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MACRO MODELS

UN APP FOR MACROECONOMIC MODELS

User Manual

Version 1.0

Very Preliminary Version

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\begin{footnotesize}
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\end{footnotesize}
The Income-Expenditure Model

1. Introduction

This paper is simply a user manual of an APP that simulates the widely used Macroeconomic Models.

2. Income Expenditure Model

1. Legenda

**Input**

<table>
<thead>
<tr>
<th>( \hat{C} )</th>
<th>Autonomous (exogenous) Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>( I_0 )</td>
<td>Net Investment</td>
</tr>
<tr>
<td>NX</td>
<td>Net Export</td>
</tr>
<tr>
<td>C</td>
<td>Marginal propensity to consume</td>
</tr>
</tbody>
</table>

| G             | Government Spending              |
| TR            | Net Government Transfers         |
| t             | Income tax rate                  |

**Output**

| NMP           | Net Marginal Propensity to consume |
| Multiplier    | Keynesian Multiplier             |
| Eq. Income    | Equilibrium Income               |
| Eq. Consumption | Equilibrium Consumption     |
| Balance       | Government Surplus               |
| \( \Delta \)Income | Income Variation                 |

**Graph**

| EAD            | Autonomous Aggregate Demand     |
| Y              | Income                           |
| tY             | income tax                       |
| C              | Consumption                      |
| I              | Investment                       |
| D              | Government Surplus               |
| B              | Government Debt                  |
a. The Model

\( Y \) is the Income. The Aggregate Demand is given by

\[ AD = G + NX + I + C \]

Where

\[ G = \bar{G} \]
\[ NX = \bar{NX} \]
\[ I = I_0 \]

The direct Tax Revenue is equal to

\[ TA = tY \]

where \( t \) is the income tax rate

\( TR \) is the Government Transfers

\[ TR = \bar{TR} \]

The Disposable Income is defined as

\[ YD = Y + TR - TA \]
\[ YD = Y + TR - tY \]
\[ YD = (1 - t)Y + TR \]

The consumption function depends on Disposable Income (YD)

\[ C = \bar{C} + cYD \]
\[ C = \bar{C} + c((1 - t)Y + TR) \]
\[ AD = C + I + NX + G + TR \]
\[ AD = \bar{C} + c((1 - t)Y + TR) + I_0 + G + NX \]
\[ AD = \bar{C} + c((1 - t)Yt + TR) + I_0 + G + NX \]
\[ AD = \bar{C} + cTR + I_0 + G + NX + c(1 - t)Y \]

In Equilibrium: Supply(Y) = Demand (AD)
[16.] \[ Y = AD \]

a. Results

Equilibrium Income

[17.] \[ Y_E = \frac{1}{1-c(1-t)}(\bar{C} + cTR + I_0 + G + NX) \]

[18.] \[ \bar{AD} = \bar{C} + cTR + G + NX + I_0 \]

Multipliers

Expenditure’s multiplier

[19.] \[ \frac{dY}{dC} = \frac{dY}{dI_0} = \frac{dY}{dNX} = \frac{dY}{dG} = \frac{1}{1-c(1-t)} \]

Transfer’s multiplier

[20.] \[ \frac{dY}{dTR} = \frac{c}{1-c(1-t)} \]

Tax multiplier

[21.] \[ \frac{dY}{dt} = \frac{-c}{(1-c(1-t))^2} \]

Balance Surplus (BS) is equal to

[22.] \[ BS = TA - G - TR \]

[23.] \[ BS = tY - G - TR \]

[24.] \[ BS = t \frac{1}{1-c(1-t)}(G + cTR + I_0 + NX + C) - G - TR \]

3. References

Blanchard O. (2009), Macroeconomics 5th Edition Pearson Education Inc


4. **APPENDIX**

Results Table 1.1

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Marginal Propensity</strong></td>
<td>$c(1 - t)$</td>
</tr>
<tr>
<td><strong>Multiplier</strong></td>
<td>$\frac{1}{1 - c(1 - t)}$</td>
</tr>
<tr>
<td><strong>Equilibrium Income</strong></td>
<td>$Y_E = \frac{1}{1 - c(1 - t)}(\bar{C} + cTR + I_0 + G + NX)$</td>
</tr>
<tr>
<td><strong>Consumption</strong></td>
<td>$\bar{C} + c((1 - t)Y_E + TR)$</td>
</tr>
<tr>
<td><strong>Balance Surplus</strong></td>
<td>$BS = tY_E - G - TR$</td>
</tr>
</tbody>
</table>