.

120 Keyder and Üstündağ, "Doğu ve Güneydoğu Anadolu'nun Kalkınmasında Sosyal Politikalar."

Figure 16: Role of Increased Coverage\*\*\* in Health Achievements (Turkey) at Province Level



\*  $\beta$  is the correlation coefficient between the two dimensions.

\*\* The plotted points represent the average life expectancy values for the 81 provinces of Turkey.

\*\*\* In this period the increased coverage of the health system is achieved through new Green Card holders.

health system toward rural areas,<sup>121</sup> along with an increased emphasis on rural values coupled with increased state participation and rural outreach efforts on the part of medical institutions,<sup>122</sup> yielded strong results, with an unprecedented decrease in the infant mortality rate that returned the country to the pre-1970 period of success in terms of this measure.<sup>123</sup> Post-1980s Turkey, on the other hand, may have experienced a steadily, though slowly, improving performance in terms of infant mortality, but this performance still trailed far behind that of China during the first decade of the 2000s, as the latter country was ranked second in the world during this period. China's infant mortality achievements are shown in the second column of Table A1-6 and in Figure 5, and the effects of these achievements on life expectancy can be seen in the final column of Table A1-6. Turkey's performance in the pre- and post-1980 periods follows a steady path of relatively constrained achievements in health and the economy, whereas China follows a more see-saw pattern, with certain decades—namely, the final three under consideration here—characterized by world-leading economic performance, and with the start and the end of the periods of non-normal growth characterized by a world-leading health performance that coincides with the rural turn in Chinese health policy.

121 Adam Wagstaff, Magnus Lindelow, Jun Gao, Ling Xu, and Qian Juncheng, "Extending Health Insurance to the Rural Population: An Impact Evaluation of China's New Cooperative Medical Scheme," *Journal of Health Economics* 28, no. 1 (January 2009): 1–19.

122 Drèze and Sen, *An Uncertain Glory*.

123 Gerald Bloom, "Building Institutions for an Effective Health System: Lessons from China's Experience with Rural Health Reform," *Social Science & Medicine* 72, no. 8 (April 2011): 1302–1309.

The differences in the Turkish and Chinese patterns can be observed in Figures 3 and 5, with the Turkish performance's steady character and the Chinese development's more radical character being especially evident in Figure 5.

When we compare the picture of health development in Turkey and China with the general picture of world development using the clustering methodology (see Tables A1-2 and A1-3), we see that, during the 2000–2010 period, both China and Turkey matched the high development pace of developing countries, with China especially showing impressive development in this dimension owing to decreases in infant mortality (see Figure 5). During this period, China also placed new emphasis on combatting the health inequalities that had arisen between rural and urban areas in the post-1980 period. For Turkey, on the other hand, the pattern of health values trailing economic values continues: even in 2010, countries in the same income grouping as Turkey were located in a higher grouping in terms of health outcome (compare the second column of Table A1-7 with the second column of Table A1-8).

#### *The utility of the convergence approach*

When we apply a new statistical approach<sup>124</sup> for dividing the dataset into a set of endogenous groups with similar convergent characteristics over the long run<sup>125</sup> — which is done with the aim of identifying the convergence/divergence characteristics of all countries in the dataset<sup>126</sup> — we can establish a set of significant results for the whole of the dataset, and specifically for the Turkey-China subgroup focused on above.

Turkey is now included among the non-converging country dataset subsample, which is located between a convergent group with higher long-term health and wealth values and another convergent group with long-term health and wealth values below those of Turkey. In terms of health values, Turkey belongs to the group that has the highest aggregate health values among developing countries that have been developing on their own separate paths over the last 60 years; the other countries in this group can be seen in Table A1-9. These countries do not share or converge toward the privileged growth that pairs economic development with health development. For the countries situated in the highest convergence class of health, which also constitute the highest one-fifth of the world's wealth distribution (as can be seen in Table A1-9), "the wealthier is healthier" hypothesis appears to be confirmed.<sup>127</sup>

124 Peter C.B. Phillips and Donggyu Sul, "Transition Modeling and Econometric Convergence Tests," *Econometrica: Journal of the Econometric Society* 75, no. 6 (November 2007): 1771–1855.

125 Monika Bartkowska and Aleksandra Riedl, "Regional Convergence Clubs in Europe: Identification and Conditioning Factors," *Economic Modelling* 29, no. 1 (January 2012): 22–31.

126 Further information concerning the convergence approach used in this paper is outlined in Appendix 5.

127 Pritchett and Summers, "Wealthier is Healthier."

The main result reached by this convergence analysis analyzing the last 50 years of global data is that development toward a common level is observed only *within* convergence groups. This means that, in the case of middle- and high-income countries, the subsets do not seem to converge to a world group, but rather to their income health group. Two of the convergence groups established are located in the middle and high part of the distribution: the rich (in both health and wealth) group, and the middle (average riches and health) group. Turkey converges to neither group, as is also the case with China and a relatively large group of middle-income South Asian and Latin American countries, amounting to one-fourth of the overall global population, as covered by the dataset. If the temporal pattern of the last 50 years analyzed here remains unchanged, there is no reason for this group of countries to join with either of the two convergent group of countries situated to their immediate left and right on Table A1-9.

## Conclusion

The conclusions concerning global health income development reached via the above analysis of cross-country data may be summarized as follows: (1) The general continuity in the global picture of health development over the decades is counteracted by crucial discontinuities in the data, discontinuities that have already been remarked upon in relation to both the country grouping level and the decadal grouping level.<sup>128</sup> (2) In terms of the crucial 1980 discontinuity focused upon both here and in previous literature, the decades preceding the 1970s followed a lower rate of growth in life expectancy values, with a greater variance; the changing values for the growth rate and variance in health and wealth values can be seen in Table A1-10. In the same period, a significant number of developing countries were taking a step backward for a variety of reasons.<sup>129</sup> Developed countries, though, followed a much more stable growth pattern that allowed them to distance themselves from the global average, even as developing countries' improvement, on average, decreased significantly. As a result, in this period the correlations between health and economic values, as seen in Table A1-11, became that much stronger, whereas in other periods these correlations weaken. (3) The 2000s—with the final date of investigation being the year 2013—represent another discontinuity in the data,<sup>130</sup> with the majority of developing countries showing a significant

128 Cornia and Menchini, "The Pace and Distribution of Health Improvements" and David M. Cutler, Angus Deaton, and Adriana Lleras-Muney, "The Determinants of Mortality," *Journal of Economic Perspectives* 20, no. 3 (Summer 2006): 97–120.

129 The HIV/AIDS epidemic and the capitalist transition of the former Soviet bloc countries explains some of this slowdown, but does not completely account for it.

130 The root causes of this observation, which remains much less remarked on as compared to the discontinuity of the 1980s, calls for investigation in a more in-depth fashion in the future.



improvement as compared to the 1980–2000 period, in terms of both economic and health performance. As a result, during this period a subset of developing countries was able to move closer to the developed country average in terms of life expectancy. A cursory and introductory view of this picture emerges from the correlation between the health and wealth relationship, which strengthens in those decades when rich countries are the best improvers in health and weakens in those periods when the poorer part of the world distribution also improves its health situation both relatively and absolutely, as shown in Table A1-11.

The general picture of global development thus supports the periodization utilized in this study, which treats the 1960s–1970s as an independent period that is significantly differentiated from the 1980s–1990s period, which in turn is significantly differentiated from the mode of development in the 2000s for the whole subset of developing countries. It seems from the data that periods of high intrasociety and intersociety economic inequality might also change the level of health improvements from which countries can profit.<sup>131</sup>

According to the specific analysis undertaken here for the Turkish case, Turkey's performance within this general picture of changing health and wealth relationships was much more stable than that of the majority of the developing country dataset.<sup>132</sup> Even in the globally problematic 1980–2000 period, Turkey's health performance did not lag, and moreover its performance in this period was relatively similar to and symmetric with its own performance in the 1960–1980 period, whereas for the majority of the developing countries, the 1980s period brought significant discontinuity in the health-economy relationship, with the pre-1980s period having been much more likely and, in its political-economic parameters, more amenable to witness the health and economy dimensions growing together.<sup>133</sup>

In terms of Turkey's performance as compared to the general picture of global development, the seven conclusions that I derive from the overall analysis in this paper may be summarized as follows: (1) Turkey is growing

131 Related work in this field has confirmed, for the developing country dataset, the relationship between inequalities in the social dimension and health improvement limitations; see Adam Wagstaff, "Socioeconomic Inequalities in Child Mortality: Comparisons across Nine Developing Countries," *Bulletin of the World Health Organization* 78, no. 1 (2000): 19–29.

132 Turkey is within the lowest 20th percentile in terms of variation in its health performance and improvement over the 50-year timeframe, while in terms of the coefficient of variation during the same period it is fifth lowest overall, with only two developing countries—namely, Brazil and Nicaragua—having a less varying performance over the same period of time. This is roughly consistent with other research on Turkey, which emphasizes the non-changing nature of Turkey's improvement and might be seen in either a positive or less than positive light; see Ziya Öniş and Fikret Şenses, "Global Dynamics, Domestic Coalitions and a Reactive State: Major Policy Shifts in Post-war Turkish Economic Development," Economic Research Center, ERC Working Papers in Economics 07/06 (September 2007). <http://www.erc.metu.edu.tr/menu/series07/0706.pdf>.

133 This is more or less in line with the already existing literature in the field; see Cutler, Deaton, and Lleras-Muney, "The Determinants of Mortality".

mostly at the pace and pattern of a developed country; that is, steadily, but at a lower pace than the maximum growth rate of successful developed countries. (2) The two most successful periods in terms of relative health development were the 1960s and the 1990s, during which, among a highly heterogeneous developing country group,<sup>134</sup> Turkey managed to distinguish itself by improving its health parameters sustainably and continuously while either explicitly targeting or implicitly diminishing the health inequalities that had been historically established. (3) The 1970s represents the most homogenous decade of health development, one in which the majority of the world, including Turkey, grew at a similar pace. (4) In the 1980s, Turkey was able to separate itself from the poor health performers in the developing country subset, within which a large minority of countries were slipping in terms of their accumulated health characteristics. (5) The 1990s was an especially successful period in that, within the context of an especially bad aggregate performance by developing countries, Turkey managed to differentiate itself positively, in relation both to the aggregate health values of the other countries, and to its own health inequality performance in other decades. (6) In the 2000s, Turkey was successful, but its overall picture was not positively distinguished from the other developing countries, which during this period were themselves growing at a more rapid pace as compared to the dormant 1980s and 1990s. (7) The most substantial macro achievements of the Turkish health system over the previous 50-plus years—i.e., establishing a coverage umbrella that, at least on the financing side, extends to nearly the whole (98 percent) of the population and bringing the infant mortality rate close to 10 (13.2) per 1,000 live births—have been hampered on the other side by the increased costs of running the health system, increased questions about the long-run sustainability<sup>135</sup> of the financing scheme as it relates to labor market equilibrium,<sup>136</sup> and longstanding inequalities that will only get worse if issues of financing and/or access begin to become insurmountable for the administrators and receivers of health.

In my view, what is needed is a fuller political economic analysis of the Turkish healthcare system, one that utilizes more micro-level work, with a

134 This group had increasingly differentiated health/economy performances in the selected decades as well. For more on the composition of the group, see Table A1-7 and Table A1-8.

135 See Zeynep Güldem Ökem and Mehmet Çakar, "What Have Health Care Reforms Achieved in Turkey? An Appraisal of the 'Health Transformation Programme,'" *Health Policy* 119, no. 9 (July 2015): 1153–1163.

136 With the current coverage ratios and state of the labor market, only 25.3 percent of the population under public insurance coverage is covered, owing to their active position in the labor market. New private infusions meant to back this public insurance scheme are limited by the fact that 11.4 million people are below the necessary level of income for making active contributions to the financing scheme; see Yenimahalleli Yaşar, "Türkiye'de Sağlık Güvencesi: Neredeyiz?"

richer set of variables, on a smaller subset of countries. Furthermore, the results outlined in this paper show that analysis of the post-1980 and pre-1980 periods should be separated, since the crucial parameters of the economy and health, as well as the relationships between them, appear to have changed significantly across that threshold. My work here has simply focused on building the groundwork for such an analysis by establishing consistent periodizations, identifying close health partners/neighbors, situating Turkey's health development and challenges within a broad global framework, and trying to illuminate the long-run development in those parameters and dimensions that play a critical role in the development of Turkey's macro health outputs.

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## Appendix 1: Tables

Table A1-1. Summary statistics for world distributions (income and health dimension)

Variable	Mean	Standard deviation
GDP per capita (1960)	3741.31	5167.21
Life expectancy (1960)	53.37	12.26
GDP per capita (1970)	5536.85	7530.26
Life expectancy (1970)	57.41	11.27
GDP per capita (1980)	7239.56	9881.05
Life expectancy (1980)	61.63	10.23
GDP per capita (1990)	8774.82	12604.00
Life expectancy (1990)	64.33	10.81
GDP per capita (2000)	10872.83	15988.73
Life expectancy (2000)	65.83	11.74
GDP per capita (2010)	12293.67	17557.71
Life expectancy (2010)	68.98	10.82

Table A1-2. Health classes of the global distribution (1960–2010)<sup>137</sup>

Class no.	Health average	Health standard deviation
1960 Class I	37.94	2.79
1960 Class II <sup>^</sup> *	45.41	1.75
1960 Class III	51.68	2.00
1960 Class IV	59.69	2.39
1960 Class V	69.79	2.35
1970 Class I	40.93	2.82
1970 Class II	47.80	1.81
1970 Class III <sup>^</sup>	53.41	1.54
1970 Class IV <sup>*</sup>	63.22	2.77
1970 Class V	71.60	1.70
1980 Class I	45.96	2.82
1980 Class II	53.27	1.72
1980 Class III <sup>^</sup>	59.89	2.04
1980 Class IV <sup>*</sup>	67.88	1.49
1980 Class V	74.03	1.46
1990 Class I	44.55	4.82
1990 Class II	56.39	2.61
1990 Class III <sup>^</sup>	64.00	1.97
1990 Class IV <sup>*</sup>	69.92	1.48
1990 Class V	75.94	1.45
2000 Class I	45.22	2.90
2000 Class II	52.57	1.86
2000 Class III	60.70	2.71
2000 Class IV <sup>^</sup> *	70.66	1.99
2000 Class V	77.72	1.64
2010 Class I	47.89	1.80
2010 Class II	54.38	1.75
2010 Class III	62.78	2.68
2010 Class IV <sup>^</sup> *	73.17	2.30
2010 Class V	80.40	1.38

137 Turkey's position is represented by ^ and China's by \* in the groupings.



Table A1-3. Income classes of the global distribution (1960–2010)<sup>138</sup>

Decade and Class no.	Wealth average	Wealth std. dev.	Health average	Health std. dev.	Number of countries
1960 Class I*	561.35	308.37	44.89	7.75	47
1960 Class II^	2233.58	693.61	54.75	7.65	16
1960 Class III	5114.61	1130.95	64.96	3.64	9
1960 Class IV	10502.15	903.38	69.22	0.55	5
1960 Class V	15324.75	2544.13	70.87	3.16	11
1970 Class I*	562.42	276.31	48.89	8.14	40
1970 Class II	2121.90	617.34	58.65	6.62	18
1970 Class III^	5707.03	1083.36	60.34	8.20	9
1970 Class IV	9993.01	1440.43	69.85	3.31	4
1970 Class V	19718.61	3620.92	71.65	2.10	17
1980 Class I*	870.95	634.20	54.78	7.94	47
1980 Class II	4232.14	1491.69	64.65	5.01	16
1980 Class III^	11524.88	2567.95	69.53	6.56	8
1980 Class IV	23162.85	2148.09	73.75	1.89	14
1980 Class V	33787.00	2834.49	74.67	2.06	4
1990 Class I	710.69	489.22	48.89	43	
1990 Class II*	4324.98	1783.00	68.86	3.95	21
1990 Class III^	14750.79	2849.75	73.62	3.47	7
1990 Class IV	28674.64	2805.52	76.03	1.90	14
1990 Class V	43718.89	5938.34	76.09	1.50	4
2000 Class I	671.00	391.92	56.31	9.59	40
2000 Class II*	3295.40	796.91	71.16	2.94	12
2000 Class III^	6035.27	1292.96	68.12	8.74	11
2000 Class IV	19087.99	4450.33	75.69	2.55	9
2000 Class V	40765.28	11658.04	78.52	1.22	16
2010 Class I	801.38	468.92	59.87	8.02	38
2010 Class II	3413.34	673.04	72.97	2.05	10
2010 Class III*	6587.97	1015.68	71.10	9.79	14
2010 Class IV^	20492.79	5334.83	77.68	3.91	10
2010 Class V	45006.07	12860.82	80.81	1.07	16

138 Turkey's position is represented by ^ and China's by \* in the groupings.

Table A1-4. Structural break test for health-economic development relations in China and Turkey<sup>139</sup>

Country	Pre-reform coefficient	Post-reform coefficient	chi2-Value	Probability of difference
China	1.92	1.98	5.42	0.0200
Turkey	0.58	-0.48	0.55	0.4579

Table A1-5. Increases in public health expenditures for Turkey and China (1995–2015)<sup>140</sup>

Country	1995–2000	2000s
Turkey	10.17	7.70
China	9.45	16.03

Table A1-6. Periodization of China and Turkey – Decadal changes<sup>141</sup> in IMR (Infant Mortality Rate), GDPPC (Gross Domestic Product Per Capita), and Life Exp. (Life Expectancy)

Decade	IMR	GDPPC	Life Exp.
1960s (Turkey)	-2.87	5.41	1.42
1960s (China)	-5.50	4.98	5.45
1970s (Turkey)	-3.43	4.13	1.17
1970s (China)	-5.40	6.29	0.80
1980s (Turkey)	-4.60	5.27	0.91
1980s (China)	-2.50	9.37	0.3
1990s (Turkey)	-4.90	3.72	0.86
1990s (China)	-1.7	10.46	0.2
2000s (Turkey)	-5.32	4.00	0.59
2000s (China)	-7.67	10.52	0.37

139 Results of the Chow Test are provided for the  $\beta_1^{>1980} = \beta_1^{<1980}$  equation, where  $\beta_1^{<1980}$  comes from the regression  $L_{it} = \beta_0 + \beta_1 \times GDP_{it}$  for the pre-1980 period in the data, with  $L_{it}$  collecting data for the life expectancy of countries and  $GDP_{it}$  collecting data for the GDP per capita for the same set of countries. For  $\beta_1^{>1980}$ , the data for both life expectancy and GDP per capita come from the post-1980 period.

140 The values are in terms of percentage changes (%).

141 All changes are in average yearly percentage units (%).

Table A1-7. Turkey's health groups (1960–2010)<sup>142</sup>

Countries 1960	Countries 2010
Algeria	Algeria
Bangladesh	Argentina
Bolivia	Bahamas
China	China
Ghana	Bangladesh
Guatemala	Barbados
Honduras	Belize
Indonesia	Brazil
Kenya	Colombia
Lesotho	Dominican Republic
Mauritania	Ecuador
Nicaragua	Fiji
Oman	Guatemala
Pakistan	Honduras
Peru	Indonesia
Rwanda	Malaysia
Sudan	Mexico
Turkey	Turkey
Zambia	Nicaragua
	Oman
	Paraguay
	Peru
	Philippines
	Sri Lanka
	St. Vincent and the Grenadines
	Syrian Arab Republic
	Trinidad and Tobago
	Uruguay
	Venezuela, RB

142 Countries are grouped according to the average adult life expectancy achievements during the period in question.

Table A1-8. Turkey's income groups<sup>143</sup> (1960–2010)

Countries 1960	Countries 2010
St. Vincent and the Grenadines	St. Vincent and the Grenadines
Uruguay	Uruguay
Algeria	Botswana
Gabon	Gabon
Singapore	Malaysia
Panama	Panama
Chile	Chile
Brazil	Brazil
Costa Rica	Costa Rica
South Africa	South Africa
Turkey	Turkey
Mexico	Mexico
Peru	Argentina
Ecuador	
Fiji	

Table A1-9. Convergence clubs of health (1960–2013)

Group 1 <sup>144</sup> (Convergent)	Group 2 (Divergent)	Group 3 (Convergent)	Group 4 (Convergent)
Japan	Oman	Guatemala	Nepal
Iceland	Ecuador	Algeria	Bolivia
Spain	Argentina	Indonesia	Pakistan
Singapore	China	Bangladesh	India
Italy	Barbados	Trinidad and Tobago	Guyana
Australia	Turkey	Fiji	Madagascar
France	Bahamas	Philippines	Rwanda
Luxembourg	Malaysia		Gabon
Sweden	Peru		Senegal
South Korea	Nicaragua		Papua New Guinea
Norway	Syria		Sudan
Canada	Venezuela		Kenya
Netherlands	Sri Lanka		Mauritania
United Kingdom	Colombia		Ghana
Austria	Belize		Liberia
Finland	Brazil		Zimbabwe
Greece	Honduras		Benin
Belgium	Dominican Republic		Republic of Congo
Portugal	St Vincent		Niger

143 The countries are grouped in terms of GDP per capita.

144 Countries are ranked within groups in terms of their life expectancy achievement for the time period studied in this analysis.

Table A1-9 (Continued)

Group 1 <sup>144</sup> (Convergent)	Group 2 (Divergent)	Group 3 (Convergent)	Group 4 (Convergent)
Denmark	Paraguay		Zambia
Costa Rica			South Africa
Chile			Togo
United States			Burkina Faso
Puerto Rico			Malawi
Panama			Cameroon
Mexico			Burundi
Uruguay			Nigeria
			Chad
			Cote D'Ivoire
			Central African Republic
			Lesotho
			Botswana
			Sierra Leone

Table A1-10. Summary of growth and standard deviation of growth for the global set of countries (1960–2010)<sup>145</sup>

Decade	Ratio of life growth to GDP growth	Average GDP growth, yearly (%)	Average life exp. growth, yearly (%)	Standard deviation (GDP growth)	Standard deviation (Life exp. growth)
1960s	0.180	4.70	0.84	12.50	0.64
1970s	0.297	2.72	0.80	3.27	0.48
1980s	0.431	1.27	0.44	3.12	0.60
1990s	0.141	1.74	0.24	2.52	0.79
2000s	0.215	2.50	0.53	2.70	0.56

Table A1-11. Global correlation between health and income (by decade)<sup>146</sup>

Decade	Correlation coefficient
1960s	0.8193
1970s	0.8020
1980s	0.8325
1990s	0.8592
2000s	0.8353

145 The full list of the global set of countries is provided in Appendix 2.

146 The health dimension is average adult life expectancy, and GDP per capita is measured in constant 2010 USD prices.

## Appendix 2: Country list used in analysis

Country List (WDI)						Country List (DHS)					
1	Algeria	24	Congo, Rep.	47	Liberia	70	Senegal	1	Australia		
2	Argentina	25	Costa Rica	48	Luxembourg	71	Sierra Leone	2	Austria		
3	Austria	26	Cote d'Ivoire	49	Madagascar	72	Singapore	3	Belgium		
4	Australia	27	Denmark	50	Malawi	73	South Africa	4	Canada		
5	Bahamas, The	28	Dominican Republic	51	Malaysia	74	Spain	5	Chile		
6	Bangladesh	29	Ecuador	52	Mauritania	75	Sri Lanka	6	Denmark		
7	Barbados	30	Fiji	53	Mexico	76	St. Vincent and the Grenadines	7	Finland		
8	Belgium	31	France	54	Nepal	77	Sudan	8	France		
9	Belize	32	Finland	55	Netherlands	78	Sweden	9	Greece		
10	Benin	33	Gabon	56	Nicaragua	79	Syrian Arab Republic	10	Iceland		
11	Bolivia	34	Ghana	57	Niger	80	Togo	11	Italy		
12	Brazil	35	Greece	58	Nigeria	81	Trinidad and Tobago	12	Japan		
13	Botswana	36	Guatemala	59	Norway	82	Turkey	13	KoreaRep		
14	Burkina Faso	37	Guyana	60	Pakistan	83	United Kingdom	14	Luxembourg		
15	Burundi	38	Honduras	61	Pakistan	84	United States	15	Mexico		
16	Cameroon	39	Iceland	62	Panama	85	Uruguay	16	Netherlands		
17	Canada	40	India	63	Papua New Guinea	86	Venezuela, RB	17	Norway		
18	Central African Republic	41	Indonesia	64	Paraguay	87	Zambia	18	Portugal		
19	Chad	42	Italy	65	Peru	88	Zimbabwe	19	Spain		
20	China	43	Japan	66	Philippines			20	Sweden		
21	Chile	44	Kenya	67	Portugal			21	Turkey		
22	Colombia	45	Korea, Rep.	68	Puerto Rico			22	UK		
23	Congo, Dem. Rep.	46	Lesotho	69	Rwanda			23	US		

### Appendix 3: Dimensions of the analysis, indicators of interest, and data sources

Dimensions	Health output	Population coverage	Health access/inequality	Health provision	Health expenditure
Main indicators	<ol style="list-style-type: none"> <li>1) Life expectancy</li> <li>2) Infant mortality</li> <li>3) Under 5-year mortality</li> </ol>	<ol style="list-style-type: none"> <li>1) Medical insurance coverage (%)</li> <li>2) Social security coverage</li> <li>3) Epidemic coverage</li> </ol>	<ol style="list-style-type: none"> <li>1) Rural/Urban inequality</li> <li>2) Income level health inequality</li> <li>3) Regional inequality</li> <li>4) Provincial inequality</li> <li>5) Different sources of health financing</li> </ol>	<ol style="list-style-type: none"> <li>1) Hospital provision</li> <li>2) Bed provision</li> <li>3) Physician provision</li> </ol>	<ol style="list-style-type: none"> <li>1) Total expenditure on health</li> <li>2) Public expenditure</li> <li>3) Private expenditure on health</li> </ol>
Periods of global data availability	1960–2013	1980–2013	1983–2013	1970–2013	1960–2013
Data sources	WDI	WDI + OECD	DHS + TUIK	WDI + DHS	WDI + DHS

## Appendix 4: Cluster analysis theory and empirics

### *Theoretical rationale for approach*

In the paper, cluster analysis is utilized in order to divide  $n$  number of countries into an endogenously chosen set of groups ( $k$ ) that minimizes in-group variation ( $v_{ik}$ ), homogenizes between cluster variation level for all periods, and allows between-cluster variation ( $v_k$ ) to be larger than the in-group variation for all the different time periods. After this methodological manner of partitioning the data into different groups (using the same methodology for different time periods consistently), the performance of the overall partitions and the position of countries within the partition is investigated using the cross-sectional dimension of the data, and I investigate how these partitions are recreated in the time dimension and how one country moves from one health cluster to another through time. The original methodology of partitioning the data is given by the following calculation:

$$\arg \min \sum \sum \|x - u_k\|^2$$

This selects the countries that go into the  $k$ -group by minimizing the squared deviations between the country value ( $x$ ) from the endogenous mean ( $u_k$ ) of the group that is formed.

As a result of utilizing this methodology, between-group variation is minimized, and, in the presence of fixed overall variance to the overall group of countries, this maximizes the variation between the groups that are formed.

### *Empirical utility of approach*

The approach identifies the health neighbors and health groups for Turkey and China for the five different time periods of study and identifies these characteristics endogenously using the time-partitioned data. As a result, the already well-identified observations that health and the rate of increase in health output are both distributed heterogeneously among countries is used in order to divide the countries into hard-partitioned mini-clusters (health neighbors). Using this consistent hard partition, two sets of questions can be asked. The first is the static question concerning what other common characteristic exists between countries that share the same health group in a given time period. The second is the dynamic question concerning what characteristics are exhibited by countries that are able to upgrade to health neighbors with higher health and human development values, and which other variables seem to limit further upgrade for countries.



## Appendix 5: Convergence analysis theory and empirics

### *Theoretical rationale for approach*

Convergence is the study of the characteristics and composition of specific endogenously determined groups that resemble one another in the crucial variables of interest more and more as a longer time series data is used. Thus, the investigation has to do with the change in time from  $t = 1$  to  $t = N$ , and as  $N$  increases, the specific country characteristics ( $H$ ) take a transition path to the steady state characteristics of the overall group ( $H_N$ ). In this case, for a country  $i$  that is moving toward this group's specific steady state, the transition path that this country takes  $h_{it}$  as time passes, more and more resembling the group growth path ( $u_n$ ).

Thus, at the start, catch-up dynamics can operate and  $h_{it}$  can be larger than  $u_n$  as time passes:

$$\begin{aligned} t &\rightarrow \infty \\ h_{it}/u_n &\rightarrow 1 \end{aligned}$$

Thus, the country's growth path more and more comes to resemble the group growth path. Since the critical variable of interest is related to the health of countries ( $H_{it}$ ),

$$h_{it} = \frac{\log(h_{it})}{N-1 * \sum \log h_{it}}$$

should be converging to 1 for all members of the group, and as a result the cross-sectional variance of the group should be converging to 0, as  $t \rightarrow \infty$ .

### *Empirical utility of approach*

Since development has always been linked to decreasing the inequality between developed and developing countries—and as a result decreasing the variance between these groups—historical analysis of whether this actually occurs is very important for understanding whether there is a homogenous (through time and space) development occurring in the data.

Since the crucial theoretical specification of the long-term growth dynamics specified by Solow in his work on the development of economic output (GDP per capita), a vibrant theoretical and empirical economic literature has emerged in the area of convergence analysis. The most important theoretical extension done on Solowian dynamics was the introduction of the possible conditional Beta convergence by Barro and Sala-i-Martin and of club convergence by Galor. Over the last ten years, the development literature has been extending empirically so as to look at not only whether the development convergence is seen in economic output, but also other more expanded variables, such as

human development, as touched upon by Noorbaksh. This study applies this idea to life expectancy values in the spirit of this expanded research and tests whether unconditional convergence (i.e., Solowian convergence), Beta convergence, or club convergence dynamics operate in the determination of the life expectancy values in the utilized dataset for the timespan of that dataset.