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Human Capital Accounting and the System of National Accounts Extension

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ABSTRACT

With the increasing importance of human capital in the development of the economy and society, it is logical to introduce human capital into the System of National Accounts (SNA). Based on the theory of human capital and the criterion of SNA (1993), this paper discusses the feasibility and the inevitability to move human capital as an asset in SNA. This change to the SNA indicates that the SNA production boundary should be revised to include the production of human capital. The paper explores how to account human capital, the changes of relative accounts within SNA, and the input-output changes.

INTRODUCTION

A report about the System of National Accounts (SNA) extension from London in May 2003 (Hill 2003) represented the inevitability for incorporating human capital within the SNA. Indeed, the development of a modern economy and a civilisation for the 21st century has entered a development period based on human capital (Davis & Noland 2001, Wang 2001, Nujoma 2003). Underpinning this perspective is the notion that the growth rate of per capital income depends on the growth rate of human capital (Lucas 1988). Due to consensus about the important position of human capital in the development of an economy, Human Capital Theory is attracting unprecedented interest, and so traditional accounting, labour economics, demographics and pedagogy are quickly evolving in response to the introduction of Human Capital Theory (Li 2000). Nevertheless, the SNA, as the international standard of National Accounting, and the guide for unifying economic analysis (Zeng 1997), focuses on tangible assets accounting, such as equipment, material, and consumer goods, with no concern for intangible assets (United Nations 1968). Until revision in 1993, the SNA included some creative works as assets, for example, software, writings and musical compositions (SNA 1993). However, it still did not include technical inventions, human capital and knowledge assets. Some researchers (Kuznets 1946, Xu 1999, Zhuang & Guo 2003) have identified this problem in the classical national accounts and propose the introduction of human capital into the SNA. However, there has been slow progress in the adoption of these notions because of the particularity and complexity in defining and assessing human capital. In 1995, when the World Bank computed national new wealth, it assessed human capital stock according to the logic of residual method and did not make use of the emergent SNA theory and method to systematically calculate human capital (Dai 1999).

Arguably, it is rational to introduce human capital into SNA, and accordingly, to have a series of effective accounting methods to apply. This paper first presents the concept of human capital and then discusses the feasibility and inevitability of moving human capital inside SNA as an asset based on the theory of human capital and the criterion of SNA 1993. This criterion indicates that the production boundary of the SNA requires revision to include the production of human capital. This paper discusses in succession the three main indicators, which account for human capital production.

1. The value added to human capital.
2. The output of human capital.
3. The intermediate consumption invested for the outputs.

Subsequently, the paper evaluates the changes in the incorporation of human capital in SNA accounts and in the input– output network. Finally, the paper briefly discusses the results and in conclusion promotes ideas for future SNA directions.

HUMAN CAPITAL AND EXTENSION OF SNA PRODUCTION BOUNDARY

Undoubtedly, in modern economic theory Human Capital Theory is one of the important theoretical foundations to account for the human capital dimension. However, the extensive definitions of human capital create accounting obstacles. Therefore, it is necessary to categorise the various definitional notions to identify a practical definition for human capital.

Presently, there are three basic views for the notion of human capital. The first is the investing view, which conceives that human capital is the result of investment, and so the human capital value is the expenditure that is invested to enhance personal physical strength and intelligence, and acquire knowledge and skills (Schultz 1961). The second is the view of part outputs, which conceives that human capital is proprietary knowledge, and skill, experience and the relevant workplace competencies of managers and technical innovators (Weijie & Zhao 2001). The third is the holistic output view, which conceives human capital as the total value of personal physical strength, intelligence, and knowledge and skills for utilisation. The total output is the sum of labour abilities of a particular population (Wang, Xu & Zhao 2005). This paper provides support for the third view, namely, that human capital is the labour ability of any person. Thus, human capital is not limited only to managers or technical personnel. More specifically, human capital is the output formed by the investment, the form is intangible, and its value is not what has been invested, but the worth

of ' output' .

The key premise is to match the standard of SNA while bringing the human capital concept into SNA. The general production defined by SNA 1993 includes the activity of producing goods and services through making use of the inputs of labour, capital, and other organisational resources, with the produced goods and services sold in the market, or at least be transferred (paid or free) from one organisation to another. The assumption is that human capital does not come innately. It is created by investment (Schultz 1961) and its production matches the definition of general production. Human capital incorporates the goods inputs (i.e., food, clothes) and service inputs (e.g., education, medical service), and is the kind of intangible assets deeded for organisational enterprise. Human capital as an input is required by all organisations to produce goods and services. The human capital is the ' output' created by investment; its production matches the general production defined by SNA 1993, and the characteristic of ' the output' meet the fundamental characteristic of the service defined by SNA 1993. Hence, it is reasonable to introduce the production of human capital into the production scope of SNA.

Nevertheless, current SNA calculates the inputs, which form human capital as consumer goods rather than investment. In order to resolve this anomaly, the production boundary of SNA requires redefinition; namely, the production of SNA should include the production of human capital. In fact, as early as the 1940s, some researchers (Kuznets 1946) nominated this problem in the classical National Accounts. During the 1980s, some researchers (Ruggles & Ruggles 1986) discussed the issue further. More recently, a Finnish scholar (Aulin-Ahmavaara 2004) introduced a systematic time parameter into the process of the human capital production and put forward the concept of extending the production boundary of the SNA.

Inevitably, the production of human capital from the perspective of societal development will be brought into the scope of SNA production. The national society has been making great strides forward into the new economy, and subsequently, the function of human capital has been increasingly highlighted. Therefore, the design of the accounting system should also match the contemporary reality of economic development, and be adapted to the development demands of the economy and the society. Indeed, Peter Hill (2003) contended that economic theory and reality compel the SNA to avoid becoming locked into its own conventions, despite various types of institutional conventions that significantly hinder the introduction of human capital into the SNA.

ACCOUNTING THE PRODUCTION OF HUMAN CAPITAL

The introduction of human capital and the extension of the production boundary within the scope of SNA attract attention for the need to calculate the output of human capital and the intermediate consumption. Such endeavours can establish the production account of human capital. The production account of human capital will include three main indicators: 1) the value added to human capital, 2) the output of human capital, and 3) the intermediate consumption invested for the outputs. It is important to acknowledge that the value added to human capital equals the output of human capital minus the intermediate consumption. Calculating the output and the intermediate consumption is the key to human capital accounting.

Output of Human Capital

Generally, the calculation of SNA output is based on the market price. As the trading market for human capital has yet to be realised in society, the output of human capital can be calculated indirectly. The output of human capital equals closing stocks of human capital minus opening stocks of human capital plus consumed human capital, which in turn, equals human capital increment plus consumed human capital. When calculating the stocks of human capital, the method of present value (Graham & Webb 1979) can be used. Some scholars (Kendrick 1976) argue that using the cost method to calculate the stocks of human capital has limitations.

Consumed Human Capital

The consumed human capital is the consumed physical strength and intelligence and the depreciation of knowledge and skill used for production. In short, consumed human capital is the amortisation of human capital. As the human capital varies unceasingly, it is a most complex construct, and consequently, its computation includes more uncertainty than the consumed physical capital. Nevertheless, consumer human capital can be computed by referring to the methods of calculating the physical capital, such as the straight line method of amortisation and accelerated amortisation (Wang 2002).

Intermediate Consumption

The intermediate consumption of human capital can be calculated according to the expenditure occurred during a given period. The expenditure includes the cost of services that meet physiological demand, health care, medical treatment and training. There is a requirement to deduct the expenditure used by the consumer.

CHANGES OF SNA ACCOUNTS

Introducing human capital into SNA will extend the production boundary and lead to a series of changes in the areas of distribution, redistribution, investment and consumption. For example, the education and training sector along with the medical treatment and health sector, which provide the education and medical treatment service mainly for individuals, are grouped as the third industry according to the current SNA. These service sectors are primarily divided into two parts according to the income sources of these sectors: one part belongs to social consumption, and the second part belongs to individual consumption. The government purchases the former and it is used for education and medical treatment costs, and individuals purchase the latter and it belongs to the household expenditure for education and medical treatment. After introducing the human capital into SNA, the services of the education and the medical treatment sectors are still provided for individuals. The main change is that education and medical treatment are no longer used for the consumption, but as the intermediate consumption of the household human capital production. Since the expenses of the education and the medical treatment are actually paid for by the householder they are only a part of the intermediate consumption, the remaining part should be the free investment to the household by the education and medical treatment sector. Therefore, a transfer payment should be recorded in the income allotment and the expenditure

account of the education sector.

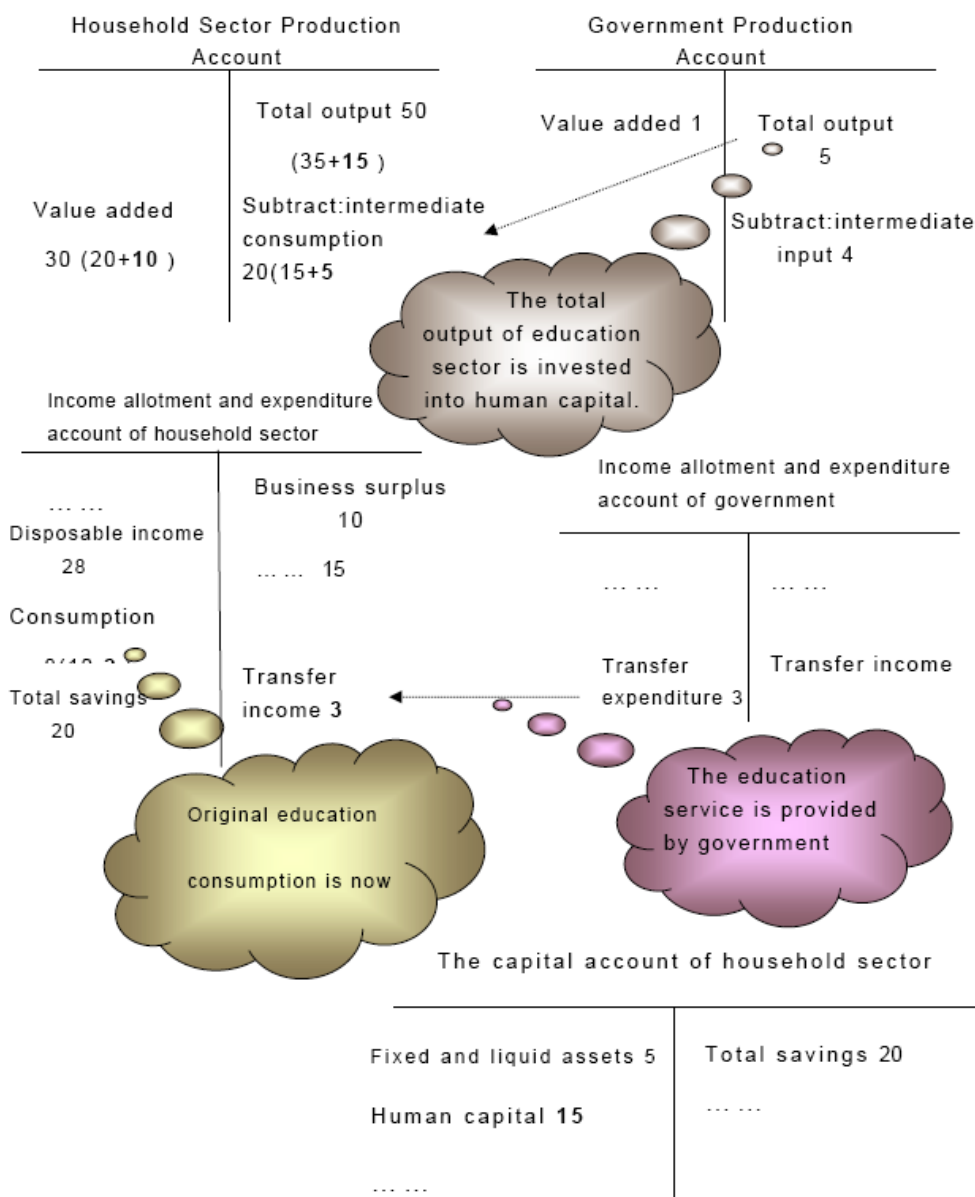
A second salient feature is that the current SNA only deals with the fixed assets investment and the added stock as the capital formation. After introducing human capital into the new SNA, the capital formation needs to be included in the human capital. Thus, the human capital should be recorded in the intangible assets item, or listed separately. Also, the stocks of human capital are to be recorded as assets in a balance sheet (Zhang 2002).

Thirdly, the introduction of the human capital accounting is likely to make the accounting of the household sector more complicated. The household sector is both a production unit and a basic unit of consumption accounting. Hence, it not only provides products and services, but also produces human capital. Therefore, in the household production account, the total output includes the output of human capital. Moreover, the total intermediate consumption includes the value of the intermediate products that are the inputs for producing human capital, and the corresponding value is deducted from the original resident individual consumption, and recorded as the intermediate consumption of the household sector (Xu 1999).

The relationship between the household sectors related to human capital and the simplified accounts of the government sector can be expressed with relatively simple data. Figure 1 indicates that SNA Accounts effect changes when human capital is integrated across sectors. For example, in the Household Sector Production Account (of Figure 1), the output of the human capital in the household sector is 15 units (note figure in bold), its value added is ten units and its intermediate input is five units.

Figure 1

The Relation between the Simplified Accounts of the Household Sector Related to Human Capital and the Government



Note. The bold values relate to human capital data.

The intermediate input (five units) comes from the education output of government in the Government Production Account. Also illustrated in Figure 1 is that in the Income Allotment and Expenditure Account of the Household Sector, the government provides three units, that is originally recorded as society consumption and individual purchases of two units that are initially recorded as the resident consumption. Obviously, in the Income Allotment and Expenditure Account of Government, there is a transfer expenditure from the government of three units. Thus, in the Capital Account of Household Sector, the output of the human capital is recorded as an asset of 15 units. Note, that in Figure 1 the bold numbers signify that data which is related to human capital.

The input– output table network shown as Table 1 is an important component of the SNA. The configuration in Table 1 reflects the economy and the relatively of key sectors. Hence, an understanding of the input– output relationships is a powerful tool to make plans for estimating resource flows and for making decisions for the national economy (Zhong 1986). However, it is necessary to adjust the input– output arrangement after human capital is introduced into the SNA (An & Mao 2000).

Firstly, to accurately reflect the economy and sector relationships of the national economy, the relevant sectors must be partitioned in the input– output network (Table 1) of the SNA according to the product sector. Thus, after the introduction of human capital into the SNA, sectors in the input– output network will include human capital as an independent product sector. Table 1 illustrates only five sectors for the sake of simplification. More specifically, only the education sector and the medical treatment sector are included, and with the human capital sector added. Secondly, incorporation of human capital effectively ‘ shifts’ the network axes. Before the integration of human capital into the SNA, the input– output network is divided into four quadrants. The dashed lines in Table 1 represent the abscissa and the ordinate of the network. After the introduction of human capital, the bold lines in Table 1 represent the new network abscissa and the ordinate. Thus, the first quadrant is extended, and the quantity of the intermediate use is increased in each sector and the quantity of the final use is reduced.

Table 1
The Whole Society Input– Output Network

| | | The intermediate use | | | | | The final use | | Total output |
|--------------------------|---------------------------------|----------------------|----------|----------|---------------------------------|---------------|---------------|------------|--------------|
| | | Agriculture | Industry | Others | Education and medical treatment | Human capital | Consumption | Investment | |
| Intermediate consumption | Agriculture | X_{11} | X_{12} | X_{13} | X_{14} | X_{15} | C_1 | I_1 | X_1 |
| | Industry | X_{21} | X_{22} | X_{23} | X_{24} | X_{25} | C_2 | I_2 | X_2 |
| | The others | X_{31} | X_{32} | X_{33} | X_{34} | X_{35} | C_3 | I_3 | X_3 |
| | Education and medical treatment | | | | | X_{45} | C_4 | | X_4 |
| | Work force | | | | | | | I_5 | X_5 |
| Value added | Human capital consumed | H_1 | H_2 | H_3 | H_4 | H_5 | | | |
| | Depreciation | D_1 | D_2 | D_3 | D_4 | D_5 | | | |
| | New created value | V_1 | V_2 | V_3 | V_4 | V_5 | | | |
| Total | | X_1 | X_2 | X_3 | X_4 | X_5 | | | |

Notes: a. X_{ij} denotes the value of the consumed products (or service) of "j" sector, which are produced by "i" sector.

b. H_j denotes the human capital consumption of "j" sector.

c. D_j denotes the fixed assets consumption of "j" sector.

d. V_j denotes the new value created of "j" sector.

e. X_j denotes the total output of "j" sector.

Thirdly, human capital intensifies in the input– output network. In Table 1, the value of the output of human capital during a period is shown as X_5 , which is not only the total investment– SX_{i5} . Infact, X_5 includes: the intermediate input– SX_{i5} , the human capital consumption– H_5 , the human capital depreciation – D_5 , and the new value created – V_5 . Table 1 depicts these values to demonstrate the output view of the human capital.

Fourthly, the quantity of the original product of each sector consumed for the final use will be reduced. What is originally used for the consumption will be divided: one part is used for the intermediate consumption in the human capital production, and the other part will be divided as the consumption. For instance, before human capital is included in Table 1, the consumption of the "i" sector = $X_{i5} + C_i$, and the total of the society = $S = \sum_{i=1}^4 I_i + X_i + C_i$. After human capital is introduced into Table 1, the consumption of the "i" sector = C_i , and the total consumption of the society = $S = \sum_{i=1}^4 I_i + C_i$. Finally, after introducing the human capital into SNA, the original new value created of each section will be reduced, but the sum of the value added of the society, namely GDP, will be increased.

DISCUSSION

This paper outlines the changes of accounts and the input– output network after the introduction of human capital into the SNA. However, the processing of these changes is debatable, which means that different perspectives and alternative standpoints may lead to a variety of interpretations. For instance, some scholars contend that the human capital concerns two types of persons. One type is the technical personnel who control core technical activities, while another type of individuals are the managers who have entrepreneurial characteristics. These two types of people are a rare resource in society and their common characteristic is that their functions are outstanding and not substitutable. Other scholars believe that the human capital concerns all personnel in an organisation, whether they are knowledge workers, or manual labourers as well as commodities that maybe as abundant as sunlight or air, but valuable and worthwhile resources in society. This paper adopts the latter viewpoint to deal with the accounts.

There are various ways of processing human capital. Processing modes are underpinned by the extent to which human capital ownership can be partitioned. According to the principal ‘ who invests, who should own the ownership’ , human capital ownership and right of use can be isolated, and treated in separate categories. Arguably, human capital, formed through training and education by the investment of enterprises and government sectors, should be included in the investment accounts and asset accounts of enterprises and government sectors, respectively. However, human capital and its carrier cannot be distributed. Thus, human capital would be included in the investment accounts and asset accounts of the household sector. Moreover, the education expenses paid by enterprises and education sector are to be regarded as prepayment of earnings and transfer payment. This notion

CONCLUSION

This paper outlines the salient relativities of human capital accounting and the SNA extension. Some related indicators and accounting frames are designated, but caution is warranted when integrating human capital into SNA. Indeed, a deeper exploration is encouraged. For example, the accounting method of human capital requires greater delineation. A possible scenario is that after introducing human capital into the household production, all the expenditures that the whole society invests for improving or increasing the competence of individuals can be separated from the consumption. The items which are presently included inside the consumption category such as food, clothes, recreation and education are worthy of further subdivision and categorisation. Such action will enable partitioning of resources for distribution to the appropriate sector (e.g., consumption, intermediated consumption of the household sector). In addition, while calculating the output of human capital (e.g., the formula presented in the text), the amortisation of human capital must also be computed. Furthermore, if considering the residual value of human capital and the amortisation of different types of human capital, it is vital to classify human capital and designate the estimation criteria (e.g., methods of fixed number of years and the residual value for amortisation). Clearly, the resolution of these issues will attract considerable further endeavour. The contention is that incorporating human capital within the SNA will realise a significant contribution toward clarifying the economic importance of human capital in society. Debatably, the notions expressed in this paper have the potential to facilitate the attention of researchers and practitioners to invest in the concept of human resources as assets and complementary human resource management issues.

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