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# Study on Multiplier Effects of China Township and Village Enterprises on National Economy

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## 1. Introduction

The production and consumption of products in any sector has close interrelations with other sectors. The change of one sector will inevitably affect the production and consumption of relevant sectors and even the whole economy. Therefore, it's very meaningful both in theory and practice to study the induced effect of sectors on national economy, i.e. multiplier effect, by using input-output technique. Staffs in Input-Output Division of China State Statistical Bureau (1993) calculated that the invest multiplier is 1.27 during the Seven-five year plan by using 1987 input-output table and, combining with consumption ratio, Zhang Kai(1998) studied invest multiplier of recent years by using 1992 input-output table.

Above research is basically based on open input-output model and, moreover, doesn't consider chain effects of household consumption on economy. In addition, the multiplier effects induced by invest in Township and Village Enterprises (TVEs), up to now, haven't been systematically studied by other researchers in China. In this paper, with TVEs and non-TVEs Input-Occupancy-Output table we constructed, we give a detailed analysis of this issue by using partial-closed input-output model.

## 2. Partial-Closed Input-Output Model

Partial-closed input-output model is model that household sector is incorporated into the first quadrant of common input-output table. Specifically, suppose the national economy is subdivided into n sectors, now, we consider the household sector as the n+1 one and add it to the first quadrant, then partial-closed input-output model is constructed. The basic equation becomes:

$$(I - A^*)X^* = Y^* \qquad (1)$$

here $A^* = \begin{pmatrix} A & h_c \\ h_r & 0 \end{pmatrix}$ $X^* = \begin{pmatrix} X \\ X_h \end{pmatrix}$ $Y^* = \begin{pmatrix} Y \\ Y_h \end{pmatrix}$

where $A$ $X$ $Y$ is matrix of direct input coefficients, column vector of gross output value and final use in common input-output model respectively, $X_h$ is total household income , $Y_h$ is exogenous household income, $h_r$ is row vector of household income coefficient, $h_c$ is column vector of consumption propensity of households.

From equation (1), we obtain:

$$X^* = (I - A^*)^{-1}Y^* \qquad (2)$$

Because of difficulty in getting data, here we denote consumption structure coefficients of households as $h_c, h_c = (h_{1c}, h_{2c}, \cdots\cdots h_{nc}, 0)'$ where $h_{ic}$ is the proportion of household consumption expenditure for products of sector $i$ in total consumption expenditure, use coefficients

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of employee compensations as $h_r$. A problem here, however, should be noted, i.e., the contents of household sector in the row don't match that in the column. As we all know, household consumption expenditure is only a part of household income. Residents also spend some of their income on savings. As to coefficient of employee compensations, it should be noted that employee compensations aren't total household income. We can see this point from input-output table. In input-output table, the sum of household consumption expenditure and household savings is larger than total employee compensations. In addition, household income also includes some welfare funds after redistribution of taxes or profits. This part of income is, however, very difficult to be divided from the redistribution, so we have to adopt indirect method. Here we regard the sum of household savings and household consumption expenditure as total household income, and then, according to the ratio of employee compensations in every sector to total employee compensations, distribute it to every sector in the row.

**3. Invest Multiplier**

Invest multiplier is the ratio of an induced change in level of GDP, directly and indirectly, to an initial change of per unit invest. Here we use GDP or value-added as the total volume of national economy.

We define $A_v^*$ as coefficient of value-added, and suppose value-added of household sector is zero, then

$$A_v^* = (a_{v1}^*, a_{v2}^*, \cdots\cdots a_{vn}^*, 0)$$

Here $a_{vj}^*$ is value-added included in per unit output value of sector *j*.

Now we will calculate full value-added. Two methods can be used to get full value-added included in per unit output of sector *j*:

1. Calculating it item by item

$$b_{vj}^* = a_{vj}^* + \sum_{i=1}^{n+1} a_{vi}^* a_{ij}^* + \sum_{k=1}^{n+1}\sum_{i=1}^{n+1} a_{vk}^* a_{ki}^* a_{ij}^* + \sum_{s=1}^{n+1}\sum_{t=1}^{n+1}\sum_{i=1}^{n+1} a_{vs}^* a_{st}^* a_{ti}^* a_{ij}^* + \cdots\cdots \quad (3)$$

*(j=1,2, ……n)*

Here $b_{vj}^*$ is full value-added included in per unit output of sector *j*, $a_{ij}^*$ is input of product *i* absorbed by per unit output of sector *j*.

Equation (3) can be written as form of matrix:

$$B_v^* = A_v^* + A_v^* A^* + A_v^* A^* A^* + A_v^* A^* A^* A^* + \cdots\cdots$$
$$= A_v^* (I + A^* + A^* A^* + A^* A^* A^* + \cdots\cdots) = A_v^* (I - A^*)^{-1}$$

Note: $(I - A^*)(I + A^* + A^* A^* + A^* A^* A^* + \cdots\cdots) = I$, $I$ is identity matrix.

2. Directly use full input coefficients

$$b_{vj}^* = a_{vj}^* + \sum_{i=1}^{n+1} a_{vi}^* b_{ij}^* \quad (j=1,2,\ldots\ldots n) \qquad (4)$$

Here $b_{ij}^*$ is full volume of product *i* per unit output value of sector *j*.

Express equation (4) as matrix, we have:

$$B_v^* = A_v^* + A_v^* B^* = A_v^* (I + B^*) = A_v^* (I - A^*)^{-1} \qquad (5)$$

Where $B^* = (I - A^*)^{-1} - I$ is matrix of full input coefficient.

Suppose invest structure as *k*, and $k = (k_1, k_2, \cdots\cdots k_n, 0)^T$, $k_i$ is the proportion of invest in sector *i* to total invest. Here $0 \le k_i < 1$ then the effect on GDP induced by per unit invest, $M_I$, is as follows:

$$M_I = B_v^* \cdot k \qquad (6)$$

$M_I$ is the invest multiplier we want to get, i.e., increment of GDP due to per unit invest.

Here it should be noted that, equation (6) won't be applicable until every sector in national economy has full idle production capacity. If economic system is in a state of full employment or exists only structural idle production capacity, increased invest can't completely combine with production factors. In consequence, it won't substantively cause the increment of GDP. Even worse, it may bring about negative effects, such as inflation.

The above is common method calculating invest multiplier. Now, we will discuss the invest multiplier of TVEs and non-TVEs.

Define $A_v^*$ as value-added coefficient

$$A_v^* = (A_v^{1*}, A_v^{2*}) = (a_{v1}^1, a_{v2}^1, \cdots\cdots a_{vn}^1, 0, a_{v1}^2, a_{v2}^2, \cdots\cdots a_{vn}^2, 0)$$

Here $A_v^{1*}, A_v^{2*}$ is row vector of value-added coefficient of TVEs and of non-TVEs under partial-closed model respectively, $a_{vj}^1, a_{vj}^2$ is value-added included in per unit output value of sector *j* of TVEs and of non-TVEs respectively.

Denote $A^* = \begin{pmatrix} A^{11*} & A^{12*} \\ A^{21*} & A^{22*} \end{pmatrix}$ $R^* = \begin{pmatrix} R^{11*} & R^{12*} \\ R^{21*} & R^{22*} \end{pmatrix}$

Here $A^*, R^*$ is input coefficient matrix and full input coefficient matrix of TVEs and of non-TVEs under partial-closed model respectively.

According to formula discussed above, full value-added coefficient is as follows

$$B_v^* = (B_v^{1*}, B_v^{2*}) = (A_v^{1*}, A_v^{2*}) \cdot \begin{pmatrix} I - A^{11*} & -A^{12*} \\ -A^{21*} & I - A^{22*} \end{pmatrix}^{-1} = \left(A_v^{1*}, A_v^{2*}\right) \cdot \begin{pmatrix} R^{11*} & R^{12*} \\ R^{21*} & R^{22*} \end{pmatrix} \quad (7)$$

Here $B_v^{1*}, B_v^{2*}$ is row vector of full value-added coefficient of TVEs and of non-TVEs under partial-closed model respectively.

Given invest structure, $k = \begin{matrix} k^1 & k^2 \end{matrix}^T$, here $k^1$ $k^2$ is column vector of invest structure coefficient of TVEs and of non-TVEs.

With formula (7), invest multiplier of TVEs is

$$M_I^1 = (A_v^{1*}, A_v^{2*}) \cdot \begin{pmatrix} R^{11*} & R^{12*} \\ R^{21*} & R^{22*} \end{pmatrix} \cdot \begin{pmatrix} k^1 \\ 0 \end{pmatrix} = (A_v^{1*} R^{11*} + A_v^{2*} R^{21*}) \cdot k^1 \qquad (8)$$

Similarly, invest multiplier of non-TVEs is

$$M_I^2 = (A_v^{1*}, A_v^{2*}) \cdot \begin{pmatrix} R^{11*} & R^{12*} \\ R^{21*} & R^{22*} \end{pmatrix} \cdot \begin{pmatrix} 0 \\ k^2 \end{pmatrix} = (A_v^{1*} R^{12*} + A_v^{2*} R^{22*}) \cdot k^2 \qquad (9)$$

According to formula (8) and (9), we get invest multiplier of TVEs and non-TVEs in 1995 invest structure. The results are 3.44 and 2.94 respectively, i.e. when we increase one unit invest in TVEs and keep invest in non-TVEs unchanged in the meantime, value-added of the whole country will raise 2.44 times as much. Similar is that of non-TVEs. From the results, we can see that per unit invest in TVEs produces more effect than that in non-TVEs. In addition, we also computed increments of total value-added induced by increase of per unit invest in every industry (but with no change of invest in other industries)(see table 1).

Obviously, the larger the invest multiplier is, the stronger the effect of one certain industry on national economy produces. In table 1, TVEs industries that have larger invest multiplier are mainly:

sewing and leather products 3.62, smelting and pressing of metals 3.59, electric equipment and machinery 3.57, transport equipment 3.55, metal products 3.52, textile industry 3.52 and chemical industry 3.51. On the whole, they mainly focus on some fast rising manufacturing industry. Nonmetal Mineral products has a large proportion in total output value, but its invest multiplier is very small. In addition, tertiary industry of TVEs, including that of non-TVEs, such as commerce, catering trade, has smaller invest multiplier. This is because tertiary industry belong to final consumption field, chain effect caused by invest is much weaker. In addition, the average effect of invest in TVEs is larger than that in non-TVEs, which further prove the above conclusion.

**Table 1.** Comparison of invest multiplier between TVEs and non-TVEs

| | Invest Multiplier | |
|---|---|---|
| | TVEs | Non-TVEs |
| Sewing and Leather products | 3.62359 | 3.44305 |
| Smelting and Pressing of Metals | 3.59031 | 2.91358 |
| Electric Equipment and Machinery | 3.56632 | 3.18179 |
| Transport Equipment | 3.54575 | 3.29494 |
| Metal Products | 3.52362 | 3.15531 |
| Textile Industry | 3.52103 | 3.34396 |
| Chemical Industry | 3.51346 | 3.05240 |
| Electronic and Telecommunications Equipment | 3.48108 | 3.16936 |
| Machinery Industry | 3.46298 | 3.08188 |
| Papermaking, Cultural and Educational Products | 3.43932 | 3.11993 |
| Construction | 3.36807 | 2.95466 |
| Timber Processing and Furniture Manufacturing | 3.34940 | 2.93536 |
| Instruments, Meters, Cultural and Office Machinery | 3.33884 | 2.90217 |
| Machinery Repairing Industry | 3.31644 | 2.97816 |
| Other Industry | 3.27296 | 3.29458 |
| Nonmetal Mineral Products | 3.21474 | 2.50959 |
| Other Nonmetals Mining and Dressing | 3.07333 | 2.06255 |
| Metals Mining and Dressing | 3.04705 | 2.46761 |
| Coking, Coal Gas and Coal Products | 3.01545 | 3.37060 |
| Food Production | 3.00716 | 2.29710 |
| Petroleum and Natural Gas Extraction | 2.89146 | 2.11211 |
| Petroleum Processing | 2.85250 | 2.61386 |
| Elect. Power, Steam and Hot Water Prod. and Supply | 2.84048 | 2.26526 |
| Agriculture | 2.80977 | 1.93542 |
| Coal Mining and Dressing | 2.79945 | 2.09941 |
| Catering Trade | 2.76891 | 2.30533 |
| Commerce | 2.65095 | 1.96134 |
| Freight and Postal Services | 2.51277 | 2.07215 |
| Other Service | 2.41783 | 2.20629 |
| **Average** | **3.16603** | **2.72758** |

Note: The industry is in order of invest multiplier of TVEs

**4. Household Income Multiplier**

Production procedure consumes not only raw material, energy, but also man power. The consumption of man power during production is expressed in employee compensations in input-output table, i.e. people get income by doing work. With the increase of production, household income increases too. Household income multiplier is the ratio of an induced change in household income of all industry, directly and indirectly, to an initial change of per unit increase of final products or service in a certain industry.

In common partial-closed input-output model, the formula of computing household income multiplier is

$$M_s = \sum_{i=1}^{n} a_{s_i} b_{ij}^{*} = A_s B^{*} \quad j=1,2\ldots\ldots n+1$$

Here $a_{s_i}$ is coefficient of employee compensations of sector *i*, $b_{ij}^{*}$ is elements of Leontief inverse matrix under partial-closed model.

When national economy is divided into TVEs and non-TVEs, household income multiplier is given as follows:

$$(M_s^1, M_s^2) = (A_s^{1*}, A_s^{2*}) \cdot \begin{pmatrix} R^{11*} & R^{12*} \\ R^{21*} & R^{22*} \end{pmatrix}$$

Here $M_s^1, M_s^2$ is row vector of household income multiplier of TVEs and of non-TVEs respectively, $A_s^{1*}, A_s^{2*}$ is row vector of coefficients of employee compensations of TVEs and of non-TVEs respectively.

So, household income multiplier of TVEs is $M_s^1 = A_s^{1*} R^{11*} + A_s^{2*} R^{21*}$

Similarly, household income multiplier of non-TVEs is $M_s^2 = A_s^{1*} R^{12*} + A_s^{2*} R^{22*}$

From the results(see table 2.), we can see that the average income multiplier of TVEs is 1.373, a little larger than that of non-TVEs with 1.350. TVEs industries that have larger income multiplier are mainly: agriculture 1.97, textile industry 1.86, coke-making industry 1.70, sewing and leather products 1.66 other industry 1.57, papermaking industry 1.53, food processing 1.52, etc. Other industries, such as machinery manufacturing, metal mining and dressing, coal mining and dressing, catering trade, also have larger income multiplier. Those that have larger income multiplier in non-TVEs mainly distribute in coal mining and dressing, textile industry, food production industry, other services, construction, catering trade. From the distribution of larger income multiplier industries, it's easy to see most of them are labor intensive industries, no matter in TVEs and non-TVEs. What we should pay more attention is that income multiplier of other services in non-TVEs is the largest, which has close correlation with too large scale of administrative department.

**5. Employment Multiplier**

Employment multiplier is the ratio of an induced change in employment of all industries, directly and indirectly, to an initial change of per unit increase of final products in a certain industry. With the increase of final demands, production scale expands correspondingly, and expanding scale, in turn, drives the demands of national economy for labor force, which produces multiplier effect. Household sector also has great influence on employment multiplier. Specifically, output value of each sector increases with the increment of final demands, and accordingly, employee compensations rise with output value. The increasing employee compensations bring about new consumption demands, which, in turn, drive the increase of output value and produce new employment. So, when we compute employment multiplier we should fully consider the influence of household consumption.

**Table 2.** Comparison of household income multiplier between TVEs and non-TVEs

| | Household Income Multiplier | |
|---|---|---|
| | TVEs | Non-TVEs |
| Agriculture | 1.97108 | 1.42687 |
| Textile | 1.86433 | 1.51192 |
| Coking, coal gas and coal products | 1.69800 | 1.35306 |
| Sewing and leather products | 1.65925 | 1.46087 |
| Other industry | 1.56937 | 1.32160 |
| Papermaking, Cultural and Educational Pro-ducts | 1.53449 | 1.44173 |
| Machinery repairing | 1.53322 | 1.29204 |
| Food processing | 1.52471 | 1.55831 |
| Machinery industry | 1.45992 | 1.25164 |
| Metals Mining and Dressing | 1.44550 | 1.36366 |
| Coal mining and dressing | 1.43808 | 1.55488 |
| Instruments, meters, cultural and | 1.42337 | 1.39644 |
| Catering trade | 1.41273 | 1.48163 |
| Construction | 1.40688 | 1.50742 |
| Timber Processing and Furniture Manufacturing | 1.40504 | 1.35799 |
| Transport Equipment | 1.39130 | 1.24126 |
| Chemical industry | 1.38487 | 1.28856 |
| Metal products | 1.32454 | 1.33915 |
| Other services | 1.31845 | 1.79468 |
| Smelting and Pressing of Metals | 1.31652 | 1.23271 |
| Electric Equipment and Machinery | 1.30291 | 1.27797 |
| Other Nonmetals Mining and Dressing | 1.25055 | 1.35434 |
| Freight and postal services | 1.21241 | 1.37473 |
| Electronic and Telecommunications Equipment | 1.13579 | 1.16181 |
| Nonmetal Mineral Products | 1.13036 | 1.38461 |
| Commerce | 1.00569 | 1.43123 |
| Petroleum processing | 0.94752 | 0.79429 |
| Elect. Power, Steam and Hot Water Prod. and Supply | 0.92312 | 1.19131 |
| Petroleum and Natural Gas Extraction | 0.81975 | 1.01212 |
| **Average** | **1.37275** | **1.35030** |

We use occupancy coefficient for labor force (labor force per ten thousand output value) to express the demands of national economy for labor force when final products increase. Then

$$\left(M_L^1, M_L^2\right) = \left(A_L^{1^*}, A_L^{2^*}\right) \cdot \begin{pmatrix} R^{11^*} & R^{12^*} \\ R^{21^*} & R^{22^*} \end{pmatrix}$$

Here $A_L^{1^*}, A_L^{2^*}$ is row vector of occupancy coefficient for labor force of TVEs and of non- TVEs under partial-closed model respectively, $M_L^1, M_L^2$ is employment multiplier of TVEs and non-TVEs respectively.

Then employment multiplier of TVEs is $M_L^1 = A_L^{1^*} R^{11^*} + A_L^{2^*} R^{21^*}$ (10)

Similarly, employment multiplier of TVEs is $M_L^2 = A_L^{1^*} R^{12^*} + A_L^{2^*} R^{22^*}$ (11)

Using formula (10) and (11), we can get employment multiplier of each sector (see table 3). In addition, we also calculate the average multiplier.

**Table 3.** Comparison of employment multiplier between TVEs and non-TVEs

| | Employment Multiplier | |
|---|---|---|
| | TVEs | non-TVEs |
| Other service | 4.25392 | 2.71400 |
| Food production | 3.81398 | 2.78423 |
| Catering trade | 3.60354 | 2.98522 |
| Agriculture | 3.32606 | 5.41776 |
| Other industry | 3.26041 | 3.87765 |
| Textile industry | 3.11967 | 3.38419 |
| Coal mining and dressing | 3.18777 | 3.26787 |
| Commerce | 2.99815 | 2.10926 |
| Construction | 2.86419 | 2.55308 |
| Papermaking, cultural and educational products | 2.85402 | 2.75772 |
| Sewing and leather products | 2.84986 | 2.93394 |
| Freight and postal services | 2.76543 | 2.52710 |
| Nonmetal mineral products | 2.70806 | 2.11994 |
| Timber processing and furniture manufacturing | 2.64248 | 2.60744 |
| Other nonmetal mining and dressing | 2.61111 | 2.48187 |
| Instruments, meters, cultural and office machinery | 2.64392 | 2.67578 |
| Machinery repairing | 2.30071 | 2.83260 |
| Metal mining and dressing | 2.54799 | 2.81046 |
| Coking, coal gas and coal products | 2.50010 | 3.26996 |
| Chemical industry | 2.39951 | 2.37080 |
| Metal products | 2.35760 | 2.27685 |
| Electric Equipment and Machinery | 2.20749 | 2.16142 |
| Elect. Power, Steam and Hot Water Prod. and Supply | 2.21830 | 1.60157 |
| Machinery industry | 2.18509 | 2.59906 |
| Transport equipments | 2.14388 | 2.34081 |
| Smelting and Pressing of Metals | 2.10606 | 2.21303 |
| Electronic and telecommunications equipment | 1.96749 | 1.78025 |
| Petroleum and natural gas extraction | 1.83571 | 1.37148 |
| Petroleum processing | 1.35920 | 1.51041 |
| **Average** | **2.77653** | **3.19958** |

Denote $\bar{M}_L^1$ as average employment multiplier of TVEs, then $\bar{M}_L^1 = M_L^1 \cdot k_Y^1$

Here $k_Y^1 = (k_{Y1}^1, k_{Y2}^1, \cdots\cdots k_{Yn}^1, 0)$ is row vector of structure coefficient of final demands of TVEs, $k_{Yi}^1 = \dfrac{Y_i^1}{\sum_{i=1}^{n} Y_i^1}$ $Y_i^1$ is final demands of sector *i* of TVEs.

Similarly, we can calculate average employment multiplier of non-TVEs $\bar{M}_L^2 = M_L^2 \cdot k_Y^2$ , $k_Y^2$ is row vector of structure coefficient of final demands of non-TVEs.

From table 3, we can see that TVEs industries that have larger employment multiplier are mainly: other services 4.25, food processing 3.81, catering trade 3.60, agriculture 3.33, other industry 3.26, textile industry 3.12, coal mining and dressing 3.09, commerce 3.00 and construction 2.86. In addition, other industries, such as sewing and leather products, papermaking industry and freight and postal services, also have large employment multiplier. All of these industries have a common property that they are labor-intensive. Almost all tertiary industry have larger employment multiplier, but those with high technology, such as electric equipment, electronic and telecom-munication, are very small in employment multiplier. Similar to that of TVEs, those with larger employment multiplier of non-TVEs generally focus on labor intensive industries. It's a little different in non-TVEs from that in TVEs, however, the employment multiplier of agriculture rises to the first.

The employment multiplier we get above statically reflect the influence of output value increment on employment when employment structure is fixed, it can't dynamically show how many occupations each industry can supply when employment structure changes in a certain period. So, we use *new labor force occupied by per unit increase of output value* instead of *labor force occupied by per unit output value* to denote the demands of national economy for labor force when final products increase, i.e. $l_i^1 = \dfrac{\Delta L_i^1}{\Delta X_i^1}$ $l_i^2 = \dfrac{\Delta L_i^2}{\Delta X_i^2}$

Here $\Delta L_i^1$ $\Delta L_i^2$ is increment of labor force of sector *i* of TVEs and of non-TVEs in a certain period respectively, $X_i^1$ $X_i^2$ is increment of output value of sector *i* of TVEs and of non-TVEs in certain period respectively, $l_i^1$ $l_i^2$ is employment elasticity of sector *i* of TVEs and of non-TVEs in a certain period respectively.

Denote $l^{1^*} = (l_1^1, l_2^1 \cdots\cdots, l_n^1, 0)$ $l^{2^*} = (l_1^2, l_2^2 \cdots\cdots, l_n^2, 0)$, then the new employment multiplier is given as follows:

**Table 4.** Comparison of employment multiplier between TVEs and non-TVEs

| | Considering Structure Change | |
|---|---|---|
| | TVEs | non-TVEs |
| Coal mining and dressing | 0.66192 | -0.01900 |
| Machinery repairing | 0.65736 | 0.18411 |
| Freight and postal services | 0.62961 | 0.25367 |
| Catering trade | 0.59694 | 0.70335 |
| Coking, coal gas and coal products | 0.51379 | 0.47825 |
| Petroleum processing | 0.50340 | 0.44050 |
| Instruments, meters, cultural and office machinery | 0.50307 | 0.86384 |
| Commerce | 0.47059 | 0.74941 |
| Other industry | 0.43589 | -0.62773 |
| Construction | 0.41939 | 0.31297 |
| Other service | 0.37913 | 0.24455 |
| Metal mining and dressing | 0.37147 | 0.23044 |
| Petroleum and Natural Gas Extraction | 0.37058 | 0.74387 |
| Nonmetal Mineral Products | 0.36877 | 0.29395 |
| Transport Equipment | 0.32454 | 0.36536 |
| Smelting and Pressing of Metals | 0.31642 | 0.28352 |
| Electric Power, Steam and Hot Water Production and Supply | 0.31737 | 0.24729 |
| Electric Equipment and Machinery | 0.31368 | 0.30455 |
| Timber Processing and Furniture Manufacturing | 0.30556 | 0.23308 |
| Metal products | 0.29529 | 0.29881 |
| Other nonmetals mining and dressing | 0.24470 | 0.16413 |
| Electronic and telecommunications equipments | 0.21266 | 0.26063 |
| Machinery industry | 0.18906 | 0.19453 |
| Chemical industry | 0.18576 | 0.19941 |
| Agriculture | 0.12917 | -0.41954 |
| Sewing and leather products | 0.10599 | 0.16980 |
| Papermaking, cultural and educational products | -0.01324 | 0.05240 |
| Textile industry | -0.08638 | 0.06722 |
| Food processing | -0.09919 | -0.08096 |
| **Average** | **0.27922** | **0.11502** |

Employment multiplier of TVEs is $M_l^1 = l^{1^*} R^{11^*} + l^{2^*} R^{21^*}$ (12)

Similarly, employment multiplier of non-TVEs is $M_l^2 = l^{1^*} R^{12^*} + l^{2^*} R^{22^*}$ (13)

Employment multiplier of each industry with new formula are given in table 4. It's very different from table 5.3 that those can absorb new labor force in TVEs change a lot. They are coal mining and dressing 0.66 machinery repairing 0.657 freight ad postal services 0.63, catering trade 0.60, coke making 0.51, petroleum processing 0.50 and instruments, meters equipment 0.50 and in addition, commerce and construction, etc. Those with higher employment multiplier without considering

structural changes, such as food processing, textile, sewing and leather products, can't enroll new labor force when employment structure changes, which indicates that the scale of these industries has been too big and labor force surplus has been very serious. Tertiary industry, such as freight and postal services, commerce, catering trade, is completely different. They not only can enroll a large amount of labor force, but also can absorb plenty of new labor force. So, these industries have great potentialities, and we should fully support their development.

## 6. Conclusions

In this paper, the main objective is to study the influence of China TVEs on national economy. We calculate three kinds of multiplier of TVEs and non-TVEs. It's easy to see that China TVEs not only account for a large proportion in national economy, but also play important role in absorbing labor force, especially those in countryside, and increasing household income. Also, we can use the results as reference to policy making.

From invest multiplier and household income multiplier, we can see that those having larger influence on economy focus on textile industry, sewing and leather products, timber processing, food processing, construction. As far as employment multiplier is concerned, those can absorb a large amount of labor force are mainly coal mining and dressing, and tertiary industry, such as commerce, catering trade, freight and postal services. So, when we take measure to adjust the industry structure of TVEs, we must consider it comprehensively. Here, it should be noted that large multiplier shows that the industry has a key status in national economy, it's not necessarily indicate that, however, we should give priority to its development. Take textile industry as a example, in the past following years, textile industry played great role in improving people's living standard, increasing foreign exchange reserve. Now, production capacity of textile industry is seriously excessive, causing enormous waste of resources. So, in order to optimizing industry structure, we should limit the development of this industry.

Taking multiplier effect and other factors into consideration, we should give priority to the development of food processing, timber processing and furniture manufacturing, sewing and leather products, building materials, electric machinery and construction in TVEs. In addition, development of tertiary industry that can absorb plenty of surplus labor force, such as commerce, catering trade, freight and postal services, should be given energetic support.

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