THE WELLNESS ECONOMY

A COMPREHENSIVE SYSTEM OF NATIONAL ACCOUNTS APPROACH

Rafael Martin M. Consing III, Michael John M. Barsabal, Julian Thomas B. Alvarez, and Mahinthan J. Mariasingham

NO. 631

December 2020

ADB ECONOMICS WORKING PAPER SERIES

ASIAN DEVELOPMENT BANK

ADB

ADB Economics Working Paper Series

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This analysis was used in the Asian Development Outlook 2020 Update. The team would like to thank Julieta Magallanes, Ana Francesca Rosales, Angelo Jose Lumba, Clara Torelli, and Elaine Tan for their valuable insights.

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ISSN 2313-5867 (print), 2313-5875 (electronic)
Publication Stock No. WPS200433-2
DOI: http://dx.doi.org/10.22617/WPS200433-2

Notes:
In this publication, "$" refers to United States dollars.
ADB recognizes "China" as the People's Republic of China.

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ABSTRACT

This paper provides a comprehensive discussion on different, interconnected methods of using the system of national accounts to measure the relevance of a country's wellness sector to its overall economy. Procedures are discussed for using input–output analysis to derive the production and employment linkages between wellness and nonwellness sectors. We also discuss procedures for using the hypothetical extraction method to derive and decompose the production and employment losses that may arise when a country's wellness sector is removed from the economy. These procedures are then used to provide estimates for ten countries in developing Asia across two time periods which together provide a proxy for the region (Asia-10), along with a discussion on how these wellness economies have grown and how each one's labor productivity and wellness sector structure have evolved between the two periods.

Keywords: economy, employment, input–output, national accounts, wellness

JEL codes: E01, C67, D57, I39, R15

I. INTRODUCTION

Wellness goes beyond a lack of physical illness. It often means thriving holistically and living a well-rounded life, and so people engage in diverse activities to help themselves feel and become well. The World Health Organization (WHO) defines wellness as:

> "...the optimal state of health of individuals and groups. There are two focal concerns: the realization of the fullest potential of an individual physically, psychologically, socially, spiritually, and economically, and the fulfillment of one's role expectations in the family, community, place of worship, workplace and other settings." (WHO 2006)

While many of these activities do not necessarily involve monetary transactions, there are wellness-related activities which are also economic in nature. In a developing world, the volume and economic value of these activities are expected to increase as people become increasingly conscious of and able to meet their need for wellness.

This paper contributes to wellness and economic literature by showing how the system of national accounts (SNA) framework can be used to measure the wellness sector's relevance to the overall economy and then demonstrating this for selected Asian Development Bank (ADB) developing member countries (DMCs) over two time periods. The main advantage of this approach is that most countries follow the SNA framework when preparing their national accounts, and theoretically this allows any country to estimate and analyze its own wellness economy, defined here as the linkages of an economy attributable to the production of wellness goods and services with monetary transactions attached to them.

As nations develop, it becomes increasingly important to be able to measure the wellness economy. From a policy perspective, this provides a better understanding of how relevant wellness activities have become to the economy, which ones are the biggest economic contributors, and which ones are potentially underdeveloped in the context of country-specific unmet social needs. For policymakers interested in maximizing the wellness of their constituents, a measure of the wellness economy becomes another analytical tool for socioeconomic development.

There have been past attempts to measure wellness economies. The Global Wellness Institute (GWI) is one of the largest institutions to attempt to estimate wellness economies, and it estimates the value of the global wellness economy at $4.2 trillion as of 2017. However, its methodology is proprietary and does not appear to follow international standards of national accounting. For example, it is unclear what the $4.2 trillion figure mentioned in GWI (2018) refers to. It appears to be in terms of gross domestic product (GDP) as it's described as "representing 5.3% of global economic output" (world GDP was over $80 trillion in 2017), but GDP is not necessarily the same as gross output.[1]

Any attempt to relate metrics and wellness starts with the most important question: What is wellness? As a naturally desirable state of health, wellness as a concept has been around potentially as long as humanity has. The desire for a better life is fundamentally a desire for wellness. As is common with such concepts, the term "wellness" can seem nebulous and imprecise, often grasped intuitively

[1] In national accounting, gross output is equal to the sum of intermediate consumption and value added. Because of the former, it is typically larger than GDP.

rather than scholastically. For the wellness economy to be measured, however, wellness must be defined explicitly.

In the modern academe, numerous definitions for wellness have been proposed, with one of the earliest coming from Dunn (1959) who defines it as "a health condition which includes general well-being of body, mind, and spirit." A review by Roscoe (2009) indicates similarities in definitions across wellness literature in the decades following Dunn (1959) but with more dimensions added, the most prevalent being those related to social, emotional, physical, intellectual, and spiritual well-being. The multidimensionality of wellness trends into the next century, with Miller and Foster (2010) stating that the broadening scope of wellness is meant to create a "theoretical framework that views individuals within a holistic perspective and consists of many dimensions." Wellness is also commonly viewed as both a state and the active pursuit of that state, and this appears in the GWI (2018) definition of wellness as "the active pursuit of activities, choices, and lifestyles that lead to a state of holistic health."

The WHO definition introduced earlier is the most explicitly comprehensive so far as it includes an economic dimension to wellness as well as the other commonly cited dimensions and recognizes wellness as both a state and an activity. As this definition shares similarities with and encompasses many others covered, this is the definition for wellness primarily being referred to in this paper. In the endeavor to estimate how much of an economy can systematically be attributed to the production of wellness goods and services, the most inclusive definition is correspondingly adopted.

Given the established multidimensionality of wellness, economic activities that fall under wellness cannot be limited to just the consumption of medical services and pharmaceutical goods. Potentially, wellness includes all economic activities and industries that help people feel and become well, such as those relating to travel, recreation, outdoor, sporting, and personal care activities. The specific economic activities considered as wellness are described further in section II and enumerated in Table A.1 of the Appendix. In this paper, the industries engaged in the production of such wellness goods and services are referred to collectively as the *wellness sector*.[2] As economies are complex systems with interconnected sectors, the wellness sector is itself supported by activities in other sectors of the economy.

In the context of economic productivity, the wellness economy is measured in terms of gross value added (GVA).[3] Therefore, the objective of the paper is to show how much of a country's GVA is attributable to those wellness goods and services with monetary transactions attached to them. This refers to two main components: (i) the GVA from the wellness sector itself, such as the GVA from hospitals; and (ii) the contribution from supporting nonwellness sectors, such as the GVA from the energy sector used to produce hospital services.

It's important to emphasize that measuring the wellness economy is not the same as measuring the welfare, wellness, or well-being of people in a country. For example, a pandemic might increase spending on hospital activities which might, holding other factors constant, mean a larger measurement of the wellness economy, yet a population's well-being could actually decline as more people fall ill or into anxiety and poverty due to the pandemic. Similarly, a wellness economy might be

[2] In this context, wellness industries and wellness subsectors may be treated synonymously.

[3] There is a small difference between a country's GVA and its GDP. A country's GDP is equal to its GVA plus nonrefundable product or sales taxes. These taxes constitute a very small percentage of GDP and are a function of product-specific value added. Therefore, for all analytical purposes, this paper assumes that GVA is almost equal to GDP and use the terms interchangeably (Consing et al. 2020).

growing due to high production of wellness goods and services, yet the population's welfare may remain low if only a wealthy minority of the population is able to consume these goods and services. This paper focuses only on using input–output analysis to measure wellness economies and not welfare.

Besides measuring the wellness economy in GVA terms, there are other ways by which the relevance of the wellness sector to the overall economy can be estimated under the SNA framework. One is to estimate *wellness employment*, defined here as the employment linkages attributable to the production of wellness goods and services with monetary transactions attached to them, and another is to estimate the production and employment losses that may occur if the wellness sector were extracted from the economy. Conceptually, these all fall under input–output analysis, and so they neatly relate to each other and are discussed as such in the methodology. Estimates for the wellness economy, the GVA lost from hypothetical extraction, and wellness employment are then produced for selected countries in developing Asia with available data over two time periods to show a practical application of this framework.

II. METHODOLOGY

A. Identifying the Wellness Sector

The first step is to identify which economic industries produce wellness goods and services. Using the fourth revision of the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 4), 35 industrial codes were identified as composing the wellness sector. These codes were selected to be as inclusive as reasonably possible of the various dimensions of wellness embodied in WHO's definition. These are likewise consistent with wellness activities discussed in the literature, such as in Kickbusch and Payne (2003), Pilzer (2007), and GWI (2018).

Some codes are included to expand the scope of commonly recognized wellness activities. For example, these ISIC codes include hospital activities for ill patients (excluded in some definitions of wellness, such as GWI 2018), under the assumption that ill patients engage in hospital activities with the intention of becoming well. As in Consing et al. (2020), these ISIC codes capture a variety of wellness goods and services from various industries, such as human health, residential care, social work, tourism, amusement, recreation, sports, creative, arts, entertainment, culture, and personal care activities as well as the construction of wellness-related structures, such as health and sports facilities and the manufacture and retail trade of wellness goods such as pharmaceutical, beauty, and sports products. Table A.1 of Appendix A contains the list of ISIC codes covering the wellness sector.

B. Data

The main data source used in computing for the contribution of the wellness sector to GDP are national input–output tables (IOTs). Symmetric IOTs summarize the flow of transactions across industries operating in the economy. These contain information on intermediate consumption, gross output, and GVA for each production sector. When IOTs are not readily available, supply and use tables (SUTs) from various national statistical offices were converted into industry-by-industry IOTs using the transformation model prescribed by Eurostat (2008). Inherent in the transformation of SUTs

into IOT is the assumption that without any regard to the producing industry, each product has its own sale-specific structure (Eurostat 2008). Table A.2 of Appendix A contains a summary of the data sources used for estimating the wellness economy in each country.

C. Disaggregation of Input–Output Tables

While a country's IOT provides information necessary in computing for sectoral GVA, the industries of the wellness sector are often grouped into various sectoral aggregates making the identification and computation of the GDP attributable to the wellness sector difficult. This is resolved by disaggregating or breaking down the IOT industries. With several methods available, this paper uses information extrapolated from supply tables, administrative, and secondary data.

The first method of disaggregating an IOT involves the use of the supply table. This is the preferred method as it involves using SNA components as a basis for disaggregation. This entails identifying wellness products and the total amount of wellness products supplied by the sector to be broken down. The total amount of wellness products that is supplied by the aggregated industry is then divided by the total output of the aggregated sector to obtain the disaggregator. This ratio is then multiplied to the relevant GVA in the IOT. This process is repeated to generate a set of disaggregators that are used to break down the aggregated sectors of interest. Once the wellness component has been separated, these are summed up to create a separate account for the wellness sector in the IOT.

Underlying the first method is the need for a highly disaggregated row accounts in the supply table. That is, for the first method to be viable, the supply products must include numerous products. Hence, if a country's supply table is not detailed enough to produce disaggregators, an alternative method of disaggregation is to use firm-level data coming from a secondary source. Here, the firm-level data from Orbis database was used. After applying the methods on filtering firms in the database as prescribed in Kalemli-Ozcan et al. (2019), data on the operating revenue of each firm for each country is collected. The operating revenues are aggregated at the four-digit ISIC level and based on the sectoral groupings in the IOT.[4] The set of disaggregators were then computed by taking the ratio of the operating revenue of ISIC industry codes for wellness industries to the operating revenue of the sector being disaggregated. If a detailed supply table is unavailable and data from secondary sources are limited for disaggregation, the donor imputation method for deriving disaggregators was employed. The objective is to use the disaggregators from a donor country.

The donor country is chosen based on the expectation that the economic structure of the imputed country closely resembles that of the donor.[5] Economic factors such as similarity in market structure, share of agriculture, industry and services to GDP, income group and major commodities produced were the main consideration in choosing a donor for a recipient country. Aside from these economic factors, similarities in geographical location, historical experience and values in different developmental indices such as the Human Development Index and unemployment rates were also taken into account in selecting the donor country. For example, the economic structure of Malaysia was used as a donor for Sri Lanka since both countries are upper middle-income economies with comparable market structure in terms of share of agriculture, manufacturing, and services to GDP. Similarly, both countries share the same colonial experience and geographical attributes. The type of disaggregation for each country IOT used in this paper is elaborated in Table A.3 of the Appendix.

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[4] Since firms in the Orbis database are classified according to the European Classification of Economic Activities Rev. 2, a concordance table was used to convert these codes into ISIC Rev. 4 industry codes.

[5] It is a requirement that the sector aggregation in the IOTs of the donor and imputed economies be the same.

Once disaggregators are estimated from the methods described above, these were further verified with available administrative data for each country of interest to ensure that the disaggregators are reliable and intuitive. The disaggregators are then used to dissect the aggregated sectors in each country's IOT. Since IOTs are characteristically symmetric, these disaggregators are multiplied to both the rows and columns corresponding to the industries in the IOT which contain the wellness activities of interest.

In effect, the symmetric IOT is expanded for each disaggregator being applied as the corresponding industry being disaggregated is split into the part of it containing wellness activities and the part of it containing nonwellness activities. For example, an IOT containing a single entry encompassing all ISIC codes starting with 47 (retail trade, except motor vehicles and motorcycles) would be split row- and column-wise using a relevant disaggregator to create a separate entry just for ISIC code 4763 (retail sale of sporting equipment in specialized stores), which is considered part of wellness.

D. Direct Computation of Wellness Sector Gross Value Added

Given that a country's IOT is disaggregated following the procedure described in the previous subsection, the wellness components of each sector were summed up to compute the country's GVA directly generated by its wellness industries, also referred to here as wellness sector GVA. Assuming that there are *n* sectors in the economy and *q* of which are wellness industries, equation (1) describes a formula for the GVA of the wellness sector that is consistent with the SNA framework.

$$\text{Wellness sector GVA} = \mathbf{p}'(\mathbf{x} - \mathbf{z}) = \mathbf{p}'\mathbf{va} \tag{1}$$

where *p* is a *n* x 1 indicator vector whose value is 1 if the entry corresponds to a wellness industry and 0 otherwise.[6] *x*, *z* and *va* are *n* x 1 vectors of output, total intermediate consumption, and gross value added, respectively. Throughout the paper, the prime symbol (′) denotes matrix transposition.

E. Tracing the Production Linkages of the Wellness Sector

The wellness GVA derived in equation (1) captures the direct economic contribution of the sector. However, the wellness economy also includes GVA from supporting nonwellness industries used to produce wellness goods and services. These contributions are not encapsulated in the previous equations. To account for these contributions when estimating the size of the wellness economy, we use Leontief's insight in Leontief (1936) to derive the wellness sector's product linkages which contain the contribution from supporting nonwellness industries.

To trace the production linkages of the wellness sector, the first step is to convert the disaggregated *n* x *n* IOT into a table with *n*-(*q*-1) x *n*-(*q*-1) dimension. This ensures that there is only a single account dedicated for the wellness sector and there is no double-counting that comes from the interaction of wellness industries with each other. Resizing the IOT entails that each entry of the wellness industry in the disaggregated IOT is added to a single account.[7]

Once the values for each wellness industry are aggregated into a single account, the matrix of technical coefficients, $\mathbf{A} = [a_{ij}]$ which gives the share of inputs from sector *j* to total output of sector *i*, is obtained. This matrix is derived by post-multiplying the matrix of intermediate consumption,

[6] As a check, the sum of each entry in p must be equal to *q*.

[7] Another way of aggregating values in each wellness industry is through the multiplication of an aggregator matrix to the components of the IOT. See Torelli and Lumba (2020) for a detailed exposition on the aggregator matrix.

$\mathbf{Z} = [z_{ij}]$, with the inverse of a diagonalized matrix of gross output, $\hat{\mathbf{X}}^{-1}$.[8] Subtracting $\mathbf{A}$ to an identity matrix and taking its inverse yields equation (2), the Leontief Inverse.

$$\mathbf{B} = (\mathbf{I} - \mathbf{A})^{-1} = [b_{ij}] \tag{2}$$

The Leontief Inverse summarizes the output requirements from each sector to meet final demand given a specific time period. b_{ij} represents the entry in the i^{th} row and j^{th} column of the matrix represented in equation (2). Similarly, we also construct the direct value-added coefficient matrix $\hat{\mathbf{V}}$ by placing the elements of a n-*(q-1)* × 1 vector of direct value-added coefficients, $\mathbf{v} = [va_j/x_j]$, into the diagonal entries. Each entry in v is obtained by dividing Sector *j*'s gross value added by the gross output of the same sector. Pre-multiplying B to $\hat{\mathbf{V}}$ gives us $\hat{\mathbf{V}}\mathbf{B}$, the total value-added matrix. This matrix indicates the value added each sector directly and indirectly required to produce a unit of its final demand. Thus, when $\hat{\mathbf{Y}}$, a diagonal matrix of the final demand, is post-multiplied to $\hat{\mathbf{V}}\mathbf{B}$, equation (3) is derived.

$$\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}} = \begin{bmatrix} v_1 b_{11} y_1 & \cdots & v_1 b_{1,n-(q-1)} y_{n-(q-1)} \\ \vdots & \ddots & \vdots \\ v_{n-(q-1)} b_{n-(q-1),1} y_1 & \cdots & v_{n-(q-1)} b_{n-(q-1),n-(q-1)} y_{n-(q-1)} \end{bmatrix} \tag{3}$$

The matrix in equation (3) with dimension n-$(q-1)$ × n-$(q-1)$, traces the production linkages of each sector in the economy by decomposing the value added made by each sector in the economy.[9] Each element in the matrix is interpreted as the value added from each sector that is directly or indirectly used in the production of final goods and services of a specific sector (Wang, Wei, and Zhu 2013; Wang et al. 2017). Therefore, the sum of each entry of the $\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}$ matrix, as shown in equation (4), gives the total GDP of the entire economy.

$$\text{Total GDP} = \mathbf{i}'\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\mathbf{i} \tag{4}$$

where i is a unit vector.

Alternatively, the entries along the rows of equation (3) can be interpreted as the distribution of the value added created from a sector across all other industries in the economy. For example, the entry in the i^{th}- row and j^{th}-column, $v_i b_{ij} y_j$, represents the value-added contribution of sector *i* that is used in the production of sector *j*'s final goods and services. Thus, the sum of each entry in the row accounts would yield the GVA that is directly created in the sector, tracing all forward linkages across all downstream sectors from a producer's perspective (Wang, Wei, and Zhu 2013).

Conversely, the entries along the column, correspond to the breakdown of value-added contributions from all sectors in the economy used in the production of a particular sector's final goods and services. Thus, looking at the entries column-wise traces the backward linkages of a particular industry across all upstream sectors from a user's perspective (Wang, Wei, and Zhu 2013).

To measure the wellness economy, the value-added contribution attributable to the wellness sector from equation (3) is estimated. This is done by including the sum of all entries in the row for the

[8] For notational purposes, a hat (i.e., $\hat{\mathbf{X}}$) represents a diagonal matrix with elements of vector $\mathbf{x}$ on the diagonal.

[9] This decomposition performed in this framework is based on the work of Wang, Wei, and Zhu (2013) and Wang et al. (2017) which decomposes the value added into various component in a multiregional input–output model.

wellness sector in equation (3). The row sum, $\mathbf{i}'\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\boldsymbol{\varepsilon}$, can be easily obtained by pre-multiplying a unit row vector and post-multiplying ε to equation (3). The vector ε is an indicator vector for the wellness sector where each element of the vector is 0 except for the row corresponding to the wellness sector with a value of 1. This term captures the value-added contributions from the wellness sector that enable production in all sectors in the economy. The term $\mathbf{i}'\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\boldsymbol{\varepsilon}$ also encapsulates the forward linkages of the wellness sector across all downstream sectors. Furthermore, this term is exactly equal to the result derived in equation (1).

The measure for the size of the wellness economy also includes the backward linkages of wellness sector. This is computed by taking the sum of the column dedicated for the wellness sector in equation (3). Operationally, the value for the backward linkage is derived by post-multiplying $\boldsymbol{\varepsilon}$ to $\mathbf{i}'\left(\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\right)'$. With the inclusion of $\mathbf{i}'\left(\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\right)'\boldsymbol{\varepsilon}$ to the new estimate of wellness GDP, the value-added contribution from supporting nonwellness sectors that enables the production of the wellness sector is accounted.

Adding these two terms while adjusting for the intersection term, $\left[\text{diag}\left(\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\right)\right]'$, which is double- counted, gives a GDP measure of the wellness economy based on its production linkages as shown in equation (5).

$$\text{Wellness GDP} = \mathbf{i}'\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\boldsymbol{\varepsilon} + \mathbf{i}'\left(\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\right)'\boldsymbol{\varepsilon} - \left[\text{diag}\left(\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\right)\right]'\boldsymbol{\varepsilon} \quad (5)$$

where, $\left[\text{diag}\left(\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\right)\right]$ is a n-(q-1) x 1 vector with the diagonal elements of equation (4) as its entries.

F. Integration of Gross Fixed Capital Formation in Wellness Gross Domestic Product

While the wellness GDP stated in equation (6) captures all contemporaneous input–output transactions with respect to the exogenous final demand, it does not include the capital goods purchased by the wellness sector for future production. To account for the gross fixed capital formation (GFCF) attributable to the wellness sector but distributed in other industries, equation (6) is adjusted as follows:

$$\text{Adjusted wellness GDP} = \mathbf{i}'\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\boldsymbol{\varepsilon} + \mathbf{i}'\left(\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\right)'\boldsymbol{\varepsilon} - \left[\text{diag}\left(\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\right)\right]'\boldsymbol{\varepsilon} + (\mathbf{i} - \boldsymbol{\varepsilon})'\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\hat{\mathbf{R}}\boldsymbol{\Lambda}(\mathbf{i} - \boldsymbol{\varepsilon}) \quad (6)$$

equation (6) is almost identical to equation (6) except that a fourth term was added, where the $\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}$ matrix is post-multiplied with $\hat{\mathbf{R}}$. The post-multiplied matrix is a *n*-(*q*-1) x *n*-(*q*-1) diagonal matrix of the ratio of use of wellness GFCF to the total final use of each sector in the economy. Each ratio is computed by dividing the sum of each row in the wellness GFCF matrix by the corresponding total final demand.[10]

The matrix product $\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\hat{\mathbf{R}}$ is again post-multiplied with a filter matrix, $\boldsymbol{\Lambda} = \hat{\boldsymbol{\alpha}}$. The diagonalized vector $\boldsymbol{\alpha}$, is an indicator vector whose value is 1 if the same industry in a donor country[11] uses wellness GFCF products and 0 otherwise. The post-multiplication of $\boldsymbol{\Lambda}$ to the matrix product $\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\hat{\mathbf{R}}$ effectively

[10] The wellness GFCF matrix ($\mathbf{W}$) is extrapolated from the GFCF vector in the IOT by multiplying the corresponding ratio of the gross output of each wellness industry to total output with the row entry in the GFCF vector. In matrix notation, $\mathbf{W} = \mathbf{g}\mathbf{t}'$, where *g* is a n-(q-1) x 1 GFCF vector and t is a qx1 vector of gross output ratios.

[11] In the application of this estimation procedure, the donor country is Canada due to data limitations. However, another economy with available data can be used as a donor country. Consequently, if the matrix product is not filtered out, $\boldsymbol{\Lambda}$ becomes an identity matrix.

filters out industries that might be providing wellness GFCF, but whose counterparts in the donor economy do not.

The sum of all entries in the resulting matrix less the entries corresponding to the wellness sector itself is the term representing the part of GDP attributable to the wellness sector's purchase of capital goods from other sectors in the economy. Thus, equation (6) is the key equation in measuring the size of the wellness economy.

G. Measuring the Employment Attributable to the Wellness Economy

Besides measuring the economy attributable to wellness in terms of GVA, the economic relevance of wellness can be characterized through its contribution to total employment. The key step in performing this analysis is the collection and processing of sectoral employment data from official sources. Since sources of labor data are likely to release employment figures at an aggregated level, different techniques are applied to further disentangle the number of jobs attributable to each sector in the economy.

The first method in disaggregating employment data uses the unit labor cost approach where the sectoral unit labor cost (ULC) is defined as the ratio of total labor cost to real output by sector (Ernst and Sarabia 2015). Since the total labor cost is the product of real wages and the total number of employees in each sector, the sectoral ULC can be multiplied to the inverse of the wage-to-output ratio to recover total employment by industry. This step is operationalized in equation (7).

$$\text{Employment}_i = \text{ULC}_j \times \frac{\text{Total Output}_j}{\text{Real Wage}_j} = \frac{\text{Real Wage}_j \times \text{Employment}_j}{\text{Total Output}_j} \times \frac{\text{Total Output}_j}{\text{Real Wage}_j} \tag{7}$$

Given that the unit labor cost approach requires data that might not be readily available from official sources, another method in deriving sectoral employment is to use the of distribution of Compensation of Employees (COE) by sector. Often, COE is provided in the SUT of a particular country. If COE is not available, the distribution of GVA can be an alternative in further dividing aggregated employment figures.

Once data on employment are processed to the desired sectoral disaggregation, the effects of the sector on jobs is determined by executing a procedure analogous to the method described in section II.E is performed. Unlike in equation (4) where $\hat{\mathbf{V}}$ is pre-multiplied to $\mathbf{B}\hat{\mathbf{Y}}$, $\hat{\mathbf{V}}$ is replaced with an employment matrix, $\hat{\mathbf{E}}$, which is a $n\text{-}(q\text{-}1) \times n\text{-}(q\text{-}1)$ diagonal matrix with labor coefficients as its diagonal entries. Labor coefficients represent the total number of persons needed to produce a unit of output and are computed by dividing the total number of jobs for each sector to the gross output of the corresponding sector (i.e.: $e_j = \text{jobs}_j/x_j$). Pre-multiplying $\hat{\mathbf{E}}$ with $\mathbf{B}\hat{\mathbf{Y}}$ yields to the matrix equation below.

$$\hat{\mathbf{E}}\mathbf{B}\hat{\mathbf{Y}} = \begin{bmatrix} e_1 b_{11} y_1 & \cdots & e_1 b_{1,n-(q-1),} y_{n-(q-1)} \\ \vdots & \ddots & \vdots \\ e_{n-(q-1)} b_{n-(q-1),1} y_1 & \cdots & e_{n-(q-1)} b_{n-(q-1),n-(q-1)} y_{n-(q-1)} \end{bmatrix} \tag{8}$$

The $n\text{-}(q\text{-}1) \times n\text{-}(q\text{-}1)$ matrix represented in equation (8) shows the number of jobs created in each sector due to the final demand. Particularly, $e_i b_{ij} y_j$ is the number of jobs created in Sector *i* due to the final demand of Sector *j*. Thus, summing up all entries in equation (8) results into the total number of jobs in the economy. Mathematically, the total number of jobs in the economy is expressed as

$$\text{Total employment} = \mathbf{i}'\hat{\mathbf{E}}\mathbf{B}\hat{\mathbf{Y}}\mathbf{i} \tag{9}$$

To derive the employment attributable to the wellness economy, entries in the column and row vectors of equation (8) corresponding to the wellness sector are added together. This procedure is summarized in equation (10).

$$\text{Wellness employment} = \mathbf{i}'\hat{\mathbf{E}}\mathbf{B}\hat{\mathbf{Y}}\boldsymbol{\varepsilon} + \mathbf{i}'\left(\hat{\mathbf{E}}\mathbf{B}\hat{\mathbf{Y}}\right)'\boldsymbol{\varepsilon} - \left[\text{diag}\left(\hat{\mathbf{E}}\mathbf{B}\hat{\mathbf{Y}}\right)\right]'\boldsymbol{\varepsilon} \tag{10}$$

The first term of equation (11) shows the total number of jobs created in the wellness sector due to the demand of all sectors in the economy. Similarly, the difference between the second and third terms of the preceding equation indicates the number of jobs induced by the final demand for wellness goods and services in all other sectors in the domestic economy.

H. Hypothetical Extraction Method

Another way of measuring the importance of wellness industries to the economy is by tracing the GDP and jobs that are lost when the sector is nullified in the economy (Miller and Blair 2009). One way of doing this is through the hypothetical extraction method (HEM).

HEM is almost identical to the analysis discussed in section II.E except that in this method, the row and column elements of the wellness sector in the matrix of technical coefficients are deleted by replacing them with zeroes to generate a new matrix, $\overline{\mathbf{A}}$. By doing so, the interdependence between the wellness sector and the rest of the economy is canceled out (ADB 2018). It also follows that there is no final demand for wellness goods and services, $\overline{y}_k = 0$, and no primary inputs, $\overline{va}_k = 0$ for the wellness sector. Since the input requirements of other sectors are unaltered, HEM assumes that the inputs originally provided by the wellness sectors are satisfied by additional imports after extraction (Dietzenbacher, van Burken, and Kondo 2019). Moreover, HEM further assumes that once the inputs for the wellness sector are extracted, these resources do not shift to other activities and therefore, remain unemployed. This assumption is valid in the short run.

With the matrix of technical coefficients altered, the entries in the Leontief Inverse are also changed (i.e.: $\overline{\mathbf{B}} = (\mathbf{I} - \overline{\mathbf{A}})^{-1}$). Similarly, new matrices of direct value-added coefficients, $\overline{\mathbf{V}}$, and final demand, $\overline{\mathbf{Y}}$, are derived. Pre-multiplying $\overline{\mathbf{V}}$ with $\overline{\mathbf{B}}$ and post-multiplying $\overline{\mathbf{Y}}$ with the matrix product gives us the new GDP of the economy when the wellness sector is nullified. The new GDP is summarized in equation (11).

$$\overline{\text{Total GDP}} = \mathbf{i}'\overline{\mathbf{V}}\overline{\mathbf{B}}\overline{\mathbf{Y}}\mathbf{i} \tag{11}$$

When HEM is also applied, the jobs that the wellness sector generates are lost. This means that the labor coefficient for the wellness sector becomes zero (i.e.: $\overline{e}_k = 0$) implying that a new employment matrix, $\overline{\mathbf{E}}$, is derived. Matrix $\overline{\mathbf{E}}$ is almost identical to matrix $\mathbf{E}$ described in section II.G, except that the diagonal entry corresponding to the wellness sector is now set to zero. By summing up the entries of the resulting matrix product from pre-multiplying $\overline{\mathbf{E}}$ to $\overline{\mathbf{B}}\overline{\mathbf{Y}}$, the remaining jobs in the domestic economy is computed. The new level of total employment is represented mathematically in equation (12).

$$\overline{\text{Total Employment}} = \mathbf{i}'\overline{\mathbf{E}}\overline{\mathbf{B}}\overline{\mathbf{Y}}\mathbf{i} \tag{12}$$

I. Gross Domestic Product Loss Decomposition

The difference between the total GDP prior extraction (equation [4]) and the hypothetical situation (equation [11]) gives us the potential GDP lost when the wellness sector is extracted. Formally, this is written as

$$\text{GDP Loss} = \mathbf{i}'\hat{\mathbf{V}}\mathbf{B}\hat{\mathbf{Y}}\mathbf{i} - \mathbf{i}'\bar{\mathbf{V}}\bar{\mathbf{B}}\bar{\mathbf{Y}}\mathbf{i} \tag{13}$$

Since HEM assumes no reallocation among domestic inputs and the extracted inputs used by the wellness sector is completely substituted by imports as a result of extraction, the estimate produced from equation (13) is an upper bound estimate in the short run. Alternatively, equation (14) can be re-written as

$$\text{GDP Loss} = va_k + y_k \sum_{\mathbf{r}} b_{rk} \frac{va_k}{x_r} + \sum_{\boldsymbol{r}} va_r(b_{rr}-\bar{b}_{rr}) \frac{y_r}{x_r} + \sum_{r\neq s}\sum_{s\neq r} va_r(b_{rs}-\bar{b}_{rs}) \frac{y_s}{x_r} \tag{14}$$

where *r* and *s* are indices for all industries except for the wellness sector with index *k*.[12] Equation (14) shows that the GDP lost can be decomposed into direct (first and second terms) and indirect losses (third and fourth terms). The direct losses comprise of the lost incurred due to removal of production linkages of the wellness sector. Specifically, the first term represents the GVA loss attributed to the wellness sector that is used in the production of final goods and services by all sectors in the economy, while the second term is the total GVA lost from other industries that were previously used in the production of final wellness goods and services in the pre-extraction scenario. These correspond to the linkages of the wellness economy described in section II.E.

Similarly, the indirect losses are incurred due to the resulting changes in the sensitivity of the output of the remaining sectors because of a change in the final demand. Specifically, the third term is the loss incurred due to own-industry output elasticities and the fourth term represents the loss due to changes in cross-industry output elasticities. The third and fourth term together are the difference between the estimated GDP lost from the hypothetical extraction of wellness industries and the estimated size of the wellness economy from its linkages in equation (6).

J. Employment Loss Decomposition

Like in section II.I, the total jobs lost after extracting the wellness sector from the domestic economy is the difference between the total employment prior extraction (equation [9]) and the new level of employment described in equation (12). In matrix form, the loss in employment is expressed as follows.

$$\text{Employment Loss} = \mathbf{i}'\hat{\mathbf{E}}\mathbf{B}\hat{\mathbf{Y}}\mathbf{i} - \mathbf{i}'\bar{\mathbf{E}}\bar{\mathbf{B}}\bar{\mathbf{Y}}\mathbf{i} \tag{15}$$

Note that equation (15) is a maximum estimate of the total jobs lost in the short run since the HEM assumes no redistribution of production inputs to remaining sectors. Furthermore, the total employment loss can be decomposed as shown in equation (16).

$$\text{Employment Loss} = jobs_k + y_k \sum_{r} b_{rk} \frac{jobs_k}{x_r} + \sum_{\boldsymbol{r}} jobs_r(b_{rr}-\bar{b}_{rr}) \frac{y_r}{x_r} + \sum_{r\neq s}\sum_{s\neq r} jobs_r(b_{rs}-\bar{b}_{rs}) \frac{y_s}{x_r} \tag{16}$$

[12] See Barsabal, Alvarez, and Consing (2020) for the detailed derivation of the GDP lost after hypothetical extraction.

The first term in equation (16) is equal to the jobs lost as a result of the nullification of the demand for wellness final goods and services from all remaining sectors. Similarly, the second term computes the jobs induced by the final demand for wellness goods and services in all other sectors in the domestic economy that are now lost, while third and fourth terms represent the losses in jobs due to the changes in output elasticities of the remaining industries. In particular, the third term represents the jobs lost due to changes in own-industry output elasticities while the fourth term shows the losses in employment due to changes in cross-industry output elasticities. By convention, the sum of the first two terms is referred as the direct employment losses and is equal to the employment losses generated by equation (16). Adding the third and fourth terms of equation (16) gives the indirect employment losses incurred.

III. RESULTS AND DISCUSSION

A. The Wellness Economy

Based on data for the previous decade, the wellness economy's prospects in developing Asia have generally been positive, demonstrating potential for high growth. Wellness traditions in the region have their roots in centuries-old practices and have deeply embedded themselves in its peoples' lives and cultures. Asian economies have successfully assimilated some of these practices even in contemporary markets, notwithstanding significant changes in their economic structure. Even the wellness economy itself witnessed drastic changes in recent periods, resulting from changes in technology and changes in demographic composition. The advancements in technology, for example, have enabled greater volumes of wellness products to be more accessible to a wide array of consumers. At the same time, the aging population in several economies in developing Asia also influenced wellness consumption patterns, as societies divert more resources toward meeting the demands of the elderly population.

The sharp increases in per capita income in developing Asia has been accompanied by a rapidly growing middle class (ADB 2019, Kharas 2017). As a consequence, large segments of the population have been able to integrate wellness goods and services into their daily consumption pattern. Moreover, there is an increasing recognition that wellness-oriented policies are needed to complement people's transitions toward improved and healthier lifestyles (ADB 2020). Given these developments, there is also growing demand for a framework by which to measure the wellness economy and to trace its evolution across countries and over time.

This section presents and discusses estimates of the wellness economy in selected countries in developing Asia using the procedures described in section II. The discussion in this section is outlined as follows: section III.A.1 discusses the size of wellness economy in aggregate and in per capita terms, while section III.A.2 highlights the structure and industry composition of the wellness sector. Section III.A.3 decomposes the wellness economy into forward and backward linkages, and wellness GFCF component. Finally, section III.A.4 presents the results of the hypothetical extraction method, where the wellness sector is hypothetically removed from the economy, and the resulting loss in GDP is calculated.

1. Size of the Wellness Economy

Table 1 shows the estimates of the wellness economy in ten of ADB's DMCs, as measured in millions United States dollars at constant 2010 prices. The wellness economies are calculated using equation (6). The estimates are presented for two periods for each country, and the annualized growth rate for each wellness economy is also shown in the last column. As a caveat, the estimates are dependent on the data sources used for disaggregation shown in Table A.3 in the appendix. Breaking down of national IOTs to disaggregate the wellness sector from the other sectors is implemented using Orbis firm-level data for the People's Republic of China (PRC), India, Philippines, Thailand, and Viet Nam. Supply table is used for Kazakhstan and Malaysia as these two countries have detailed products in their SUTs. When the other two sources are insufficient, the structure of donor country is used to approximate the disaggregation for another country. The choice is based on the similarity in economic structure (i.e., share of agriculture, industry, and services to GDP), level of development (i.e., income classification, HDI), geographic proximity, and historical context. Malaysia is used as the donor country both for Fiji and Sri Lanka, while the structure of the PRC is used for Mongolia.

Table 1: Size of the Wellness Economy for Selected Asian Countries
($ million, constant 2010 prices)

Country	Period 1	Period 2	Real Wellness GDP Growth Rate (annualized, %)	Real GDP Growth Rate (annualized, %)
Asia-10	756,800	1,460,166	10.7	7.2
Fiji	105	171	10.2	4.6
India	90,902	171,070	13.5	7.4
Kazakhstan	8,811	9,237	1.2	2.6
Malaysia	11,044	20,545	13.2	5.3
Mongolia	333	622	9.3	8.2
People's Republic of China	585,508	1,176,330	10.5	7.6
Philippines	14,410	21,802	8.6	6.6
Sri Lanka	8,783	9,351	1.3	4.3
Thailand	29,118	37,437	5.2	2.8
Viet Nam	7,786	13,601	11.8	6.2

GDP = gross domestic product.

Notes: Real GDP data are based on World Bank's estimates. The growth rate for Asia-10 is the average growth rate of all countries' wellness economies weighted by each one's real GDP in the second period. Periods: Fiji (2012, 2017); India (2012, 2017); Kazakhstan (2013, 2017); Malaysia (2010, 2015); Mongolia (2010, 2017); People's Republic of China (2010, 2017); Philippines (2012, 2017); Sri Lanka (2012, 2017); Thailand (2012, 2017); Viet Nam (2012, 2017).

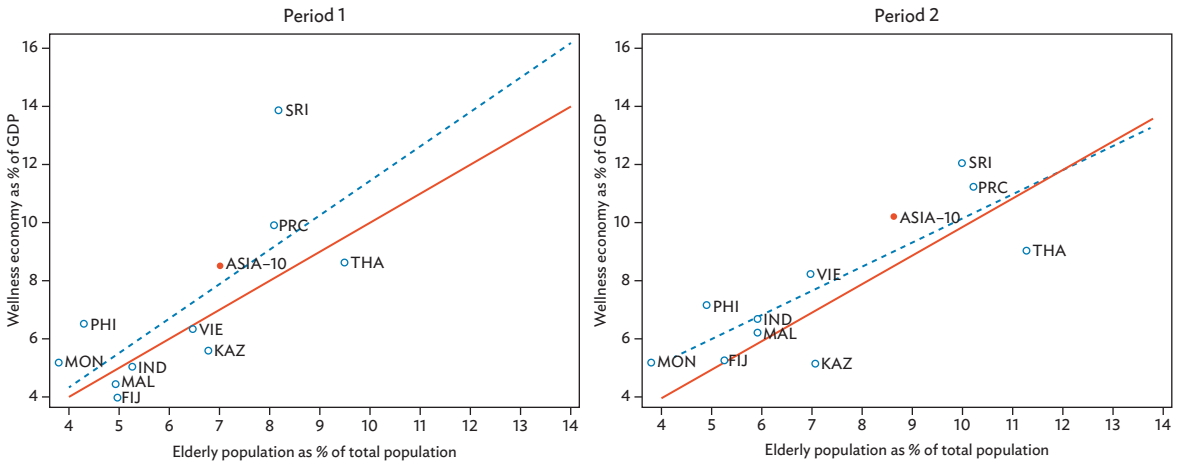
Source: Authors' calculations. Real GDP data are based on World Bank's estimates. The growth rate for Asia-10 is the average growth rate of all countries' wellness economies weighted by each one's real GDP in the second period.

Box: Wellness Economies and Aging

Intuitively, spending on wellness goods and services may share a relationship with a country's demographic structure. As the share of the elderly population increases, the demand for goods and services which constitute the wellness sector also increases. These include health-care services, residential care services, manufacture of pharmaceuticals, among other wellness products consumed by the elderly population. Hence, it is interesting to compare the size of wellness economy as a percentage share of GDP with the share of elderly population to the economy's total population, as shown in Box Figure 1 for each of the two periods.

In general, economies with higher percentage share of elderly population also have larger wellness economy as a percentage share of GDP (i.e., Sri Lanka, the People's Republic of China, and Thailand). In contrast, economies with lower percentage share of elderly population also have lower share of wellness economy as a percentage of GDP (i.e., Mongolia and Fiji). The upward-sloping fitted line suggests a positive correlation between wellness economy and aging. As a caveat, the scatterplot shown in the Box Figure 1 below does not imply causality. For comparison, a red line is also shown which indicates a one-to-one correlation between wellness economy as a percentage of GDP and elderly population as a percentage of total population. Notice that the fitted line deviates from the red line, indicating that there are factors, other than changes in the demographic structure that also influence the size of wellness economy.

Correlation between the Size of Wellness Economy and Aging



FIJ = Fiji, GDP = gross domestic product, IND = India, KAZ = Kazakhstan, MAL = Malaysia, MON = Mongolia, PHI = Philippines, PRC = People's Republic of China, SRI = Sri Lanka, THA = Thailand, VIE = Viet Nam.

Notes: Periods: FIJ (2012, 2017); IND (2012, 2017); KAZ (2013, 2017); MAL (2010, 2015); MON (2010, 2017); PHI (2012, 2017); PRC (2010, 2017); SRI (2012, 2017); THA (2012, 2017); VIE (2012, 2017).

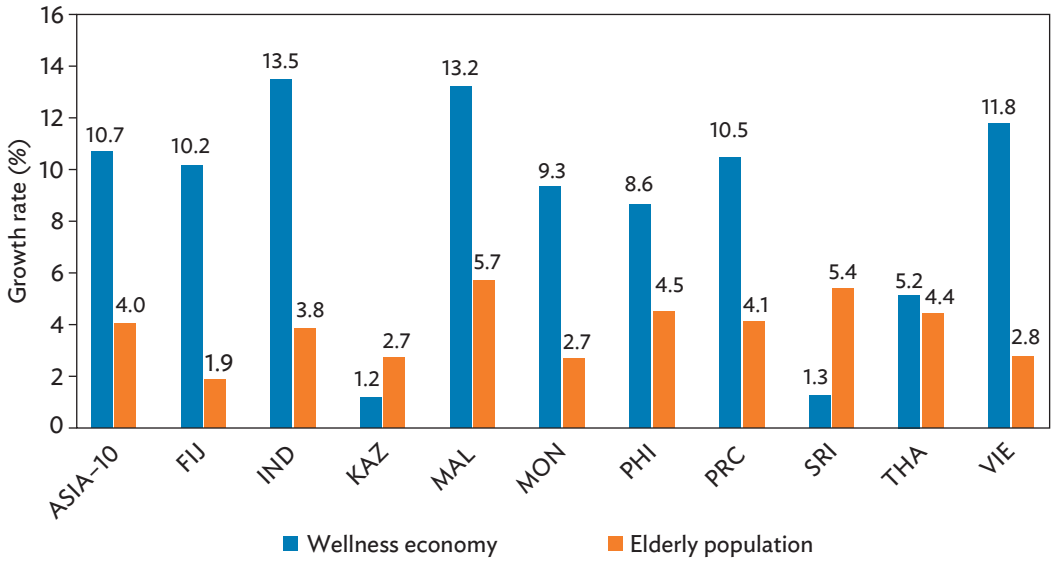
Source: Authors' calculation using demographic data from the online ADB Key Indicators Database. https://kidb.adb.org/kidb/ (accessed 28 October 2020).

continued on next page

Box continued

Alternatively, one can also compare the growth rate of wellness economy and the growth rate of elderly population between two periods, as illustrated in Box Figure 2. In Asia-10, the annualized growth rate of population aged 65 years and above is at 4%, which is far below the 10.7% annual rate of expansion of wellness economy in recent years. This pattern is observed for almost all of ADB DMCs. The most notable gap between growth rate of wellness economy and growth rate of elderly population is seen for India (13.5% vs. 3.8%), Viet Nam (11.8% vs. 2.8%), and Fiji (10.2% versus 1.9%). Meanwhile in the People's Republic of China, the annual growth rate of wellness economy is 10.5%, which also exceeds the 4.1% annual growth rate of elderly population.

Growth of Wellness Economy versus Growth of Elderly Population



FIJ = Fiji, IND = India, KAZ = Kazakhstan, MAL = Malaysia, MON = Mongolia, PHI = Philippines, PRC = People's Republic of China, SRI = Sri Lanka, THA = Thailand, VIE = Viet Nam.

Notes: Periods: FIJ (2012, 2017); IND (2012, 2017); KAZ (2013, 2017); MAL (2010, 2015); MON (2010, 2017); PHI (2012, 2017); PRC (2010, 2017); SRI (2012, 2017); THA (2012, 2017); VIE (2012, 2017).

Source: Authors' calculations. The estimates for Asia-10 are the weighted average growth rate for the 10 economies.

Overall, Box Figures 1 and 2 suggest that the increase in the size of wellness economy is also largely driven by factors other than the country's aging population. These factors capture shift in preferences which could relate to wellness consumption patterns as well as changes in behaviors toward healthy and well-rounded lifestyles.

Countries in developing Asia have made significant strides in the expansion of the wellness economy. In absolute terms, the PRC experienced the most significant expansion of the wellness economy, doubling its size from $585.5 billion to $1.18 trillion in just 7 years. This is equivalent to an average annual growth rate of about 10.5%. The annualized growth rate of the wellness economy has also been double digit for India (13.5%), Malaysia (13.2%), Viet Nam (11.8%), and Fiji (10.2%). If these growth rates are sustained, these countries' wellness economies can be expected to double in size in less than 7 years. Mongolia and the Philippines also experienced a significant increase in the size of the wellness economy, growing annually at an average of 9.3% and 8.6%, respectively. Together, these 10 economies demonstrate rapid growth, from an estimated $756.8 billion in the first period to $1.46 trillion in the second period in constant 2010 prices.[13]

Except for Kazakhstan and Sri Lanka, the estimated annual growth rate of the wellness economy is much higher compared to the growth of the entire economy. This implies that the expansion of the wellness economy generally outpaced the other sectors. In Malaysia, for example, the annualized growth rate of the wellness economy is 7.9 percentage points higher compared to the average annual growth of its real GDP. In India this difference is as much as 6.1 percentage points. The same pattern is also observed in the case of Fiji and Viet Nam, where the estimated growth of the wellness economy is at least 5.6 percentage points higher relative to the entire economy. For Mongolia, Thailand, the PRC, and the Philippines, the difference is between 1 to 3 percentage points. Collectively for Asia-10, wellness gross value added has expanded in recent years at an estimated average of 10.7% annually, which is 3.5 percentage points higher compared to the 7.2% annual expansion of its overall GDP in constant prices. These estimates are consistent with earlier findings from GWI (2018) which suggests that the expansion of the wellness economy is relatively faster than the expansion of the overall economy.

Table 2 shows the size of the wellness economy in per capita terms, expressed in United States dollars at constant 2010 prices. In this table, wellness is measured to take into account the differences in population. These estimates can be interpreted as the annual spending on wellness per individual. While the aggregate size of the wellness economy, shown in Table 1, is comparable for Malaysia and the Philippines in period 2, the corresponding estimates in per capita terms differ significantly. Malaysia's wellness per capita in 2015 is 3.3 times the wellness per capita in the Philippines in 2017, and the latter's estimate is much closer to that of Mongolia ($200) and Fiji ($195) in the more recent period.

Notably, wellness per capita spending is comparable for the PRC, Sri Lanka, and Thailand in period 1: $438 (2010), $430 (2012), and $429 (2012), respectively. However, stark differences are observed between their annual growth rates thereafter. Table 2 indicates that wellness per capita in Thailand grew at 4.7% annually, which is less than half the annual growth rate of wellness per capita in the PRC. In Sri Lanka, wellness per capita barely increased by $6 for a period of 5 years, while Kazakhstan experienced a $5 decline in wellness per capita between 2013 and 2017. In contrast, the double-digit annual growth rate in Malaysia and Viet Nam increased wellness per capita by $287 (73%) and $57 (65%), respectively, and each expansion occurred within a span of 5 years. Despite having a population comparable in size to that of the PRC, India's wellness per capita grew the fastest, expanding at an average annual growth rate of 12.2%—from $78 in 2012 to $128 in 2017.

[13] The two periods estimated for each country are not necessarily the same due to data limitations. However, looking at these figures together as a proxy for developing Asia can give an idea of how big the region's wellness economy has become. This is done by summing the GVA attributable to wellness for all countries and dividing by the sum of their total GVA in each of the two periods (Consing et al. 2020).

Table 2: Size of the Wellness Economy in Per Capita Terms for Selected Asian Countries
($, constant 2010 prices)

Country	Period 1	Period 2	Real wellness GDP Per Capita Growth Rate (annualized, %)	Real GDP Per Capita Growth Rate (annualized, %)
Asia-10	259	476	6.7	3.9
Fiji	122	195	9.9	4.3
India	72	128	12.2	6.2
Kazakhstan	517	512	(0.2)	1.2
Malaysia	392	679	11.6	3.8
Mongolia	122	200	7.2	6.1
People's Republic of China	438	848	9.9	7.1
Philippines	148	207	6.9	5.0
Sri Lanka	430	436	0.3	3.3
Thailand	429	541	4.7	2.4
Viet Nam	87	144	10.6	5.1

GDP = gross domestic product.

Notes: Population and Real GDP per capita data are based on World Bank's estimates. The wellness economy in per capita terms for Asia-10 is the average in each period weighted by each country's total population. The growth rate for Asia-10 is the average growth rate of all countries' wellness economies per capita weighted by each one's real GDP per capita in the second period. Periods: Fiji (2012, 2017); India (2012, 2017); Kazakhstan (2013, 2017); Malaysia (2010, 2015); Mongolia (2010, 2017); People's Republic of China (2010, 2017); Philippines (2012, 2017); Sri Lanka (2012, 2017); Thailand (2012, 2017); Viet Nam (2012, 2017).

Source: Authors' calculations.

2. Structure of the Wellness Sector

Figure 1 shows the structure of the GVA coming from just the wellness sector itself (also called the forward linkage as discussed in section II.E) for the selected ADB DMCs. This figure highlights the top five wellness industries for each country by year, as measured by their percentage share to total GVA from wellness industries. Results suggest that the top five wellness industries alone comprise at least 50% of the wellness sector for all countries. In most economies, the share of the top five wellness industries is as high as 80%. For example, in Fiji, the top five wellness industries comprise 82.3% of its wellness sector in 2012, which increased to 88% in 2017. This proportion was even higher in India for both years, at about 90%. In Kazakhstan, the top five wellness industries comprised 60.7% of its wellness sector in 2012, but this share declined to 53.7% in 2017, indicating that other wellness industries had increased their share to the country's GVA from wellness industries.

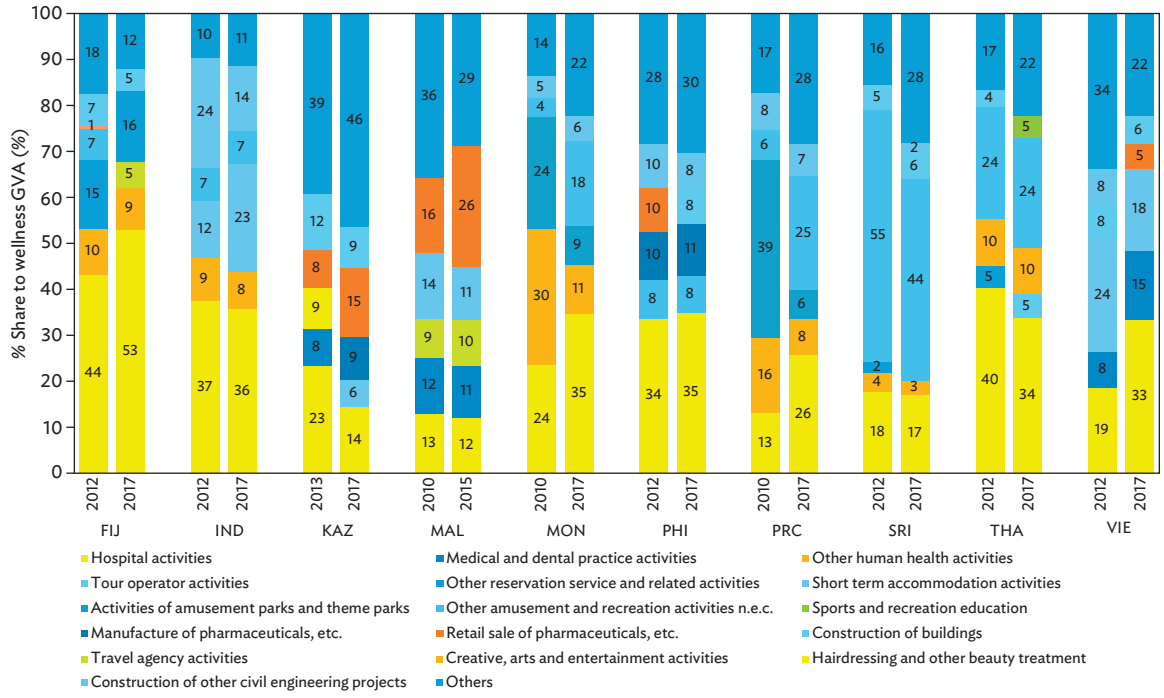
Most of the top five wellness industries consistently appear in both years, suggesting that there is no major change in the structure of the wellness sector between the two periods. In the PRC, health care-related services, amusement parks and other recreation activities, as well as wellness-related construction activities consistently appear in the top five wellness industries for both years. These industries also dominate the wellness sector in the case of Mongolia and India for both years. Meanwhile, Malaysia's wellness sector is dominated by retail of pharmaceutical goods, health care-related industries, as well as wellness tourism-related sectors including short-term accommodation and travel agency services. While these industries consistently dominate the country's

wellness sector, each industry's relative importance, expressed as a share of the wellness sector GVA, does not remain constant.

Health care-related industries consistently make up a large part of the wellness sector for all countries in both years. Specifically, hospital activities account for at least 10% of the wellness sector. This share is higher for Fiji, Mongolia, Philippines, Thailand, and Viet Nam, where hospital services alone comprise at least 30% of the country's wellness sector GVA, at least in the latter period. Including medical and dental practice industries, as well as other human health activities, health care-related industries comprise a significant portion of wellness sector, even accounting for over or nearly half of the wellness GVA in Fiji and Viet Nam.

In the case of the PRC, Sri Lanka, and Thailand, the biggest contributors to the wellness sector after human health activities are amusement and recreation activities. In Kazakhstan, Malaysia, and the Philippines, the biggest contributors, after human health activities, are those activities relating to the manufacture and retail trade of pharmaceutical products. In Fiji, India, and Viet Nam, tourism-supporting activities related to short-term accommodation are the biggest contributors after human health activities. Even when the size of wellness economies relative to total economies are similar for some ADB DMCs, their structures can vary significantly from one another.

Figure 1: Structure of the Wellness Sector: Share of the Top Five Wellness Industries
(as a % of wellness sector GVA)



FIJ = Fiji, GVA = gross value added, IND = India, KAZ = Kazakhstan, MAL = Malaysia, MON = Mongolia, PHI = Philippines, PRC = People's Republic of China, SRI = Sri Lanka, THA = Thailand, VIE = Viet Nam.

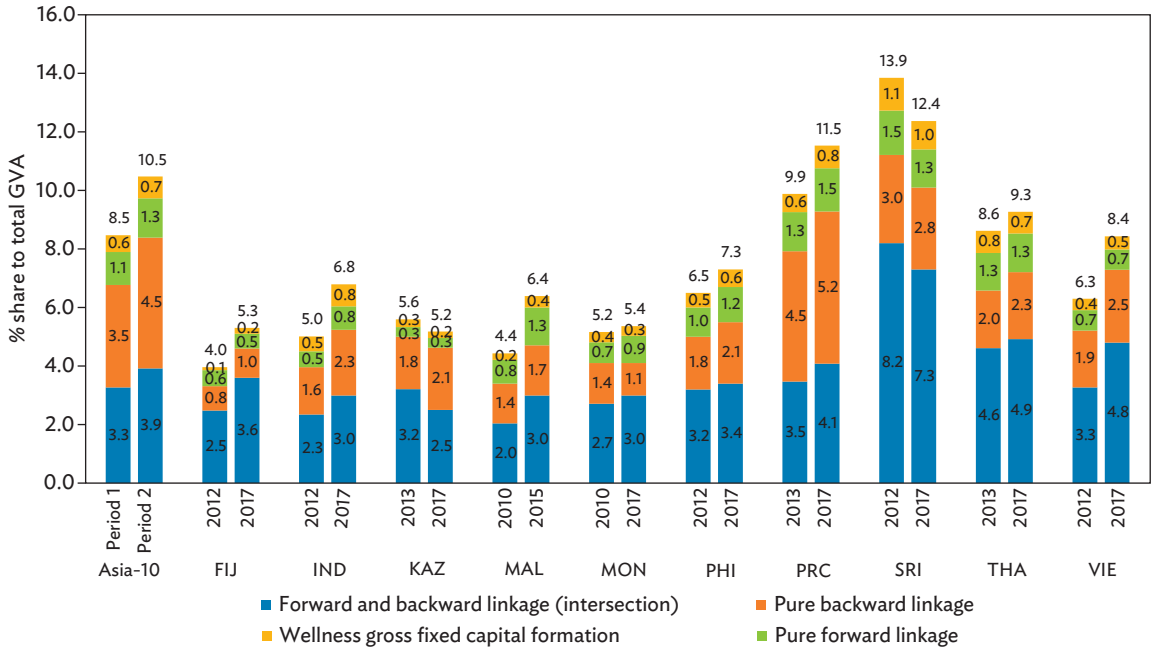
Source: Authors' calculations.

3. Forward and Backward Linkages

As discussed in the methodology, the production of the wellness sector is interconnected with other sectors in the economy through its forward and backward linkages. Here, the forward linkage refers to the GVA from wellness industries used in the production of all goods and services, and this corresponds to the first term in equation (6). Intuitively, production in the wellness sector and the demand for wellness goods and services used in the production of other goods and services (including within the wellness sector itself) move together. The length of the forward linkage of the wellness sector measures its relative significance in terms of the overall productive activities that the wellness sector could support (Miller and Blair, 2009).

On the other hand, the backward linkage refers to the GVA from all industries used in the production of wellness goods and services, and this corresponds to the second term in equation (6). Intuitively, a rise in the production in the wellness sector is associated with an increase in demand for goods and services used in the production of wellness goods and services. The length of the wellness sector's backward linkage can be interpreted as its relative importance in the economy in terms of the overall productive activities that it generates. The total linkage of the wellness sector is the sum of the sector's forward and backward linkages less their intersection (to remove the double-count). Figure 2 presents the estimates for these linkages in terms of their percentage share to the country's total GVA, as indicated by the bars of different colors.

Figure 2: Disaggregation of Wellness Economy by Country, by Period
(as % of GDP)



FIJ = Fiji, GDP = gross domestic product, GVA = gross value added, IND = India, KAZ = Kazakhstan, MAL = Malaysia, MON = Mongolia, PHI = Philippines, PRC = People's Republic of China, SRI = Sri Lanka, THA = Thailand, VIE = Viet Nam.

Source: Authors' calculations. The estimates for Asia-10 is the average GVA share to total GVA of each country weighted by each one's real GDP in the second period.

The orange bars represent the pure backward linkage, while the green bars represent the pure backward linkage. The blue bar indicates the intersection between forward and backward linkages, which is equivalent to the double-count. Hence, the pure backward linkage together with the intersection represent the total backward linkage. In the same manner, the pure forward linkage together with the intersection indicate the total forward linkage. Finally, yellow bars represent the gross fixed capital formation (GFCF) that is relevant to the wellness sector. Wellness GFCF represents the investments made by the economy for the future production of wellness goods and services, and this could be in the form of construction of buildings and infrastructure, purchase of machineries and equipment, or procurement of intellectual property rights. The total height of the bars indicates the size of wellness economy as a percentage of total GVA, corresponding to equation (6).

Figure 2 exhibits these estimates for ten ADB DMCs. With the exception of Sri Lanka and Kazakhstan, the share of the wellness economy increased between the two time periods for each country. As shown in Table 1, this translates to a wellness economy that generally expands faster than the total economy. Notice that the wellness economy's share in Sri Lanka and Kazakhstan actually decreased between the two time periods, and correspondingly, the wellness economy grew slowly relative to the total economy. In the PRC, the share of wellness economy increased from 9.9% (2010) to 11.5% (2017). Considering that the PRC has a population of more than 1.3 billion, and being one of the largest economies in the world, this rapid growth translates to a huge leap on the productive activities that constitute the wellness economy. It is also worth mentioning that India experienced a significant increase in the size of its wellness economy, growing from 5.0% to 6.8% of its GDP in just a span of 5 years.

For the four Southeast Asian economies included, the share of wellness economy is at least 6% in the latter period. In Thailand, the share of wellness gross value added increased from 8.6% (2012) to 9.3% (2017), while in the Philippines, the size of the wellness economy grew from 6.5% (2012) to 7.3% (2017). Viet Nam and Malaysia experienced sharp increase in the size of wellness economy. In Viet Nam, this share increased from 6.3% (2012) to 8.4% (2017), while in Malaysia, the share of wellness economy grew from 4.4% (2010) to 6.4% (2015).

Mongolia's share of wellness GVA moderately increased by 0.2 percentage point, from 5.2% in 2010 to 5.4% in 2017. Likewise, the share of wellness GVA in Fiji increased from 4.0% in 2012 to 5.3% in 2017. In Sri Lanka, the share of wellness GVA is 13.9% in 2012. This share had moderately declined by 1.5 percentage points in 2017. The same trend is observed in the case of Kazakhstan, where the wellness economy moderately shrank by 0.4 percentage point, from 5.6% in 2013 to 5.2% in 2017. The decrease in the share of wellness economy for these two countries, however, does not imply that the levels of wellness GDP decreased over time. Rather, this trend only indicates that the rest of the economy grew faster than the wellness economy.

Results indicate that the backward linkage of the wellness sector is longer than its forward linkage for all countries for both periods. In the context of input–output analysis, a strong backward linkage is indicative of heavy reliance on interindustry supply. This is usually evident in the case of services sector, where inputs from other industries are required for its production. Since a huge proportion of wellness economy is comprised of services, as in health care, amusement and entertainment, and tourism activities, the interconnection with the upstream sectors is also expected to be much more significant compared to the downstream sectors. The gap between the backward linkage and the forward linkage is largest in the case of the PRC for both periods, between which it increased. This reflects the "rebalancing of the economy" in the PRC, where services sector now comprising a bigger share of the economy than industry (World Bank 2017).

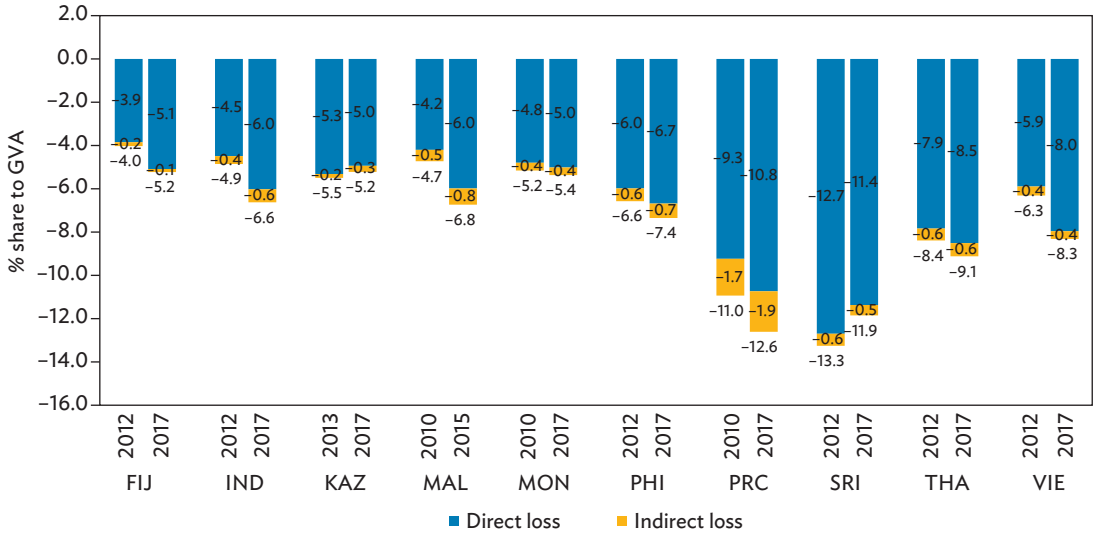
Finally, wellness GFCF as a percentage of GVA is largest in Sri Lanka (1.1% in 2012, and 1% in 2017). This reflects the economic boost driven by the public investment to rebuild after ending its 3-decade conflict in 2009. However, this source of growth is not sustainable in the long run (World Bank 2015), which could also explain the declining share of wellness GFCF in the latter period. In the other economies, the share of wellness GFCF is less than 1%. In level, the PRC's wellness GFCF stands at $95.1 billion in 2017, and this is more than three times higher than the wellness GFCF of the other nine economies combined.

4. Hypothetical Extraction of the Wellness Sector

The hypothetical extraction of the wellness sector allows us to gauge its relative importance to the country's total economy. In this process, both the backward and forward linkages of wellness sector are nullified, creating a hypothetical scenario where the wellness-producing and wellness-supporting industries are inexistent. This method therefore measures how much of the country's GDP is lost when the wellness sector is extracted, both directly and indirectly.

Figure 3 illustrates the results of the hypothetical extraction method as applied to ten of ADB's DMCs. The estimated loss from nullifying the wellness sector is expressed as a percentage of GDP, decomposed into direct and indirect loss as described in equation (14). The direct loss is exactly the same as the sum of the forward and backward linkages, less the double-count, as shown in Figure 2. Results consistently indicate that the GDP lost is greater than the share of wellness to GDP. That is, extracting wellness economy has a synergistic effect on the economy, as it does not only directly remove the contribution of the wellness sector to the gross value added, but it also entails some decline in the output of other sectors. Notice that the indirect GDP loss is largest in the PRC, where it accounts for 1.7% in 2010, and 1.9% in 2017. For the rest of the economies, the indirect loss is less than 1%, ranging from 0.1% to 0.7%.

Figure 3: Decomposition of Gross Domestic Product Loss When Wellness Sector is Extracted by Country, by Period
(as % of GDP)



FIJ = Fiji, GDP = gross domestic product, GVA = gross value added, IND = India, KAZ = Kazakhstan, MAL = Malaysia, MON = Mongolia, PHI = Philippines, PRC = People's Republic of China, SRI = Sri Lanka, THA = Thailand, VIE = Viet Nam.
Source: Authors' calculations.

Table 3 shows the decomposition of GDP loss into direct and indirect loss. The latter is further disaggregated into own-industry elasticity effects and cross-industry elasticity effects. In all economies, own-industry elasticity effect is less than 0.1% of GDP for both periods. The aggregated cross-industry elasticity effect is much higher relative to own-industry elasticity effect, reaching as much as 1.85% of GDP as in the case of the PRC. Except for Fiji and Kazakhstan, cross-industry elasticity for the other economies ranges between 0.33% and 0.73% of GDP. Together, these elasticity effects could also be interpreted as the extent of interdependence of the other sectors when the wellness sector is hypothetically extracted in the economy.

Table 3: Decomposition of Gross Domestic Product Loss When Wellness Sector is Extracted
(as % of GDP)

Country	Period	Total Loss	Direct Loss	Indirect Loss	Own-Elasticity Effect	Cross-Elasticity Effect
Fiji	2012	4.04	3.86	0.18	0.00	0.18
	2017	5.24	5.10	0.14	0.00	0.14
India	2012	4.87	4.50	0.37	0.00	0.37
	2017	6.64	6.04	0.60	0.01	0.60
Kazakhstan	2012	5.51	5.33	0.18	0.01	0.18
	2017	5.23	4.95	0.28	0.02	0.26
Malaysia	2010	4.73	4.21	0.53	0.01	0.52
	2015	6.74	6.00	0.75	0.02	0.73
Mongolia	2010	5.17	4.81	0.36	0.02	0.34
	2017	5.37	5.03	0.35	0.02	0.33
People's Republic of China	2012	10.96	9.26	1.70	0.02	1.68
	2017	12.64	10.76	1.18	0.03	1.85
Philippines	2012	6.66	6.00	4.28	0.04	0.55
	2017	7.26	6.70	0.67	0.07	0.60
Sri Lanka	2012	13.30	12.73	3.83	0.03	0.53
	2017	11.89	11.40	0.48	0.02	0.46
Thailand	2012	8.40	7.86	0.55	0.01	0.54
	2017	9.15	8.53	5.04	0.01	0.60
Viet Nam	2012	6.33	5.91	7.08	0.01	0.41
	2017	8.33	7.98	0.36	0.01	0.35

GDP = gross domestic product.
Source: Authors' calculations.

B. Wellness Employment

As discussed in the previous section, the wellness economy has a sizeable contribution to the GDP of developing economies in Asia. Hence, it should also be expected that the wellness economy generates and supports a significant portion of the overall employment. This section delves into this empirical inquiry by quantifying the size of the wellness employment in terms of the number of jobs attributable to the wellness economy (section III.B.1). Moreover, this section compares the labor productivity in the wellness economy (section III.B.2), and presents the decomposition of the wellness employment into forward and backward linkages to quantify the relative size of employment which are directly or indirectly generated by the wellness sector (section III.B.3). Finally, employment loss from a hypothetical extraction of the wellness economy is also examined, as an alternative measure for the relative significance of the wellness economy in the overall employment (section III.B.4).

1. Size of Wellness Employment

Table 4 shows the estimated wellness employment for each country and time period, containing the jobs that are both directly and indirectly attributable to the production of wellness goods and services. The annualized growth rate of wellness employment is also included in the third column where it can be compared with the growth rate of total employment for each country. Further insights on the wellness sector's economic relevance may be derived from this. Malaysia's wellness employment had the largest increase from 595,000 in 2010 to 1.6 million in 2015, and this is followed by the PRC where wellness employment grew from 58.7 million in 2010 to 118.5 million in 2017. Both countries experienced double-digit wellness employment growth rates of 21.9% and 10.5%, respectively. India's wellness employment also experienced significant growth at 7.7% annually, from 21.4 million in 2012 to 30.6 million in 2017. Generally, the economies of Asia-10 have experienced a positive growth in wellness employment across the two time periods estimated in each. Collectively, wellness employment in Asia-10 expanded from 88.1 million to 159.4 million between the two periods estimated, increasing at an annual growth rate of 9.7%.

Except for Malaysia and the PRC, the growth of wellness GVA is generally faster than the growth of wellness employment. Collectively for Asia-10, the weighted average annual growth rate of wellness gross value added is one percentage point higher than the weighted average annual growth rate of wellness employment. This indicates growth in labor productivity within the wellness economy in recent years, consistent with what is shown in Table 3 for most of ADB DMCs. Labor productivity in the wellness economy increased from $8,594 to $9,160 for Asia-10, ranging from $4,903 (Viet Nam) to as high as $18,891 (Sri Lanka) in period 2. The structure of the wellness sector may explain the variation in labor productivity across countries. For example, industries such as the manufacturing of pharmaceutical goods may be more productive than retail trade services.

Table 4: Wellness Employment for Selected Asian Countries
(Thousands)

Country	Period 1	Period 2	Wellness Employment Growth Rate (annualized, %)	Employment Growth Rate (annualized, %)
Asia-10	88,059	159,410	9.7	0.2
Fiji	10	13	5.4	2.9
India	21,139	30,628	7.7	(0.1)
Kazakhstan	634	654	0.8	0.0
Malaysia	595	1,600	21.9	3.4
Mongolia	63	91	5.4	2.6
People's Republic of China	58,742	118,536	10.5	0.3
Philippines	1,959	2,292	3.2	1.4
Sri Lanka	487	495	0.3	1.5
Thailand	2,049	2,327	2.6	(0.8)
Viet Nam	2,381	2,774	3.1	1.1

Notes: The growth rate for Asia-10 is the average growth rate of all countries' wellness employed weighted by each one's total employment in the second period. Periods: Fiji (2012, 2017); India (2012, 2017); Kazakhstan (2013, 2017); Malaysia (2010, 2015); Mongolia (2010, 2017); People's Republic of China (2010, 2017); Philippines (2012, 2017); Sri Lanka (2012, 2017); Thailand (2012, 2017); Viet Nam (2012, 2017).
Source: Authors' calculations.

2. Wellness Economy Labor Productivity

Table 5 compares wellness economy labor productivity, expressed as wellness economy GDP per worker in the wellness economy, to economywide labor productivity, expressed as total GDP per worker in the economy, as indicated by the ratios shown in the last two columns. A ratio greater than 1 indicates that wellness labor productivity is stronger than overall labor productivity. Conversely, a ratio less than 1 indicates that wellness labor productivity is weaker than overall labor productivity, such as in Kazakhstan, Malaysia, Mongolia, and the PRC in the second period.

Generally, it cannot be concluded with high certainty what the causes of these ratios are due to the limited data and sample size. Theoretically, however, there may be several explanations for these ratios. Countries with ratios less than 1 may have sufficiently advanced industrial or manufacturing sectors that produce high-value goods with relatively few laborers, and therefore workers in the wellness sector, whose goods are typically service oriented, might not be as productive relative to that. The reverse scenario implies a similar logic for the wellness sector where, supposing that its structure is oriented toward high-value goods and services that require relatively low labor, a ratio greater than 1 may arise. Similarly, countries with underdeveloped industrial sectors or are otherwise services oriented may have the average laborer being similar in productivity to workers in the wellness economy. Employment populations may also differ fundamentally between a country's wellness economy and its overall economy due to other factors and unique social conditions that are difficult to observe or measure quantifiably.

Table 5: Wellness Economy Labor Productivity for Selected Asian Countries
($, constant 2010 prices)

	Wellness Economy Labor Productivity		Ratio of Wellness Economy Labor Productivity to Total Economy Labor Productivity	
	Period 1	Period 2	Period 1	Period 2
Asia-10	8,594	9,160	1.3	0.9
Fiji	10,540	13,158	1.0	1.1
India	4,300	5,585	1.1	1.0
Kazakhstan	13,897	14,124	0.7	0.6
Malaysia	18,561	12,841	0.9	0.5
Mongolia	5,286	6,837	0.8	0.7
People's Republic of China	9,967	9,924	1.2	0.8
Philippines	7,356	9,512	1.3	1.3
Sri Lanka	18,034	18,891	2.0	1.9
Thailand	14,211	16,088	1.5	1.4
Viet Nam	3,270	4,903	1.3	1.5

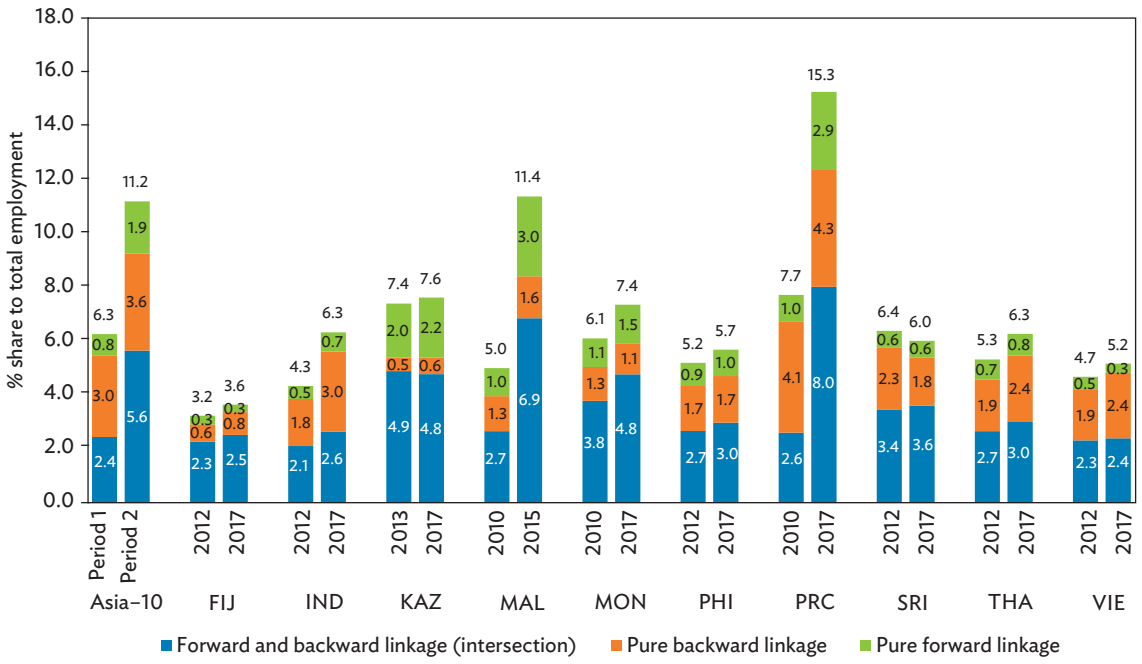
Note: Overall labor productivity are calculated as the ratio between Real GDP (in $, constant 2010) and total employment using World Bank data. Periods: Fiji (2012, 2017); India (2012, 2017); Kazakhstan (2013, 2017); Malaysia (2010, 2015); Mongolia (2010, 2017); People's Republic of China (2010, 2017); Philippines (2012, 2017); Sri Lanka (2012, 2017);Thailand (2012, 2017); Viet Nam (2012, 2017).
Source: Authors' calculations.

3. Wellness Employment: Forward and Backward Linkages

Figure 4 shows the disaggregation of wellness employment in terms of its forward and backward linkages. Forward linkage captures the number of jobs that are directly generated by the wellness sector, while backward linkages captures the employment that are indirectly attributed to the wellness industries, as these jobs are generated by other sectors that support wellness industries. The blue bars represent the intersection between forward and backward linkages (equivalent to what is double-counted applying the methodology). The orange bars represent the pure backward linkages, while the green bars represent the pure forward linkages. The cumulative height of the three bars is the percentage share of wellness employment to the country's total employment.

In general, the percentage share of wellness employment to total employment increased for each country over the two time periods estimated. The sharpest rise is seen in the case of the PRC and Malaysia, increasing by 7.5 and 6.4 percentage points, respectively. For other countries in Asia-10, wellness employment's contribution varies between 3.6% to 7.6% of total employment by the second period. Collectively, Asia-10's share of wellness employment increased rapidly between the two periods, from 6.3% to 11.2% of total employment in the region, primarily driven by the steep increase of wellness employment in the PRC. It is also observed that the backward linkage is generally higher than the forward linkage, indicating that much of the employment attributable to wellness comes from the industries supporting the wellness sector. This is generally consistent with the results shown in Figure 2, where wellness-supporting industries are shown to account for a larger share of the wellness economy relative to the wellness sector itself.

Figure 4: Disaggregation of Wellness Employment by Country, by Period
(as % of GDP)



FIJ = Fiji, GDP = gross domestic product, IND = India, KAZ = Kazakhstan, MAL = Malaysia, MON = Mongolia, PHI = Philippines, PRC = People's Republic of China, SRI = Sri Lanka, THA = Thailand, VIE = Viet Nam

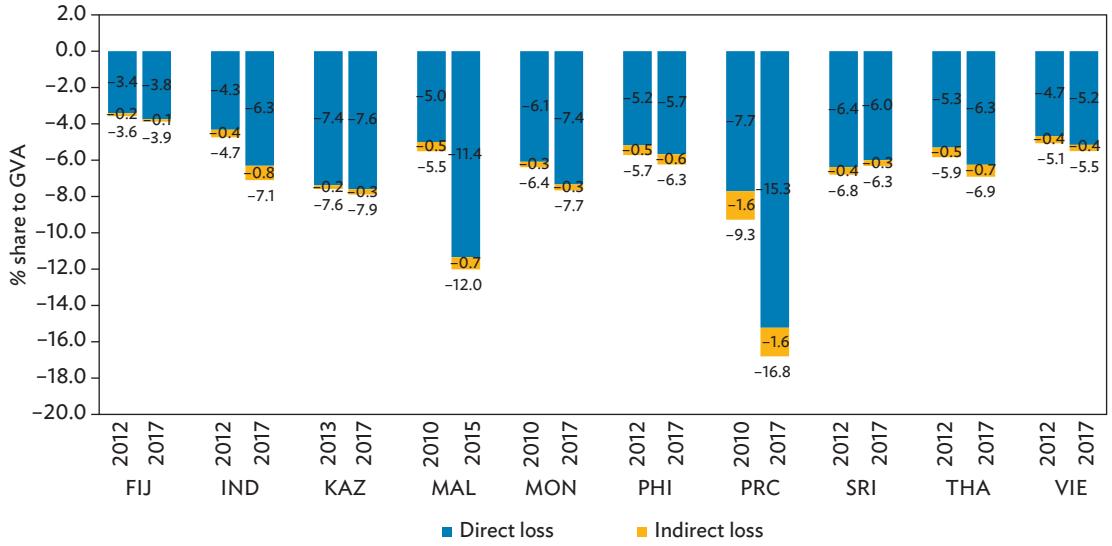
Source: Authors' calculations. The estimates for Asia-10 is the average wellness employment share of each country weighted by each one's total employment in the second period.

4. Potential Employment Losses from Hypothetical Extraction

Similar to section III.A.4, the relative importance of the wellness sector is also measured in terms of the estimated employment loss from its hypothetical extraction. In this process, all linkages relating to the wellness economy are nullified to measure how many jobs will be lost when both forward and backward linkages of the wellness sector are extracted.

Employment loss from the hypothetical extraction of the wellness sector is shown in Figure 5. Results are expressed as a percentage of total employment, and are decomposed into direct and indirect loss, similar to what is shown in Figure 3. Note that the direct loss, as indicated by the blue bars, is equivalent to the percentage share of wellness employment to total employment shown in Figure 4. Similar to the results of the hypothetical extraction method as applied to GDP, employment loss as a percentage of total employment is higher than the share of wellness employment to total employment. The difference constitutes the indirect loss, as indicated by the orange bars. The wellness employment loss as a percentage of total employment is highest for the PRC at 16.8% (2017), and Malaysia at 12.0% (2015). For the rest of Asia-10, wellness employment loss as a percentage of total employment ranges from 3.9% (Fiji) to 7.9% (Kazakhstan), in the second period.

Figure 5: Decomposition of Employment Loss When Wellness Sector is Extracted by Country, by Period
(as % of total employment)



FIJ = Fiji, GVA = gross value added, IND = India, KAZ = Kazakhstan, MAL = Malaysia, MON = Mongolia, PHI = Philippines, PRC = People's Republic of China, SRI = Sri Lanka, THA = Thailand, VIE = Viet Nam.

Source: Authors' calculations.

The decomposition of indirect wellness employment into own-industry elasticity and cross-industry elasticity effects is further detailed in Table 6. Results show that own-industry elasticity effects range from 0% (Fiji) to 0.05% (Philippines), while cross-industry elasticity effects range from 0.14% (Fiji) to 1.56% (PRC).

Together, the own-industry elasticity and cross-industry elasticity effects are the reason why estimated employment losses from hypothetical extraction of the wellness sector in Table 6 are greater than just the employment attributable to the wellness economy. The own-elasticity effect is the additional loss in employment caused by greater sensitivity of nonwellness sectors' outputs (and therefore employment) to declines in each one's *own* final demand post-extraction than pre-extraction. The cross-elasticity effect is the additional loss in employment caused by greater sensitivity of nonwellness sectors outputs to declines in *each other's* final demand post-extraction than pre-extraction. Since production declines beyond the production attributable to the wellness economy in the current period as shown in the estimated GDP losses from section III.A.4, the corresponding estimates on employment losses are correspondingly severe.

Table 6: Decomposition of Employment Loss When Wellness Sector is Extracted
(as % of total employment)

Country	Period	Total Loss	Direct Loss	Indirect Loss	Own-Elasticity Effect	Cross-Elasticity Effect
Fiji	2012	3.59	3.43	0.16	0.00	0.16
	2017	3.89	3.75	0.14	0.00	0.14
India	2012	4.75	4.34	0.41	0.01	0.40
	2017	7.12	6.33	0.80	0.01	0.78
Kazakhstan	2012	7.61	7.40	0.21	0.01	0.20
	2017	7.91	7.62	0.29	0.01	0.28
Malaysia	2010	5.52	5.01	0.51	0.01	0.50
	2015	12.04	11.37	0.67	0.01	0.65
Mongolia	2010	6.40	6.10	0.30	0.01	0.29
	2017	7.69	7.36	0.33	0.01	0.32
People's Republic of China	2012	9.30	7.72	1.58	0.02	1.56
	2017	16.84	15.27	1.57	0.02	1.55
Philippines	2012	5.74	5.20	0.54	0.03	0.51
	2017	6.26	5.68	0.57	0.05	0.52
Sri Lanka	2012	6.82	6.39	0.43	0.02	0.41
	2017	6.33	6.02	0.31	0.01	0.30
Thailand	2012	5.85	5.32	0.53	0.01	0.53
	2017	6.93	6.27	0.66	0.01	0.65
Viet Nam	2012	5.08	4.68	0.40	0.02	0.38
	2017	5.52	5.17	0.35	0.01	0.34

Source: Authors' calculations.

IV. CONCLUSION AND MOVING FORWARD

This paper contributes to the literature on wellness economics and national accounting by showing how the SNA framework can be used to estimate the economy attributable to the production of wellness goods and services and then applying this methodology to selected countries in developing Asia. Through input–output analysis, it is possible to derive the production and employment linkages between the wellness sector and nonwellness sectors, the potential production and employment losses that may arise if the wellness sector were hypothetically extracted from the economy, and how these two sets of estimates relate to one another. Theoretically, this means that any country whose economic accounting is consistent with the SNA framework can estimate the economic relevance of its wellness sector. This in turn creates fertile new ground in the field of wellness economics as new

data create new possibilities for research and, eventually, policies to promote wellness. As estimates for more countries are produced over time, it becomes feasible to generate reliable figures at the regional, and eventually, global level.

Nevertheless, there are ways to improve the quality of wellness economy estimation within the SNA framework. The main challenges are data related. Firstly, there would be no need for disaggregation if each country's IOT were highly detailed, ideally with rows and columns for all 4-digit ISIC rev. 4 codes. In practice, however, a balanced IOT of such a size would be costly to produce. A second-best scenario would be for each country's IOT to contain rows and columns corresponding to at least the 4-digit codes covering the production of wellness goods and services, such as those listed in Table A.1. A similar prescription applies when estimating wellness employment as employment numbers are needed for each industry in the IOT in order to estimate the wellness economy's contribution to overall employment.

Secondly, while the selected ISIC codes provide a basis for estimating the wellness economy, the process of drawing out the corresponding GVA from available SNA components often differ in practice between countries due to nonuniformity in the level of detail and aggregation. Access to highly detailed supply tables and nationally representative firm-level data on output would allow for more reliable disaggregation of IOTs when needed, and uniformity in the level of aggregation across countries would allow for better comparisons in wellness economy estimates between countries and across time.

Fortunately, uniformity can be achieved through the use of national IOTs derived from regional IOTs such as the World Input–Output Tables and the ADB Multiregional Input–Output Tables which provide annual national accounts data at a uniform level of detail for a multitude of countries across time. While the level of detail per country is highly aggregated under these regional IOTs, the fact that they are uniform in detail means that they may be subjected to a uniform process of disaggregation and allow for more reliable cross-country analyses.

APPENDIX

Table A.1: List of Industries and Activities Considered Part of the Wellness Economy

ISIC Rev.4 Code	ISIC Industry	Wellness-Related Activities
2023	Manufacture of soap and detergents, cleaning and polishing preparations	Only activities related to the manufacture of personal care items (e.g., beauty, sunburn, manicure preparations, etc.)
2100	Manufacture of pharmaceuticals, medicinal chemical and botanical products	All activities related to the manufacture of pharmaceutical, medicinal, and botanical products
3012	Building of pleasure and sporting boats	All activities related to the manufacture of boats for recreation and wellness purposes
3230	Manufacture of sports goods	All activities related to the manufacture of sporting goods
4100	Construction of buildings	All activities related to the construction of wellness-related and indoor-sports facilities
4290	Construction of other engineering projects	All activities related to the construction of outdoor wellness and sports facilities
4721	Retail sale of food in specialized stores	All retail sale activities of fruits and vegetables
4763	Retail sale of sporting equipment in specialized stores	Retail sale of sporting and wellness-related goods
4772	Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles in specialized stores	Retail Sale of pharmaceuticals and cosmetic articles
5510	Short-term accommodation activities	Includes only the provision of short-term accommodation for holiday, wellness, and recreation purposes.
5520	Camping grounds, recreational vehicle parks and trailer parks	Includes only the provision of accommodation in recreational camps and facilities
7721	Renting and leasing of recreational and sports goods	Includes activities involving the rental and leasing services of recreational and wellness-related sports goods
7911	Travel agency activities	Includes activities of agencies engaged in selling of wellness travel, tour, transportation, and accommodation services
7912	Tour operator activities	Includes activities of agencies engaged in arranging and assembling wellness-related tours
7990	Other reservation service and related activities	Other provisional wellness-travel reservation activities not included in 7911 and 7912
8130	Landscape care and maintenance service activities	All service activities related to landscape care and maintaining wellness spaces
8541	Sports and recreation education	Education services related to the pursuit of sports, recreation, and wellness (e.g., yoga, martial arts, etc.)
8610	Hospital activities	All activities
8620	Medical and dental practice activities	All activities

ISIC Rev.4 Code	ISIC Industry	Wellness-Related Activities
8690	Other human health activities	All activities
8710	Residential nursing care facilities	All activities
8720	Residential care activities for mental retardation, mental health and substance abuse	All activities
8730	Residential care activities for elderly and disabled	All activities
8890	Other social work activities without accommodation	All other social work activities without accommodation aimed at improving wellness
9000	Creative, arts and entertainment activities	All creative, arts and entertainment services aimed at improving wellness
9101	Library and archive activities	Activities related to the operation of libraries
9102	Museum activities and operation of historical sites and buildings	Activities related to the operation of wellness-related sites (e.g., spiritual spaces, museums, etc.)
9103	Botanical and zoological gardens and nature reserves activities	All activities related to the operation of wellness-inducing sites (e.g., botanical gardens, etc.)
9311	Operation of sports facilities	All activities related to the operation of sports facilities
9312	Activities of sports clubs	All activities related to the operation of sports clubs promoting fitness
9319	Other sports activities	All other fitness related activities excluded in 9311 and 9312
9321	Activities of amusement parks and theme parks	All activities related to the operation of amusement and theme arks
9329	Other amusement and recreation activities, n.e.c.	All other wellness-related activities excluded in 9321
9602	Hairdressing and other beauty treatment	All activities aimed at promoting beauty and wellness
9609	Other personal service activities, n.e.c.	All activities of Turkish baths, sauna and steam baths, solarium, salons etc.

ISIC = International Standard Industrial Classification of All Economic Activities, n.e.c.= not elsewhere classified.

Source: United Nations. 2008. *System of National Accounts.* New York.

Table A.2: Data Sources

Country	Table	Years Available	Dimension of Tables	Source
Fiji	IOT	2012,2017	35 x 35	ADB
India	IOT	2012,2017	35 x 35	ADB
Kazakhstan	SUT	2013, 2017	698 x 114	KAZ SC
Malaysia	SUT	2010, 2015	68 x 86; 124 x 124	ADB; DOSM
Mongolia	IOT	2010, 2017	35 x 35	ADB
People's Republic of China	IOT	2010, 2017	35 x 35	ADB
Philippines	IOT	2012, 2017	35 x 35	ADB
Sri Lanka	IOT	2012, 2017	35 x 35	ADB
Thailand	IOT	2012, 2017	35 x 35	ADB
Viet Nam	IOT	2012; 2017	35 x 35	ADB

ADB = Asian Development Bank, DOSM = Department of Statistics Malaysia, IOT = input–output table, KAZ SC = Agency of the Republic of Kazakhstan on Statistics, SUT = supply and use table.

Source: Authors' compilation.

Table A.3: Data Sources for Input–Output Table Disaggregation

Country	Source of Disaggregators
Fiji	Structure of donor country (MAL)
India	Firm-level data (Orbis)
Kazakhstan	Supply table
Malaysia (MAL)	Supply table
Mongolia	Structure of donor country (PRC)
People's Republic of China (PRC)	Firm-level data (Orbis)
Philippines	Firm-level data (Orbis)
Sri Lanka	Structure of donor country (MAL)
Thailand	Firm-level data (Orbis)
Viet Nam	Firm-level data (Orbis)

Source: Authors' compilation.

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The Wellness Economy

A Comprehensive System of National Accounts Approach

This working paper explains how to derive indicators for a country's wellness sector using the system of national accounts framework. It also provides estimates of these indicators for 10 countries in developing Asia across 2 time periods. Estimates include the wellness sector's production and employment linkages with nonwellness sectors and potential losses in production and employment if the wellness sector were hypothetically extracted from each economy.

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