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ECONOMICS AND BUSINESS DEPARTMENT

# ESTIMATING THE RETURN OF INVESTMENT IN MONGOLIAN AGRICULTURE USING THE SECTORAL BALANCE METHOD

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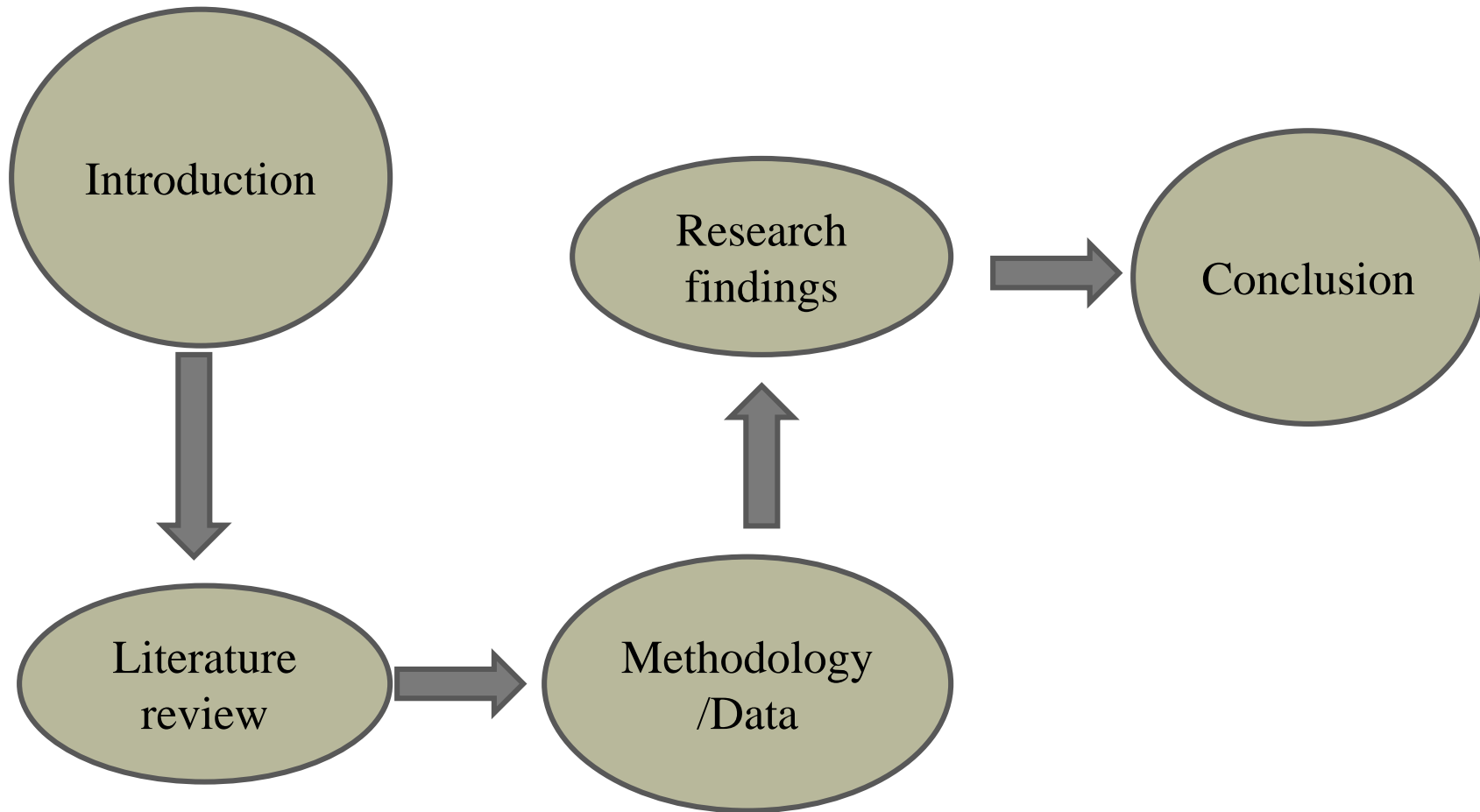uyanga@mandakh.mn

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# Outline

# KEYWORDS

o   Economic growth,

o   Inclusive growth,

o   Agricultural development,

o   Unemployment,

o   Poverty rate

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# PURPOSES OF THE RESEARCH

1. To evaluate job creation of the investment by economic sectors (especially agricultural investment):
   - *The Dutch Disease (Corden & Neary, 1980) :*
     - *Booming sector: mining*
     - *Other sectors*
       - ***Non-tradable** goods of the domestic market-oriented sectors*
       - *Tradable goods of the export-oriented sectors*

2. To define these investments' contribution to the total GDP and job creation

# INTRODUCTION

o Developing countries have needs of

➢ Poverty alleviation,

➢ People's well-being improvement,

➢ **More investment in agriculture**

    ➢ *Most labor intensive sector*

    ➢ *Avoiding the Dutch Disease symptoms*
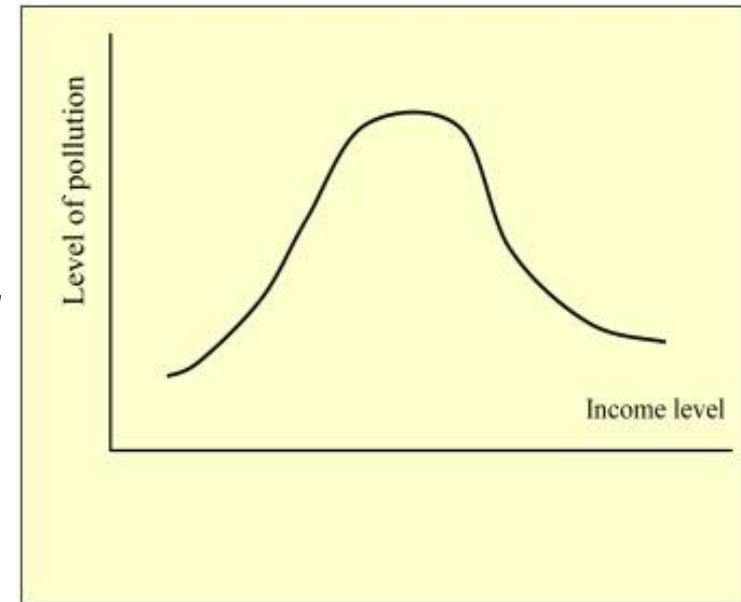


Pollution as a function of income level

Fig 1. Kutsnets curve   (Kuznets, 1955)

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## 1.1. LITERATURE REVIEW ON SECTORIAL ANALYSIS (IOA)

o Input-output analysis is a form of macroeconomic analysis based on the interdependencies between economic sectors *(Leontief, 1936)*

o The IOA can be used to analyze both sectorial intermediate inputs and the value added *(Akita, Shishido, Nobukuni, Kawamura, & Furukawa)*

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**1.1. SECTORIAL ANALYSIS ON AGRICULTURAL OR ENVIRONMENTAL ISSUES**

o IOA has an ability to identify the output change in a given sector due to general equilibrium effects in all sectors *(Holland & Martin, 1993)*

o Environmentally extended IOA (EEIOA) supports environmental policy by quantifying how demand for goods and services leads to resource use and emissions across the economy *(Ridout et al, 2018)*

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## 4. CURRENT SITUATION OF MONGOLIAN ECONOMY

o During 2000-2017, <span style="color:red">Annual growth rate of real GDP of Mongolia is around 7%</span>

o Poverty rate:
   o *21.6% in 2014*
   o *29.6% in 2016*

o Unemployment rate: *7.8% by end of 2018.*
   o *The lowest level is 2.8% in 2007*
   o *The highest level is 11.6% in 2009*

## 4. CURRENT SITUATION OF MONGOLIAN ECONOMY

## The policy to develop all economic sectors at same time
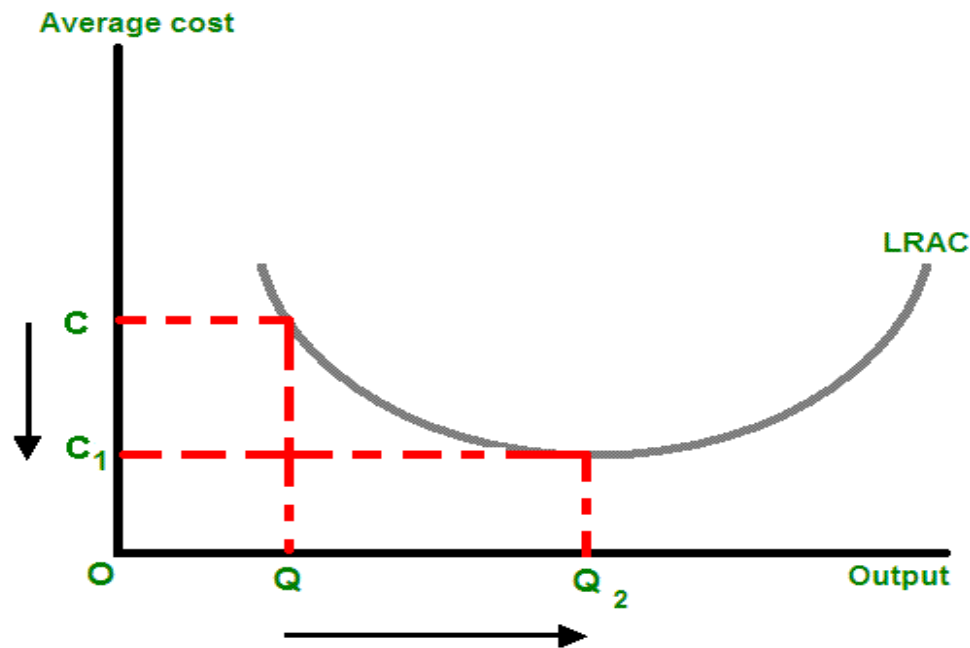


Fig 1. Kutsnets curve   (wikipedia.org)

# 4. CURRENT SITUATION OF MONGOLIAN ECONOMY

Table 1. Investments by sectors and their shares

| Investment by economic sectors | 2009 | | 2017 | |
|---|---|---|---|---|
| | Investment | Share, % | Investment | Share, % |
| **Total** | 2,146,150.8 | 100.0% | 10,337,466.7 | 100.0% |
| Agriculture, forestry and fishing | 21,034.5 | 1.0% | 104,166.2 | 1.0% |
| Mining and quarrying | 487,007.1 | 22.7% | 4,474,232.0 | 43.3% |
| Processing industries | 60,922.1 | 2.8% | 155,071.8 | 1.5% |
| Electricity, gas, steam and air conditioning supply, water supply | 120,788.6 | 5.6% | 592,715.4 | 5.7% |
| Construction | 148,429.7 | 6.9% | 1,031,559.8 | 10.0% |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 304,746.3 | 14.2% | 708,889.0 | 6.9% |
| Transportation and storage | 126,422.8 | 5.9% | 142,676.2 | 1.4% |
| Accommodation and food service activities | 3,264.8 | 0.2% | 93,713.2 | 0.9% |
| Information and communication | 34,878.7 | 1.6% | 204,204.8 | 2.0% |
| Financial and insurance activities | 71,365.5 | 3.3% | 725,656.2 | 7.0% |
| Real estate activities | 26,904.2 | 1.3% | 57,300.6 | 0.6% |
| Public administration and defense; compulsory social insurance | 374,088.9 | 17.4% | 1,070,896.5 | 10.4% |
| Education services | 158,141.1 | 7.4% | 193,711.7 | 1.9% |
| Activities of households as employers | 162,899.6 | 7.6% | 373,623.7 | 3.6% |
| Other service activities | 45,256.9 | 2.1% | 409,049.6 | 4.0% |

Source: NSO, www.1212.mn

## 5. MODEL SPECIFICATION AND METHODOLOGY

$$X_i = z_{i1} + z_{i2} + \ldots + z_{in} + C_i + G_i + I_i + E_i - M_i =$$
$$a_{i1}X_1 + a_{i2}X_2 + \ldots + a_{in}X_n + C_i + G_i + I_i + E_i - M_i \quad (i=1,2\ldots,n)$$

*(Marto Sargento, 2009)*

$$X = AX + C + G + I + E - M$$

X  -  Total output,

C  -  Households spending,

G  -  Government expenditure,

I  -  Investment,

E  -  Export,

M  -  Import,

A  -  Technological coefficient,

$$\mathbf{X} = \begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix} \quad \mathbf{A} = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$$

# 6. RESULTS AND DISCUSSION

## *Table 1: Investment multipliers, by economic sectors*

| № | Economic sectors | Direct | Indirect | Total |
|---|---|---|---|---|
| S1 | Agriculture, forestry and fishing | 1.095 | 0.633 | 1.728 |
| S2 | Mining and quarrying | 1.039 | 0.196 | 1.235 |
| S3 | Manufacturing | 1.124 | 0.964 | **2.089** |
| S4 | Electricity, gas, steam, air conditioning supply | 1.703 | 0.974 | **2.677** |
| S5 | Water supply; sewerage, waste management and remediation activities | 1.125 | 0.205 | 1.33 |
| S6 | Construction | 1.261 | 0.55 | 1.811 |
| S7 | Wholesale and retail trade; repair of motor vehicles and motorcycles | 1.038 | 1.06 | **2.098** |
| S8 | Transportation and storage | 1.12 | 0.868 | 1.988 |
| S9 | Accomodation and food service activities | 1.006 | 0.182 | 1.188 |
| S10 | Information and communication | 1.09 | 0.376 | 1.466 |
| S11 | Financial and insurance activities | 1.05 | 0.535 | 1.585 |
| S12 | Real estate activities | 1.004 | 0.3 | 1.305 |
| S13 | Professional, scientific and technical activities | 1.03 | 0.43 | 1.46 |
| S14 | Administrative and support service activities | 1.07 | 0.299 | 1.37 |
| S15 | Public administration and defence; compulsory social insurancy | 1.001 | 0.106 | 1.107 |
| S16 | Education services | 1.01 | 0.037 | 1.047 |
| S17 | Human health and social work activities | 1.005 | 0.031 | 1.035 |
| S18 | Arts, entertainment and recreation | 1.003 | 0.018 | 1.021 |
| S19 | Other service activities | 1.162 | 0.066 | 1.228 |
| S20 | Taxes less subsidies on products | 1 | 0 | 1 |

# 6. RESULTS AND DISCUSSION

## *Table 2: The employment multipliers, by economic sectors*

| № | Economic sectors | Direct | Indirect | Total |
|---|---|---|---|---|
| S1 | Agriculture, forestry and fishing | 0.089 | 0.005 | 0.094 |
| S2 | Mining and quarrying | 0.005 | 0.009 | 0.014 |
| S3 | Manufacturing | 0.019 | 0.032 | 0.051 |
| S4 | Electricity, gas, steam, air conditioning supply | 0.019 | 0.009 | 0.029 |
| S5 | Water supply; sewerage, waste management and remediation activities | 0.022 | 0.012 | 0.034 |
| S6 | Construction | 0.022 | 0.015 | 0.038 |
| S7 | Wholesale and retail trade; repair of motor vehicles and motorcycles | 0.041 | 0.008 | 0.049 |
| S8 | Transportation and storage | 0.028 | 0.006 | 0.034 |
| S9 | Accomodation and food service activities | 0.052 | 0.021 | 0.073 |
| S10 | Information and communication | 0.018 | 0.01 | 0.028 |
| S11 | Financial and insurance activities | 0.014 | 0.005 | 0.019 |
| S12 | Real estate activities | 0 | 0.006 | 0.006 |
| S13 | Professional, scientific and technical activities | 0.016 | 0.01 | 0.026 |
| S14 | Administrative and support service activities | 0.031 | 0.014 | 0.045 |
| S15 | Public administration and defence; compulsory social insurancy | 0.038 | 0.005 | 0.044 |
| S16 | Education services | 0.066 | 0.007 | 0.073 |
| S17 | Human health and social work activities | 0.049 | 0.008 | 0.057 |
| S18 | Arts, entertainment and recreation | 0.057 | 0.009 | 0.065 |
| S19 | Other service activities | 0.062 | 0.014 | 0.076 |
| S20 | Taxes less subsidies on products | 0.413 | 0 | 0.413 |
|  | Total effects | 1.061 | 0.207 | 1.268 |

# 6. CONCLUSIONS

## *Investment multipliers*

| № | Economic sectors | Direct | Indirect | Total |
|---|---|---|---|---|
| 1 | **Electricity, gas, steam, air conditioning supply** | 1.703 | 0.974 | **2.677** |
| 2 | Wholesale and retail trade; repair of motor vehicles and motorcycles | 1.038 | 1.06 | 2.098 |
| 3 | **Manufacturing** | 1.124 | 0.964 | **2.089** |
| 4 | Transportation and storage | 1.12 | 0.868 | 1.988 |
| 5 | Construction | 1.261 | 0.55 | 1.811 |
| 6 | **Agriculture, forestry and fishing** | 1.095 | 0.633 | **1.728** |

*Investments in agriculture multiply the total GDP by 1.728...*

# 6. CONCLUSIONS

## *The employment multipliers*

| № | Economic sectors | Direct | Indirect | Total |
|---|---|---|---|---|
| **1** | **Agriculture, forestry and fishing** | **0.089** | **0.005** | **0.094** |
| 2 | Other service activities | 0.062 | 0.014 | 0.076 |
| 3 | Accomodation and food service activities | 0.052 | 0.021 | 0.073 |
| 4 | Education services | 0.066 | 0.007 | 0.073 |
| 5 | Arts, entertainment and recreation | 0.057 | 0.009 | 0.065 |
| 6 | Human health and social work activities | 0.049 | 0.008 | 0.057 |
| 7 | Manufacturing | 0.019 | 0.032 | 0.051 |
| 11 | Construction | 0.022 | 0.015 | 0.038 |
| 18 | Mining and quarrying | 0.005 | 0.009 | 0.014 |
| 19 | Real estate activities | 0 | 0.006 | 0.006 |

*Both multipliers of investment and employment are high only on agriculture*

# 7. FURTHER RESEARCHES

1. *To define the economic sub-sectors (livestock or farming)* **to create more jobs using IOA** *and* **to support it by investment policy**
   - o *To reduce harmful effects on the nature*

2. *The ways to use IOA into environmental issues like a water usage efficiency, forestry, and etc.*

3. *To study other country's success stories of IOA and to adapt them into decision making processes*

# THANK YOU FOR YOUR ATTENTION