Is the slowdown of China's economic growth affecting multidimensional well-being dynamics?

Is the Slowdown of China's Economic Growth Affecting Multidimensional Well-being Dynamics?

Luca Bortolotti[a] and Mario Biggeri[b]

Abstract

After many years of outstanding GDP growth and structural changes, China is now facing an economic slowdown. This paper aims to analyse the effects of this slowdown on individual well-being, from a multidimensional and provincial perspective.

The empirical analysis is based on data obtained from the China Health and Nutrition Survey, for the 2011 and 2015 waves. The notions of moderate prosperity, harmony and balanced growth pursued by the Chinese Government are used to select nine dimensions. These dimensions – based on 56 variables – are aggregated into an individual well-being index using the Multidimensional Synthesis of Indicators technique.

The econometric results reveal that, in the 2011–2015 period, individual multidimensional well-being stagnated; moreover, some dimensions were affected much more than others, according to individual characteristics (e.g. age, gender) and geographical differences (e.g. urban/rural, east/west provinces). This creates new challenges for the central and provincial governments of China, in their pursuit of a more 'harmonious' and balanced development.

Keywords: New Normal, China, Multidimensional well-being dynamics

1. Introduction

Since its 1978 reforms, China has achieved phenomenal economic growth and structural change, including opening-up to international markets, thanks to the pragmatic approach of the Chinese Communist party under the leadership of Deng Xiaoping. In 2001, China was admitted to the World trade Organization (WTO), an event that cemented its export-led focus and high rates of growth, turning the country into the 'world's factory'. During the 2008-2009 financial crisis, China reinforced its economic prominent role at international level, starting the reorientation of its development strategy from export-led towards endogenous growth. Both the domestic supply and the domestic

[a] Department of Economics and Statistics "Cognetti de Martiis", University of Turin, Italy and Turin Center on Emerging Economies.

[b]Department of Economics and Management, University of Florence, Florence, Italy and Action Research for CO-development.

demand were strengthened, fostering the structural change of the country. Later, Xi Jinping, who was elected as President of the People's Republic of China (PRC) by the National Peoples' Congress in 2012, promoted the 'Chinese Dream'. This dream has two main goals: to turn China into a 'moderately prosperous society' by 2021 (the centenary of the Communist Party of China) and to transform it into a modern developed country by 2049 (the centenary of the PRC). These targets indicate that Chinese leadership is committed to pursuing long-term economic development in keeping with 'harmonious society' guidelines and will continue to embrace not just the growth of GDP, but broader and more inclusive social objectives (Joshi, 2012; Garnaut et al., 2013, Wang et al., 2020).

While the economic success of the reforms is undeniable, the success of Chinese development is less straightforward if we consider the inclusiveness, multidimensionality and environmental sustainability of such processes. The question of the environmental sustainability of China's rise is receiving increasing attention in economic literature. This literature, among others, includes contributions about provinces convergence towards a balanced development consistent with 'harmonious society' principles (Biggeri and Bortolotti, 2020), green total factor productivity and its convergence across Chinese provinces (Huang et al., 2021), and the deleterious effects of pollution on social issues such as corruption and crime rate (Wu et al., 2021). Our analysis touches, instead, on the transmission of development from the monetary sphere to the individual multidimensional well-being, considering the different outcomes at provincial level. Indeed, well-being is related to two other debated aspects of China's reforms, namely the regional divide across provinces and the recent slowdown of China's economic growth.

The Chinese economy has shown signs of fatigue in recent years. It has failed to achieve double-digit growth since 2011, with the GDP growth rate stabilising at around 6–7% over the last decade. The development strategy adopted in the first three decades of reforms (especially following China's admission to the WTO), appeared then excessively dependent on export and investment and convinced the government to promote the (relatively weak) internal demand, by addressing the severe forms of unsustainability and inequality which hampered development (Yongdin, 2010; Garnaut et al., 2013; Luo et al., 2020; Schettino et al., 2021).

The economic slowdown began ten years ago and is sometimes called the 'New Normal'. This phenomenon is not necessarily perceived negatively in the Chinese development literature, as it may force policymakers to consider 'rebalancing' the Chinese development model, thus addressing the key issue of economic sustainability (Garnaut et al., 2013; Cubizol, 2019). From this perspective, the well-being of individuals and the fair redistribution of resources should become core objectives of

Chinese economic policy, to ensure political legitimacy and to promote a virtuous circle of economic development.[3]

However, not all of the available literature is optimistic about the effects of 'rebalancing'. For example, Lo (2016) cautions that the prevailing approach towards the New Normal favours neoliberal policies that would endanger the 'production-oriented structural-institutional nexus', eventually causing the end of the 'Golden Age of Chinese development'. Moreover, the effects of the New Normal and related policies are likely to trigger non-economic consequences, as tighter budget constraints affect the provision of social development services.

Several studies analyse disparity and convergence across Chinese provinces after the reforms, obtaining mixed results (Tian et al., 2016; Li and Fang, 2018; Biggeri and Bortolotti, 2020; Huang et al., 2021). However, empirical analysis concerning the heterogeneity of provincial reactions to the New Normal phase of development remains limited. Considering that differences in the economic structure influence the capacity of territories to tackle shocks and protect their economic and social development (Cardinale, 2019), distinguishing the effects of the New Normal between Chinese provinces becomes even more crucial. Adopting a human well-being perspective adds a layer of sophistication to prevailing analyses and introduces a stream of literature in which the Chinese context has, to date, been largely unexplored (see the next section). In fact, the nexus between these three elements – economic slowdown, regional divide and individual well-being – has been observed theoretically (Biggeri, 2008): the Chinese development model has triggered rapid economic growth in coastal provinces, followed by delayed spatial and multidimensional human development. To the best of our knowledge, however, there is not yet any systematic empirical analysis concerning this nexus during the New Normal phase of development or with reference to the target of achieving an endogenous growth and a 'moderately prosperous society'. Such a nexus seems even more relevant given the emergence of new threats related to the COVID-19 crisis (Liu, 2021) and menaces to global peace. In this fragile context, China's central and local governments gave increasing importance to environmental and social aspects of sustainability in the 14th Five-Year Plan (2021-2025), at detriment of GDP growth. Moreover, the China's National Plan on Implementation of the 2030 Agenda for Sustainable Development was adopted in 2016, reinforcing in the meanwhile the China National Sustainable Communities project (Wang and Xu, 2021).

This paper aims to contribute to filling this gap by analysing the dynamic of multidimensional well-being in China, with reference to the 'moderately prosperous society', for the period 2011–2015. In

[3] According to Biggeri (2008), the weakness of Chinese policies in turning economic growth into human development is not only problematic in itself but also hampers the production of 'virtuous circles' of development that characterised the rise of developed countries by strengthening internal demand.

particular, this research attempts to answer the following questions: (1) how did individual multidimensional well-being evolve during the New Normal period? (2) which personal characteristics affect multidimensional well-being dynamics and how? and (3) does the response to the New Normal differ across provinces?

These three questions are explored through econometric analysis. The paper computes a new index based on the Multidimensional Synthesis of Indicators (MSI) technique (see Mauro, Biggeri and Maggino, 2018). Our empirical analysis is based on the data of the China Health and Nutrition Survey (CHNS) panel, which covers 12 provinces using the 2011 and 2015 waves.[4] Fifty-six variables are selected and aggregated into nine unidimensional indicators of well-being; these unidimensional metrics are then aggregated into an index of individual multidimensional well-being. This multidimensional index is used to explore the trends in individual well-being according to individual characteristics (e.g. age, gender, *hukou* status[5]) and structural and territorial differences (e.g. urban/rural, provincial) indicated in the literature as major sources of segmentation of China's society (Shi et al., 2018). Furthermore, in order to observe the spatial heterogeneities of China's slowdown, Heilongjiang and Guizhou provinces (i.e. the best and worst performers) are singled out.

The paper is divided into five sections. The following section provides background and discusses the three elements of the nexus, beginning with recent differences in outcome recorded across Chinese provinces. Here we consider how the economic literature has investigated the Chinese outcomes in terms of multidimensional development, highlighting the main results and the gaps that this paper aims to fill. Section 3 briefly describes the data and methodology employed in this paper, detailing how both were selected with the aim of providing an index to fit the Chinese context and in light of China's target of a 'moderately prosperous' society. Section 4 reports the main results for the measure of multidimensional well-being in 2011 and 2015, and then explains these achievements based on individual characteristics before, finally, comparing the results for the best and worst performing provinces. Section 5 concludes by considering the main findings of the study and by discussing policy implications.

2. Background

2.1. Inequalities across China

[4] The China Household Income Project data are then used for a robustness test.

[5] The *hukou* is a system of domestic passports adopted in China that regulates the access to health and education welfare and formally discriminates between citizens who enjoy full urban citizenship status (with corresponding benefits) and those who retain peasant status even after migrating to an urban area, resulting in profound inequality (Shi et al., 2018).

In order to analyse the well-being of individuals in China, it is vital to consider the asymmetric nature of economic and social development across its provinces. During the reform period, the reported 'China average' outcomes barely represented the effective improvements experienced at provincial level. Indeed, China's territories were exposed to different policies and, in several cases, reacted very differently to them, as a vast literature testifies (see, among others, Goodman and Segal, 2002; Biggeri and Bortolotti, 2020; Luo et al., 2020). Amongst the 'winners', who outperformed the national average, we find urban areas, in general, and the eastern or coastal provinces, especially in the South of China; in stark contrast, the economic development of the inner provinces and rural areas has been much slower. This kind of asymmetric development, which was initially accepted and in part supported by the central government,[6] became a burden in the 1990s, forcing the Chinese government to reverse its fiscal decentralisation policies in 1994. Moreover, after 1999, the government launched the Go West strategy, followed by the Rise of Central China Plan in 2004. Thus, while natural resource endowments and historical path dependencies continue to support divergence across provinces, the government's fiscal efforts and a market-driven 'flying geese' approach promoted rebalancing across provinces, favouring a shift of industrialisation and development from eastern to inner China in the new millennium (Shue and Wong, 2007; Fang et al., 2009; Huang and Chand, 2015). Still today, between-provinces inequality is a major component of overall China's income inequality, which in turn is deeply related with the peculiar political transition strategy implemented by political authorities (Li et al., 2018). Indeed, between-provinces inequality started to decrease in 2002 after a major increase in the preceding decades, and after few years overall inequality started to decrease as well (Luo et al., 2020).

The differences in development levels across provinces remain massive, although a mild convergence process can gradually erode such gaps (Huang and Chand, 2015; Bai et al., 2020; Biggeri and Bortolotti, 2020). Figure 1 illustrates the GDP growth rate of 31 Chinese provinces, autonomous regions and municipalities (excluding the special administrative regions of Hong Kong and Macau) in the new millennium and allows us to better observe the effects of the slowdown.

[6] Deng Xiaoping believed that promoting the economic development of some areas (namely coastal areas) was a necessary step to enhance the development of the rest of the country. Hence his famous comment that the reforms should 'let some people get rich first' (Huang and Chand, 2015).

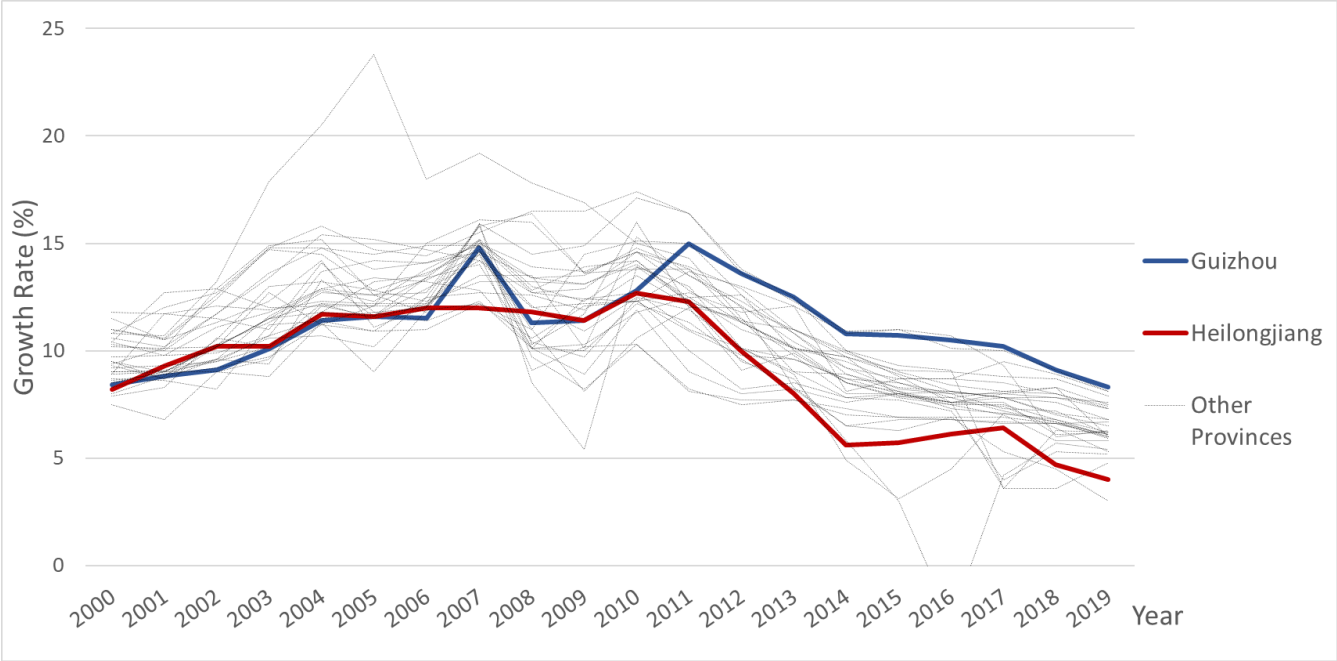

Figure 1: GDP growth rate of Chinese provinces during 2000–2019.

Source: National Bureau of Statistics of China online data.[7]

Indeed, the graph indicates a break after the first decade of the new millennium, during which the growth trend accelerated (with a brief exception in 2009). Since 2011, growth has slowed in all of China's provinces, even if the pace of this decrease is not constant. The contrasting cases of Heilongjiang and Guizhou are highlighted in the graph. Heilongjiang is currently one of the provinces with the weakest growth rate (only the neighbouring Jilin province recorded a weaker performance in 2019), while Guizhou has the strongest provincial growth rate of the last three years. Such differences emerged during the New Normal phase, as the two provinces had previously achieved similar growth rates.

Considering the traditional division between eastern, central and western provinces, Heilongjiang belongs to the central group and is located in the northern part of the country (Manchuria), a region historically characterised by a bureaucratic-oriented development model, based on heavy industries, following the Soviet model. This model fell into crisis with the economic transition towards a socialist market economy (Goodman and Segal, 2002), a transition that was more thwarted in Manchuria with respect to all other areas.[8] On the contrary, Guizhou is situated in the southern part of the western region (i.e. the region historically most disadvantaged). This implies that Guizhou was supported

[7] Available at http://data.stats.gov.cn/english, last accessed in April 2021.

[8] The heterogeneous institutional change experienced by Chinese provinces resulted in significantly different income outcomes. Biggeri (2003) investigates the impact of institutional change, proxied by the share of state-owned enterprises' (SOEs) industrial gross output value (IGOV) over the total GOV, finding a negative impact in Heilongjiang and the northeast region. This dynamic appears even stronger during the current slowdown.

from the investment stemming from the Go West strategy and the Rise of Central China Plan, which triggered industrialisation and development (Sun et al., 2016).

It is important to note that different economic performances within and across provinces results in different levels of welfare services, thus conditioning the resources and incentives of local governments (Shue and Wong, 2007). For example, the provision of healthcare and education services is deeply affected by provincial inequalities, leading to mechanisms of self-reinforcing inequality. Figure 2 illustrates the trend in the share of provincial government expenditure allocated to education between 2007 and 2019 across 31 provinces (Heilongjiang and Guizhou are highlighted, indicating a divide that is growing even faster than that observed in Figure 1).

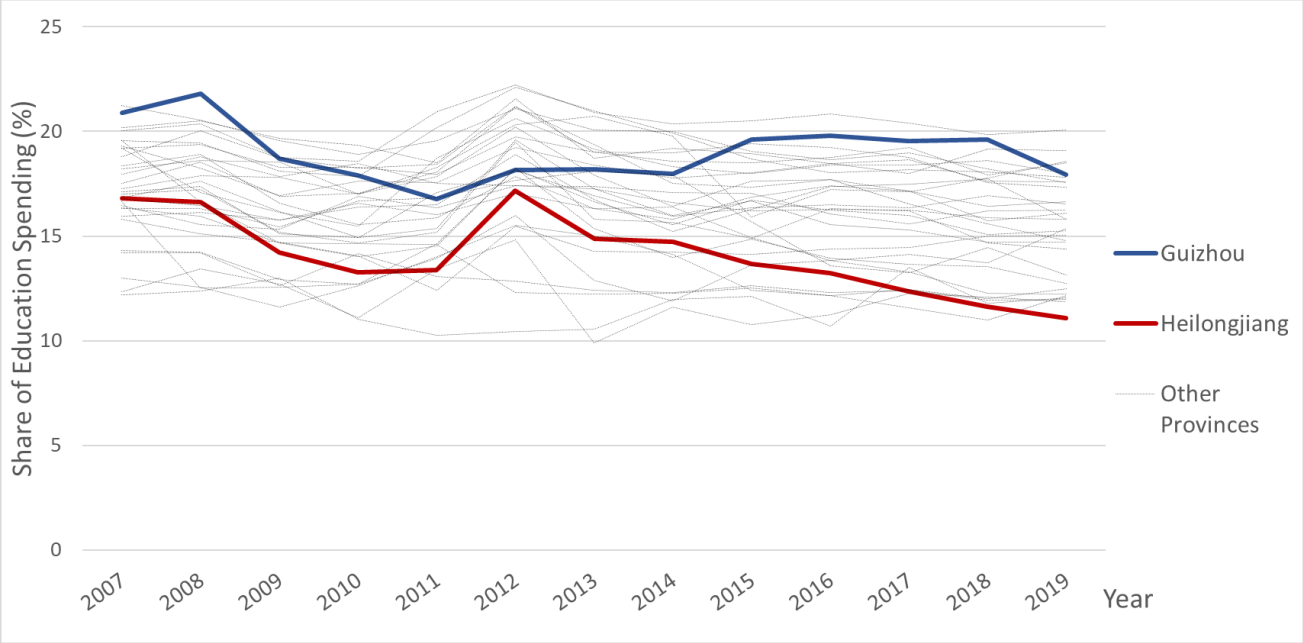

Figure 2: Local government expenditure in education over total expenditure during 2007–2019.
Source: National Bureau of Statistics of China online data.[9]

2.2 Multidimensional well-being in Chinese studies

The number of global studies that adopt a multidimensional perspective has expanded rapidly in recent years (Greco et al., 2019). This approach stems from the theoretical critiques levelled against the capacity of monetary metrics to capture the full complexity of well-being, human development and sustainability (Brundtland et al., 1987). Amongst the theoretical foundation of these analyses, it

[9] Available at http://data.stats.gov.cn/english, last accessed in April 2021.

is important to recall the *basic needs* approach (Hicks and Streeten, 1979) and the *capability* approach (Sen, 1999), which are at the core of the human development paradigm (UNDP, 1990, 2022). Moreover, in some cases, economic development is not sufficient to guarantee improvements in happiness (the so-called 'Easterlin Paradox'; Easterlin, 1973) or to ensure sustainable increases in happiness over the long term (Brundtland et al., 1987). Thanks to these and many other contributions, national and international agencies have become increasingly aware of the importance of multidimensional indices of well-being, which include the Human Development Index (HDI).[10] In turn, empirical applications of multidimensional indices have raised new methodological issues and have triggered further theoretical and empirical analyses.

A recent UNDP survey listed more than a hundred composite measures of human progress that are constantly monitored in different fields of study (Yang, 2014). Different indices have typically been developed to answer different research questions (and reflect different assumptions behind various conceptions of multidimensionality). These indices, and many others focused on more specific phenomena, can be distinguished according to their characteristics:

- *Countries versus individuals*: the HDI and most of the other indices included in the UNDP survey (Yang, 2014) are computed at national level; they embrace, for example, the measurement of variables on a per capita basis or consider the share of population falling into a given category. Such indices usually lead to ranking countries or charting their scores over time, but such metrics cannot describe the targets of policy interventions (i.e. households and individuals). In contrast, an index that computes multidimensional scores from micro-survey data at an individual level, such as the MSI, can generate comparable scores within the population.
- *Poverty versus well-being indices*: some multidimensional indices are specifically constructed to measure multidimensional forms of deprivation amongst the poor and are, therefore, not sensitive to what occurs above the poverty line. Instead, they discard this information in accordance with the 'Strong Focus' axiom (Bourguignon and Chakravarty, 2003).
- *Compensatory versus non-compensatory indices*: this difference, discussed by Mazziotta and Pareto (2016), relates to the aggregation method, which can allow for perfect substitutability across dimensions (by utilising a simple mean) or penalise heterogeneity across dimensions,

[10] The HDI has been computed annually since 1990 by the United Nations Development Program (UNDP), and is used extensively in a variety of studies. Some national agencies have recently promoted their own multidimensional indices of well-being (e.g. CONEVAL in Mexico or BES in Italy). The French government has also commissioned an analysis that underlines the importance of the multidimensional approach (Stiglitz et al., 2017). Finally, it is worth mentioning that the goals of the international community, such as the Sustainable Development Goals (SDGs), are set in a multidimensional framework. Efforts to develop an index to reflect these goals include Sachs et al. (2016) and Biggeri et al. (2019).

to allow for the fact that increases in non-deprived dimensions may not fully compensate equal losses in deprived dimensions. In short, this approach recognises that homogeneity across dimensions has intrinsic value.

The analysis of multidimensional well-being is especially relevant for China, for a variety of reasons. China has a peculiar history, unique institutions and a distinctive development strategy. Easterlin (2017) identifies a non-linear association between income and life satisfaction since the beginning of the reforms. This finding suggests that focusing exclusively on income and material gains may provide a partial – and potentially misleading – indicator of China's development. A similar conclusion is reached by Graham et al. (2017), who explores reduction in life satisfaction as experienced in China. Moreover, Biggeri et al. (2019) notes that the measurement of multidimensional development in China, with respect to the SDGs and 2030 Agenda, is particularly sensitive to the aggregation method (specifically to assumptions about substitutability). In terms of the domestic development agenda, the multidimensional framework is particularly well-suited to exploring targets relating to a 'harmonious' and 'moderately prosperous' society.

Amongst recent multidimensional analyses focused on China,[11] Bin (2016) investigates regional disparities using an original 'composite index of regional development'. This index combines five dimensions computed at provincial level (macroeconomic, science and innovation, environmental sustainability, human capita and public facilities) and points to the persistence of clubs of provinces with different levels of development. Similarly, Schütz et al. (2017) computes multidimensional convergence across provinces, obtaining evidence of scattered convergence between 1993 and 2012. Ray and Mishra (2012) and Nicholas et al. (2019) focus instead on deprivations among Chinese individuals, comparing China with India and studying their distribution over time. Du et al. (2019) find that provincial income inequality has a significant negative impact on long-term subjective well-being. In Barbieri et al. (2020), sustainable development is the interest variable, connected to the innovation policies adopted at local level by specialised towns. The literature has also highlighted the efforts of central and local authorities in achieving multidimensional well-being and multidimensional poverty reduction, consistently with the China's Dream strategy (Biggeri and Bortolotti, 2020; Wang et al., 2020; Wang and Xu, 2021).

Despite the growth of the multidimensional approach both worldwide and in the Chinese context, to the best of our knowledge, the effects of China's New Normal on individual multidimensional well-

[11] For the sake of brevity, only a concise literature review is provided here. Nicholas et al. (2019) provides a more extensive review about multidimensional measures of well-being in China. However, neither the literature reported here nor that left aside focuses on the New Normal period and the relation between economic slowdown and individual well-being.

being have not yet been analysed. In other words, while the transmission of China's development from the economic to the multidimensional space is widely investigated, the topical question of how this transmission evolves during the slowdown seems still unanswered. This paper is a first step in this direction. The original contribution of this work is thus to measure the change in individual multidimensional well-being during the recent period of low economic growth. A secondary contribution is the provision of a new well-being index that is capable of aggregating individual outcomes from nine dimensions in a non-compensatory manner that can be utilised in econometric investigation. Both these contributions can be used for policy evaluation and policy recommendations.

3. Data and methodology

3.1. Data

Data are taken from the 2011 and 2015 waves of the China Health and Nutrition Survey (CHNS) in order to focus on the economic slowdown. The CHNS is an ongoing panel dataset consisting of 7,200 households in 12 Chinese provinces, selected using a multistage random cluster process. The project collects data for multiple disciplines and is financed by the Carolina Population Center (University of North Carolina at Chapel Hill) and the National Institute for Nutrition and Health (Chinese Center for Disease Control and Prevention). This dataset is well-suited for investigating multidimensional aspects of development across China, which is demonstrated through its widespread use in different streams of literature.[12]A different dataset, the China Household Income Project (CHIP), also appreciated for its detailed information,[13] is then used to test the robustness of the relation between income growth and subjective well-being during the New Normal.

The unit of analysis are adult individuals aged 18 or older. The sample consists of 26,872 individuals, 9,160 (about 68 per cent) of whom were surveyed in both years.[14] Missing data were imputed through multiple imputation by chained equations (see Table A1 in the appendix).

To identify the relevant dimensions that constitute our index of multidimensional well-being, we began by adopting the three pillars that underpin the HDI: a long and healthy life, knowledge and a

[12] An extensive list of studies using CHNS data can be found on the CHNS website: https://www.cpc.unc.edu/projects/china/publications (last accessed in March 2020).

[13] The CHIP data focus on the monetary space and do not allow building a multidimensional indicator as granular as the MSI. However, they include detailed information about current and previous income and subjective well-being, which is a variable strictly related to multidimensional well-being (Ruggeri et al., 2020).

[14] The sample includes 3,873 individuals surveyed in 2011 only and 4,679 individuals surveyed in 2015 only. More information about the CHNS can be found on the CHNS website (see link in previous footnote).

decent standard of living (UNDP, 1990). These pillars, or dimensions of human development, are also the basis of many other development indices and conceptions of well-being (Clark, 2002) as well as multidimensional development indices that relate to China (Ray and Mishra, 2012). To address critiques relating to the narrow scope of HDI analyses (Ranis et al., 2006), we expanded the dimensions included in our index to cover nine domains, in accordance with the existing literature (Clark, 2002): health, nutrition, sanitation, education, work, leisure, housing, asset and income.

These domains touch on some of the most pressing issues in the lives of Chinese citizens.[15] Harmony between people, society and nature, which is fundamental in the harmonious society perspective, is captured by proxy through the leisure dimension as time devoted to various intellectual and recreational activities.

To achieve comparable individual measures for the nine dimensions, 56 indicators were selected, including categorical, binary, discrete and continuous variables. The standardisation of indicators is undertaken to obtain comparable unidimensional indicators, with each variable ranging between 0 (highest deprivation) and 1 (highest achievement).

Table A1 (see appendix) describes the nine indicators and their components, specifying how 0 and 1 scores were set, and their underlying variables, specifying the percentage of missing (imputed) data.

3.2. Methodology

The methodology adopted for aggregating these nine indicators into a multidimensional index of development is the MSI approach. This recent technique allows us to maintain the principles of full sensitiveness, continuity, flexible structure of substitutability and straightforward interpretation (Mauro et al., 2018). MSI indices measure well-being on a continuous scale, without resorting to the counting approach of traditional poverty measures, and it easily handles dimensions that are non-perfect substitutes. In other words, this technique improves upon the arithmetic mean as an aggregation procedure for penalising heterogeneous achievements. Although most analyses that use the MSI focus on the macro level (see Biggeri et al., 2019), this technique can also be applied at the individual level.

The peculiarity of the MSI, compared with other non-compensatory indices, is the way such penalisation is framed. In order to avoid the "inescapable arbitrariness" (Anand and Sen, 1997) of the parameters that regulate substitutability, the extent of substitution is related to the observed characteristics of the unit of analysis, under the assumption that poorer individuals are more constrained. Technically, the MSI approach operates according to the following equation.

[15] The so-called 'new three big mountains' faced by Chinese individuals are housing, healthcare and education.

$$MSI_i = 1 - \left[\frac{1}{k}\sum_{j=1}^{k}\left(1 - x_{ij}\right)^{\frac{1}{\mu_i}}\right]^{\mu_i} \quad where\ \mu_i = \frac{1}{k}\sum_{j=1}^{k} x_{ij} \tag{1}$$

Here MSI_i is the non-compensatory well-being index of individual i; k is the number of dimensions included in the analysis (in our case, k = 9, as described in Section 3.1); and x_{ij} is the outcome for individual i in dimension j, with $0 \leq x_{ij} \leq 1$. Extreme outcomes $x_{ij} = 0$ and $x_{ij} = 1$ correspond, respectively, to the lowest and highest levels of well-being in dimension j (see Table A1 in the appendix for the empirical extremes featured cases in our study). The resulting MSI index, by construction, ranges in the same interval, with $MSI = 0$ corresponding to the lowest multidimensional well-being and $MSI = 1$ to the highest multidimensional well-being.

The simple mean across dimensional outcomes for a single individual, μ_i, is the parameter that determines how far heterogeneous outcomes are penalised: the lower the μ_i, the higher the penalisation (and vice versa). In other words, when an individual performs poorly overall (low μ_i), any disparities in performance across dimensions are more strongly penalised. Conversely, when there is heterogeneity across outcomes (and such outcomes are generally satisfying), substitutability is higher. To the extreme, there is perfect substitutability when $\mu_{ij} = 1$, and no substitutability when $\mu_{ij} = 0$.[16]

Through the MSI technique, we obtain an individual-based index that can measure the multidimensional well-being of each individual on a continuous basis and adjust the rate of penalisation of heterogeneous outcomes for individuals across dimensions. Indeed, such goals often refer to a 'balanced' development (Joshi, 2012): i.e. preventing a concentration of well-being in some dimensions while neglecting other dimensions. Like the dataset, the methodology was selected to be consistent with the goals of the 'Chinese Dream' and to provide a non-compensatory individual-level measure of well-being to monitor the latest trends.

4. Results

The results are presented in three subsections. First, we illustrate the trajectory of the overall index and its nine components between the two years. Second, through an econometric model, we

[16] In cases with a finite number of dimensions (such as in this study), this corresponds to individual MSI equal to 1 and 0, respectively.

investigate how the heterogeneous individual characteristics of the sample influence the overall level of well-being. Finally, we restrict our focus to two specific groups: adult individuals living in Guizhou and Heilongjiang – which are respectively the top and worst performing provinces in terms of per capita gross regional product - to observe in detail the circumstances of different types of individuals.

4.1. Well-being in 2011 and 2015

Table 1 presents the average scores for our nine components of well-being as well as the results for our aggregate MSI index for 2011 and 2015.

Out of the nine components of our index, five record an improvement (on average) between 2011 and 2015. The components that increased are health, sanitation, education, income and asset. All of these dimensions record a statistically significant increase at the 1% level. As expected, at macro-level, the National Bureau of Statistics of China (online data) records improvements in access to public facilities, educational attainment, income per capita and durables owned, which is consistent with our findings.

Table 1: Aggregated well-being and unidimensional scores across provinces.

Dimension	**2011**	**2015**
Health	0.8316716	0.845673
Nutrition	0.7919615	0.784569
Sanitation	0.8340793	0.844827
Education	0.6154692	0.654896
Work	0.6948079	0.632095
Leisure	0.5936096	0.578207
Income	0.8370278	0.842852
Asset	0.6936335	0.704386
Housing	0.5732024	0.554774
Aggregate Well-being (MSI)	0.6805028	0.676108

Source: author's calculation.

In contrast, the four other components record an average deterioration over the same time span. The decline in the dimensions of nutrition, work, leisure and housing is also significant at the 1% level. Rising nutritional problems in China are well-documented in the literature (see for example Chen et al., 2012). Despite a reduction in the undernourished population, the number of individuals suffering

from overnutrition and obesity is increasing, and our data are consistent with this trend.[17] In terms of work and leisure, the literature on life satisfaction in China has shown how these aspects have deteriorated, in stark contrast with economic flourishing, implying severe drawbacks for happiness (Easterlin et al., 2017; Graham et al., 2017). The ongoing increase in housing prices in China – and the related problems for more vulnerable segments of the population – is widely documented in the literature (see for example Zhang, 2015). Our results confirm this trend and the relative disadvantages of urban populations in this dimension.

The net effect of these changes, along with the increase in variance across outcomes,[18] leads to an average net loss of multidimensional well-being at the aggregate MSI level. This decrease, illustrated in Table 1, is once again significant at 1% level. The MSI score is strongly correlated with self-reported life satisfaction.[19]

The evolution of the distribution of well-being between 2011 and 2015 is shown in Figure 3. In 2015, the MSI is characterised by a slightly lower share at the top of distribution (MSI > 0.85), while more people occupy the middle-low well-being group (0.45 < MSI < 0.65).

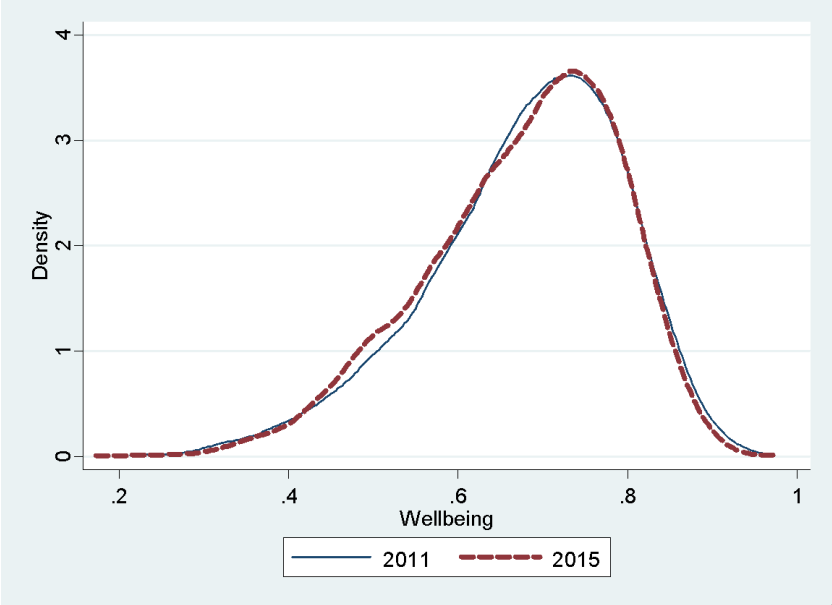

Figure 3: Distribution of well-being in 2011 and 2015.

Source: author's elaboration.

[17] The average BMI increased significantly from 23.7 to 24.1 between 2011 and 2015. The threshold for overnutrition is usually set at 25 points (obesity starts at 30 BMI points).

[18] The average across the standard deviations recorded by each individual increased significantly from 0.23 to 0.24.

[19] This information, collected in an ordinal variable, expresses a rate for the quality of life from 1 (very good) to 5 (very bad). Life satisfaction appears to be much more correlated with the MSI (correlation coefficient: -0.24) than with the income per capita (-0.14).

However, the 2015 sample is not perfectly comparable with the 2011 group. The 2015 population is disproportionally older and resides in rural areas. Both of these factors are expected to have a downward influence on the level of well-being.

In order to answer our first research question ('How did individual multidimensional well-being evolve in the New Normal period?'), the difference between 2011 and 2015 is observed using a pseudo-panel approach. We created 1,242 groups,[20] controlling for province, age, gender, year and rural/urban residence. In this pseudo panel, the difference between the MSI scores in 2015 (0.681) compared to 2011 (0.678) is slightly positive, but the results are not statistically significant at 10% level. The income component, on the contrary, increased significantly.

Comparing samples where age, geography and gender are held constant leads to the conclusion that no significant change occurred in well-being levels between 2011 and 2015. In other words, during this phase of economic slowdown, the multidimensional well-being of Chinese individuals has stagnated. This stagnation in overall well-being is not directly driven by income (which, on the contrary, triggers a significant positive effect). The regressions in Section 4.2 confirm this finding while exploring the question of how personal characteristics influence well-being.

4.2. Determinants of well-being

In order to account for the changes in the sample between periods, and at the same time to analyse inequality between different individuals in terms of multidimensional well-being, the determinants of the MSI were investigated using OLS regressions. Seven covariates are progressively added in each step of the analysis:

- New Normal: a binary variable that identifies whether observations are recorded in 2015, the New Normal phase; this time dummy catches thus the net increase in well-being not related to the other covariates.
- Age: a variable expressed in years that controls for the age of individuals, given the assumption that the well-being of individuals declines over time (because health typically declines with age).
- Age□: age squared, introduced to allow for a non-linear association between age and well-being.
- Urban: a binary variable that identifies individuals living in urban areas.

[20] The pseudo panel distinguished between 13 age groups, 12 provinces, two genders and two types of residence, resulting in 624 observations in each of the two waves of the survey. Because three of these groups were empty, they were discarded for both years, leading to a final sample of 1,242.

- Female: a binary variable identifying female individuals.
- No *hukou*: a binary variable that identifies individuals living in an urban area who are not officially registered as having urban citizenship.
- Coast: a binary variable that identifies individuals living in coastal provinces.

These covariates are progressively included in the OLS regression, as shown in Table 2. The variable 'New Normal' is negatively correlated with the MSI index. However, this negative correlation becomes positive and non-significant when the main control variables for individual characteristics are included (column 2). The multidimensional well-being of comparable Chinese individuals (with similar characteristics) does not seem to change between 2011 and 2014. The effect of age is negative, as expected. The introduction of the variable 'age squared' refines the analysis, pointing to an inverted-U effect: well-being initially increases with age but soon (at around 22 years old, according to the estimates) starts to decrease at an accelerating rate. Column 3 includes the distinction between the (advantaged) coastal provinces and those remaining. Finally, column 4 adopts a multilevel model to account for two additional provincial characteristics: the budget share devoted to education (Pub_Edu) and the share of investments received from foreign firms (FDI). While the share of education spending is slightly positive, no significant effect is associated with the presence of FDIs. A multilevel model allows the individual- and provincial-level covariates that can affect well-being to be combined. Starting from a model without covariates (null model), followed by the inclusion of individual-level covariates, and then provincial-level covariates, guarantees a p-value test significant at 0.000.

Table 2: OLS regression results. Interest variable: multidimensional well-being (MSI aggregation).

	(1) MSI	(2) MSI	(3) MSI	(4) MSI
New Normal	-0.00427**	0.00125	0.00183	0.00245
	(-3.02)	(1.03)	(1.53)	(1.31)
Age		0.00228***	0.00241***	0.00230***
		(10.50)	(11.29)	(10.83)
Age□		-0.0000535***	-0.0000548***	-0.0000533***
		(-25.47)	(-26.50)	(-25.98)
Urban		0.0603***	0.0554***	0.0497***
		(44.53)	(41.23)	(35.93)
Female		-0.0318***	-0.0317***	-0.0317***
		(-26.17)	(-26.49)	(-26.87)
No_Hukou		-0.0710***	-0.0598***	-0.0514***

		(-31.40)	(-26.41)	(-22.37)
Coast			0.0351***	0.0304***
			(28.85)	(2.95)
Pub_Edu				0.165*
				(2.05)
FDI				0.151
				(1.01)
_cons	0.680***	0.713***	0.692***	0.667***
	(670.72)	(130.82)	(127.89)	(43.28)
Observations	26872	26872	26872	26872
adj. R^2	0.000	0.265	0.287	

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: author's calculation.

Territorial differences also emerge from the analysis and are consistent with the literature on spatial inequality in China (see Goodman and Segal, 2003; Shue and Wong, 2007; Huang and Chand, 2015, *inter alia*). Rural areas and inner provinces are characterised by significantly lower levels of well-being, as expected.

Since column 2 residents in urban areas are distinguished according to *hukou* status. In addition to the urban and rural categories (the former being advantaged over the latter), migrants are particularly disadvantaged; their multidimensional well-being is, on average, even lower than rural dwellers.[21] This result breaks new ground, supporting Cai and Wang's (2018) analysis of China as a 'three-strata society' in which migrants report the lowest subjective well-being.

Finally, women exhibit significantly lower levels of aggregate MSI well-being, confirming the existence of a gender gap. This result can be found in the literature on wage differentials (see Chi and Li, 2008), but was not observed in terms of multidimensional well-being in China. Indeed, to investigate this topic, an individual-based measure of well-being, such as the MSI, is needed.

Table 3: Quantile regression.

VARIABLES	MSI q10	MSI q25	MSI q50	MSI q75	MSI q90
New_Normal	0.001	-0.001	0.003*	0.003*	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age	0.003***	0.003***	0.003***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

[21] The net effect of the variables 'urban' (residing in urban areas) and 'no_hukou' (maintaining a rural hukou) is negative.

Age□	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Urban	0.070***	0.068***	0.056***	0.041***	0.030***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Female	-0.039***	-0.042***	-0.031***	-0.023***	-0.016***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
No_Hukou	-0.068***	-0.071***	-0.065***	-0.049***	-0.039***
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
Coast	0.046***	0.043***	0.037***	0.024***	0.019***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.560***	0.624***	0.693***	0.763***	0.805***
	(0.008)	(0.008)	(0.007)	(0.007)	(0.008)
Observations	26,872	26,872	26,872	26,872	26,872

Source: author's calculation.

The statistical trends just described are not homogeneous across the whole sample. Table 3 replicates for different quantiles of the MSI the regression in Table 2 (see column 3) and finds that greater disparities occur among the most vulnerable groups. The median quantiles are those who gained the most in the New Normal phase, as interquantile regression testify (see Table A2 in the Appendix). This outcome is consistent with government's purpose of empowering the middle class and support endogenous growth.

Table A3 in the appendix reports the effect of the six regressors (age squared is excluded in favour of a more straightforward interpretation) for each of the nine components of well-being, while the effect of controlling for provinces is explored in the next subsection.

As a robustness test, we observe the average level of subjective well-being recorded in 14 Chinese provinces in 2013 as measured in the CHIP dataset. This average value is not significantly correlated with the average household income in the same period, but it is significantly associated with the difference between 2013 and 2012 average income levels (Appendix, Table A4). In other words, a slowdown in the monetary field, seems to impact not only on objective multidimensional well-being but also on subjective well-being, a similar but not overlapping concept (Ruggeri et al., 2020).

4.3. Well-being in specific provinces

As the previous section shows, the well-being of Chinese individuals is not homogeneous across different social and geographic groups. Similarly, income is not evenly distributed within such groups, as a vast literature on inequality in China testifies. As described in the introduction, the slowdown of Chinese GDP growth recorded in the second decade of this millennium has had a different impact in different provinces, in terms of GDP but also through public spending.

To better distinguish how structural factors brought change to well-being between 2011 and 2015, we focus our analysis on individuals residing in two provinces: Heilongjiang and Guizhou. This allows us to describe how different types of discrimination overlap within the context of a deeply stagnating province (Heilongjiang) and a more dynamic one (Guizhou) in the New Normal era.
Table 4 displays the average level of multidimensional well-being and its components for these provinces during the two waves.

Table 4: Aggregated well-being and unidimensional scores in Heilongjiang and Guizhou in 2014.

	Heilongjiang		Guizhou	
Dimension	2011	2015	2011	2015
Health	0.858	0.848	0.861	0.896
Nutrition	0.798	0.779	0.772	0.784
Sanitation	0.731	0.763	0.766	0.807
Education	0.621	0.652	0.463	0.554
Work	0.749	0.605	0.652	0.571
Leisure	0.553	0.557	0.596	0.593
Income	0.684	0.831	0.608	0.832
Asset	0.565	0.705	0.632	0.643
Housing	0.852	0.539	0.820	0.646
Aggregate Well-being (MSI)	**0.676**	**0.656**	**0.641**	**0.660**

Source: author's calculation.

The table shows that the ranking position of Heilongjiang and Guizhou reversed between 2011 and 2015. Heilongjiang recorded a deterioration in the health and nutrition sectors, as well as for aggregate MSI, while these variables increased in Guizhou. Heilongjiang also recorded weaker growth in the education and income dimensions, while the drop in housing and work was more pronounced.
These results are supported by econometric analysis. Consider the starting point and time effects in Heilongjiang and Guizhou. Table 5 indicates how the results change, singling out with fixed effects the well-being recorded in Heilongjiang (column 2, containing a fixed effect labelled 'Heilongjiang' and a fixed effect for the New Normal in Heilongjiang, labelled 'H_New_Normal') and the well-being starting point and growth recorded in Guizhou (column 3, labelled 'Guizhou' and 'G_New_Normal'). In column 2, we observe that Heilongjiang used to have a significant advantage in MSI compared with similar provinces, but growth has been significantly weaker, overcompensating the advantage. Guizhou, on the other hand, was (non-significantly) worse off in 2011 but afterwards benefitted from a significantly higher rate of development.

Finally, in columns 4 and 5, the well-being of Heilongjiang and Guizhou (labelled H_MSI and G_MSI, respectively) are studied separately from the remaining provinces. Our aim is to observe whether the MSI scores in these two provinces differ only in terms of average starting point and growth, or if they are affected differently by the characteristics of individuals. We confirmed the second hypothesis through a Chow test (Chow, 1960), which indicates that repeating the analysis in Heilongjiang and Guizhou leads to significantly different regression results. In both of these provinces, the rural/urban divide and discrimination against migrants are more relevant than in the remaining sample. As already observed, these two provinces have different starting points and growth trends.

Table 5: OLS regression results. Interest variable: multidimensional well-being (MSI aggregation).

	(1) MSI	(2) MSI	(3) MSI	(4) H_MSI	(5) G_MSI
New_Normal	0.00183 (1.53)	0.00324** (2.61)	0.000293 (0.24)	-0.0154*** (-3.45)	0.0203*** (4.57)
Age	0.00241*** (11.29)	0.00239*** (11.16)	0.00244*** (11.40)	0.00526*** (5.89)	0.00327*** (4.15)
Age □	-0.0000548*** (-26.50)	-0.0000545*** (-26.35)	-0.0000550*** (-26.61)	-0.0000789*** (-8.86)	-0.0000643*** (-8.63)
Urban	0.0554*** (41.23)	0.0556*** (41.35)	0.0556*** (41.32)	0.0944*** (15.80)	0.0819*** (12.88)
Female	-0.0317*** (-26.49)	-0.0316*** (-26.49)	-0.0317*** (-26.50)	-0.0320*** (-7.19)	-0.0384*** (-8.67)
No_Hukou	-0.0598*** (-26.41)	-0.0601*** (-26.54)	-0.0602*** (-26.56)	-0.129*** (-16.85)	-0.0754*** (-9.80)
Coast	0.0351*** (28.85)	0.0361*** (28.61)	0.0359*** (28.33)	0 (.)	0 (.)
Heilongjiang		0.0169*** (5.04)			
H_New_Normal		-0.0187*** (-4.09)			
Guizhou			-0.00447 (-1.35)		
G_New_Normal			0.0191*** (4.34)		
_cons	0.692***	0.691***	0.692***	0.628***	0.668***

	(127.89)	(127.56)	(127.19)	(28.42)	(33.56)
N	26872	26872	26872	1968	2162
adj. R^2	0.287	0.287	0.287	0.254	0.318

Source: author's calculation.

5. Conclusion

This paper investigates the impact of the economic slowdown on the multidimensional well-being of individuals in China. The MSI technique provides a synthetic measure of multidimensionality that penalises individuals, with heterogeneous outcomes, especially in deprived contexts. This helpful and innovative property is consistent with the 'Chinese Dream' target of realising a moderately prosperous society. As a matter of fact, the MSI index of multidimensional well-being results more strongly correlated with self-reported quality of life than per capita income.

The well-being dynamics in the New Normal context is computed for adult individuals from 12 provinces in China, during 2011 and 2015, using data obtained from the CHNS dataset. This sample allows to observe levels and dynamics of individual well-being in the New Normal context. Moreover, two provinces, Heilongjiang and Guizhou, are studied separately so as to focus on the dynamics of well-being in particularly successful (Guizhou) and stagnating (Heilongjiang) contexts. The primary results can be summarised in the following three ways.

First, between 2011 and 2015, the average level of multidimensional well-being stagnated. Although a slight decrease in well-being is nominally recorded, the overall trend is stable when controlling for other individual phenomenon (such as the ageing of the sample) and for macroeconomic differences through OLS and multi-level regressions. This result supports the idea that economic growth is an important element to guarantee a well-off society, so the 'rebalancing' should not offset the production-oriented efforts in support of China's economy, consistently with the warnings by Lo (2016).

Secondly, individual characteristics (such as age and gender) and residence matter in terms of multidimensional well-being. As expected, well-being decreases in old age following a non-linear trend, and women record lower outcomes too. On the other hand, inhabitants of coastal provinces and urban citizens (provided they possess an urban hukou) have higher than average scores. Moreover, the impact of these characteristics is not homogeneous across the distribution of well-being. This result suggests maintaining policies in support of sustainability, equity and inclusiveness, reinforcing thus policies such as the China National Sustainable Communities project and implementing the 2030 Agenda for Sustainable Development.

Thirdly, Heilongjiang province, as a representative case of economic stagnation in the Manchuria region, reports a significantly worsening well-being trend, different from the results emerging from 'pooled' data. On the other hand, Guizhou province is catching up, recording faster growth in the well-being of its citizens. This result indicates that the 'Go West' strategy may be too simplistic to fully catch the spatial inequalities in well-being currently recorded among inner China.

Analysing the effects of the economic slowdown in terms of individual well-being is, therefore, a crucial part of any comprehensive evaluation of China's latest phase of development and long-term structural changes. Although 'optimistic' scholars tend to emphasise the opportunities triggered by the New Normal in terms of the reorientation of reforms towards sustainability and human development, our analysis shows that the slowdown of economic growth has been accompanied by stagnating levels of multidimensional well-being, while provinces that are economically more vulnerable can experience also a reduction in well-being. This evidence supports a strengthening of policies that target human development, especially in provinces that lag behind. Moreover, specific groups in the population, such as migrants and rural dwellers, emerge as particularly vulnerable. Social security policies should, therefore, be designed with particular attention to these individuals. Opportunities for 'kicking off' virtuous circles, where individual well-being and macroeconomic development mutually support each other, is a corresponding topic that merits future research.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix Tables

Table A1: Dimensions and variables included.

Dimension	0 if	1 if	Variable	Mean	Unit (items)	Miss%
Health	Diseases=0 No Chronic Disease Smoking =0	Diseases=28 Severity=3	Diseases	0.45	Days	5.42
			Severity	0.35	Categorical	3.71
			Chronic diseases (includes 20 variables)	0.32	Y/N (20)	0.06
			Smoking	0.25	Y/N	3.74
Nutrition	BMI =22.5	BMI<13.5 or BMI>40.5	Height	161.6	Cm	2.23
			Weight	62.7	Kg	2.31
Sanitation	Water=0 Flush=0 Surrounding=0	Water=3 Flush=3 Surrounding=3	Water	0.38	Categorical	0.85
			Flush	0.84	Categorical	0.13
			Surrounding	0.22	Categorical	0.12
Education	Schooling=0	Schooling=13	Schooling	8.27	Years	0.14
Work	Employment=1	Employment=1 U.Cause≠4, 5	Employment	0.52	Y/N	0.01
			Unemployment cause	3.93	Categorical	0.19
Leisure	Sleep ≥ 8 P.Act. ≥ 210 S.Act. ≥ 420	Sleep ≤ 5 P.Act. = 0 S.Act.=0	Sleep	7.81	Hours/day	4.32
			Physical activity (includes 6 variables)	62.2	Minutes/week (6)	3.61
			Sedentary activity (includes 9 variables)	955.9	Minutes/week (9)	3.62
Income	Income ≥ 11	Income ≤ 0	Income	9.26	ln (¥)	1.62
Assets	Assets = 8	Assets = 0	Durables (includes 8 variables)	5.59	Y/N (8)	0
Housing	Rooms ≥ 3	Rooms = 0 Ownership = 0	Rooms	1.40	Nr/ppl	1.69
			Ownership	0.91	Y/N	0.10

Notes: 'Unemployment cause' refers only to the subgroup of unemployed individuals. 2011 and 2015 data are pooled.

Source: CHNS

Table A2: Interquantile regression (deciles 0.3, 0.6 and 0.9).

	(1) 3rd vs 6th MSI	(2) 6th vs 9th MSI	(3) 3rd vs 9th MSI
New_Normal	0.00355**	-0.00345	0.000106
	(2.73)	(-1.75)	(0.08)
Age	-0.000363	-0.000470	-0.000833*
	(-1.26)	(-1.41)	(-2.12)
Age ◘	0.00000666*	0.0000119***	0.0000185***
	(2.30)	(3.61)	(4.75)
Urban	-0.0164***	-0.0204***	-0.0368***
	(-8.29)	(-7.76)	(-17.24)
Female	0.0107***	0.0128***	0.0236***
	(6.89)	(10.42)	(12.76)
No_Hukou	0.0126***	0.0182***	0.0308***
	(3.83)	(5.65)	(8.40)
Coast	-0.0111***	-0.0127***	-0.0238***
	(-6.43)	(-6.82)	(-11.33)
_cons	0.0806***	0.0857***	0.166***
	(11.62)	(9.93)	(17.69)
N	26872	26872	26872

Notes: The first column compares the 3rd and 6th deciles; the second the 6th and 9th, the third the 3rd and 9th.

Source: CHNS

Table A3: Impact of individual characteristics on wellbeing components.

	Health	Nutrition	Sanitation	Education	Work	Leisure	Income	Asset	Housing
New_Normal	+***	-***	+***	+***	-***	-***	+***	+***	-***
Age	-***	+***	-***	-***	-***	-***	-***	-***	+***
Urban	-***	+***	+***	+***	+***	+***	+***	+***	-***
Coast	-***	-***	+***	+***	+***	+***	+***	+***	-***
Female	+***	-***	+	-***	-***	-***	-***	-***	-
No_Hukou	-***	-***	-**	-***	-***	-***	-***	-***	+***

Notes: Coefficients are estimated through OLS regression. For simplicity, only the signs are reported. As all components increases with aggregate wellbeing, significant positive coefficients indicate a positive effect on wellbeing. For example, 'Urban' residence positively affects 7 out of 9 dimensions. Conversely, for example, the absence of a legal residence permit has a negative impact on 8 out of 9 dimensions. It is important to note that the impact of New_Normal (i.e. the exogenous effect of passing of time), is significantly positive for 5 of the 9 dimensions, including income. Monetary growth and individual multidimensional wellbeing do not fully overlap and should be considered as two complementary indicators of development.

Source: author's calculation based on CHNS

Table A4: Correlation matrix of average Happiness, Income and Income difference in 14 Chinese provinces, 2013.

	Subjective Well-being	$Income_t$	$Income_{t-1}$	Income Difference
Subjective Well-being	1			
$Income_t$	-0.3066 (0.2863)	1		
$Income_{t-1}$	-0.2635 (0.3628)	0.9933 (0)	1	
Income Difference	-0.4691 (0.0906)	0.6559 (0.0109)	0.5641 (0.0356)	1

Notes: Self reported well-being is measured on a scale between 1 (Very happy) and 5 (Not happy at all); negative correlations indicate therefore a positive effect with happiness. p-values reported in parentheses

Source: author's calculation based on CHIP