Microfoundations of Effective Demand

Tae-Hee Jo

1. Introduction
2. Methodology of Heterodox Microfoundations
3. Veblen’s Micro-Macro Synthesis
4. Microfoundations of the Business Enterprise
5. Theories of Effective Demand
6. Microfoundations of Effective Demand

Tae-Hee Jo

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University of Missouri–Kansas City

November 30, 2007
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To set up the microfoundations of effective demand from an Institutionalist and Post Keynesian perspective.

1. Methodology of heterodox microfoundations
2. The theory of the business enterprise
3. The principle of effective demand
Questions and Conclusions

- How can we conceptualize microfoundations in heterodox economics?
Questions and Conclusions

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- **Heterodox microfoundations**: linking micro and macro. The generation of macro-outcomes through purposeful micro-actions. Structure–Agency–Causal Mechanism.
Questions and Conclusions

- How can we conceptualize microfoundations in heterodox economics?

- **Heterodox microfoundations**: linking micro and macro. The generation of macro-outcomes through purposeful micro-actions. Structure–Agency–Causal Mechanism.

- Why/What/How Microfoundations of Effective Demand?
Questions and Conclusions

- How can we conceptualize microfoundations in heterodox economics?

- **Heterodox microfoundations**: linking micro and macro. The generation of macro-outcomes through purposeful micro-actions. Structure–Agency–Causal Mechanism.

- Why/What/How Microfoundations of Effective Demand?

  1. Problems of NC microfoundations and HT macrofoundations.
  2. Expenditure decisions determine output, employment, and income + Actions embedded in causal mechanisms and socio-economic structures.
  3. *Input-Output Matrix* and *Price-Quantity Model*
Contributions

- **Challenging conventional wisdoms**: The micro-macro dichotomy, neoclassical microfoundations, PW/PK macrofoundations, and (macro) theories of effective demand.
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- **Challenging conventional wisdoms**: The micro-macro dichotomy, neoclassical microfoundations, PW/PK macrofoundations, and (macro) theories of effective demand.

- **The micro-macro synthetic approach**: by way of Veblen and Post Keynesians (Kalecki, Eichner, and Lee); Critical Realism.
Contributions

- **Challenging conventional wisdoms**: The micro-macro dichotomy, neoclassical microfoundations, PW/PK macrofoundations, and (macro) theories of effective demand.

- **The micro-macro synthetic approach**: by way of Veblen and Post Keynesians (Kalecki, Eichner, and Lee); Critical Realism.

- **Enhancing the principle of effective Demand**: by incorporating micro and by identifying structures, casual mechanisms, and the role of agency.
Why and What Methodology?

Methodology: inquiry into the structure of science (visions, assumptions, theory, methods, and applications).
**Methodology**: inquiry into the structure of science (visions, assumptions, theory, methods, and applications).


- The methodological principles of the microfoundations of effective demand.
Neoclassical Microfoundations

- Scarcity and rationality; methodological individualism, closed-system.
- Micro-reductionism, the fallacy of composition, the fallacy of aggregation (under-specification), the absence of emergent properties and social relations
Post Walrasian Macrofoundations

- Heterogeneity, institutional constraints, bounded rationality, emergent properties, and path-dependency
- The priority of macro-constraints on individual choices
- Rational choice + (dis)equilibrium approach in a more complex context
Marx’s Political Economy: Micro-macro issues are integrated at the class level; class relations and material conditions. Reciprocal influence between micro and macro
Heterodoxy: Marx, Veblen, and Keynes

- **Marx’s Political Economy**: Micro-macro issues are integrated at the class level; class relations and material conditions. Reciprocal influence between micro and macro

- **Veblen’s Evolutionary Institutionalism**: Micro-Macro synthesis. Agency is co-existing with structure (institutions). Active agency at the center of the evolutionary process
Heterodoxy: Marx, Veblen, and Keynes

- Marx’s Political Economy: Micro-macro issues are integrated at the class level; class relations and material conditions. Reciprocal influence between micro and macro

- Veblen’s Evolutionary Institutionalism: Micro-Macro synthesis. Agency is co-existing with structure (institutions). Active agency at the center of the evolutionary process

- Keynes’s Non-ergodic Economics: Analytical dualism between micro and macro with an emphasis on the latter. But Keynes had micro ideas which paved the way for macro theories.
**Post Keynesian Approaches**

- **PK macrofoundations:** Dominance of macro over micro. Legitimizing micro-reality via macrofoundations. Lack of micro-reality, fallacy of aggregation, incompatibility between macrofoundations and open-system ontology.
Post Keynesian Approaches

- **PK macrofoundations**: Dominance of macro over micro. Legitimizing micro-reality via macrofoundations. Lack of micro-reality, fallacy of aggregation, incompatibility between macrofoundations and open-system ontology.

- **Sraffian structural approach**: Theory of value, distribution, and output are integrated. Structural forces and long-period approach. Absence of actions (agency) and diverse institutional settings.
Post Keynesian Approaches

- **PK macrofoundations**: Dominance of macro over micro. **Legitimizing micro-reality via macrofoundations. Lack of micro-reality, fallacy of aggregation, incompatibility between macrofoundations and open-system ontology.**

- **Sraffian structural approach**: Theory of value, distribution, and output are integrated. **Structural forces and long-period approach. Absence of actions (agency) and diverse institutional settings.**

- **Kaleckian microfoundations**: Macro analysis grounded in micro-reality (degree of monopoly, class relations), which sheds lights on the micro-macro synthetic approach
Heterodox Microfoundations

- **Structures**: Circular production economy, surplus production economy, and monetary production economy.

**Input-Output Matrix**: Irreducible and indecomposable reality. Inter-industrial flows of intermediate goods, surplus (final goods), and total outputs in value terms.
**Structured Microfoundations**

- **Structures**: Circular production economy, surplus production economy, and monetary production economy.

**Input-Output Matrix**: Irreducible and indecomposable reality. Inter-industrial flows of intermediate goods, surplus (final goods), and total outputs in value terms.

- **Agency and Causal mechanisms**: Agency renders structures open and going through causal mechanisms.
Input-Output Matrix

Microfoundations of Effective Demand
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\[
\text{Value of intermediate output} + \text{Value of final output (surplus)} = \text{Value of total commodity output}
\]

\[
\text{Value of material inputs} + \text{Value added (wage+profit)} = \text{Value of total industry output}
\]
Micro-Macro Dichotomy: A Veblenian view

- Micro-macro dichotomy → microfoundations, micro-reductionism, formalism;
  Utilitarian–Marginalist–Newtonian.
- A settled habit of thought that rules the way of analyzing the real world.
Micro-Macro Dichotomy: A Veblenian view

- Micro-macro dichotomy → microfoundations, micro-reductionism, formalism; Utilitarian–Marginalist–Newtonian.
- A settled habit of thought that rules the way of analyzing the real world.
- Alternative approaches and ideas are ignored and vulgarized since they challenge the status quo, conventional wisdoms, and vested interests.
- Theory for the sake of theory: ‘ceremonial adequacy’
Cultural, complex, social, historical, realistic, emergent, open-ended, path-dependent, dynamic, phylogenetic, interdisciplinary, and evolutionary
Veblen’s Synthesis

- Cultural, complex, social, historical, realistic, emergent, open-ended, path-dependent, dynamic, phylogenetic, interdisciplinary, and evolutionary

- **Agency**: ‘social animal’ – instincts, knowledge, skills, habits, and actions.
Veblen’s Synthesis

- Cultural, complex, social, historical, realistic, emergent, open-ended, path-dependent, dynamic, phylogenetic, interdisciplinary, and evolutionary
- **Agency**: ‘social animal’ – instincts, knowledge, skills, habits, and actions.
- **Society and Agency**: interaction by way of the formation and the evolution of institutions.
Veblen’s Synthesis

- Cultural, complex, social, historical, realistic, emergent, open-ended, path-dependent, dynamic, phylogenetic, interdisciplinary, and evolutionary

- **Agency**: ‘social animal’ – instincts, knowledge, skills, habits, and actions.

- **Society and Agency**: interaction by way of the formation and the evolution of institutions.

- **Evolutionary Process**: Social structure and culture $\rightarrow$ action (*origination*) $\rightarrow$ institutions at the macro (*diffusion & adaption*) $\rightarrow$ structure and culture (*retention*)......
Neo-Schumpeterian Synthesis: Micro-Meso-Macro

- Evolutionary process: complex adaptive system → formal evolutionary model; system dynamics, simulation, evolutionary games.
Neo-Schumpeterian Synthesis:
Micro-Meso-Macro

- Evolutionary process: complex adaptive system → formal evolutionary model; system dynamics, simulation, evolutionary games.
- Meso: knowledge, rules, routines, network.
Neo-Schumpeterian Synthesis: Micro-Meso-Macro

- Evolutionary process: complex adaptive system → formal evolutionary model; system dynamics, simulation, evolutionary games.
- Meso: knowledge, rules, routines, network.
- Veblen Vs. Neo-Schumpeterians

<table>
<thead>
<tr>
<th>Center of Analysis</th>
<th>Veblen</th>
<th>Neo-Schumpeterians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitual action</td>
<td>Purposeful action</td>
<td>Knowledge and Rules</td>
</tr>
<tr>
<td>Complex social being</td>
<td></td>
<td>Innovative knowledge</td>
</tr>
<tr>
<td>Settled habits of thought</td>
<td></td>
<td>Rule-maker, Rule-carrier</td>
</tr>
<tr>
<td>Heterogeneous</td>
<td></td>
<td>Settled rules</td>
</tr>
<tr>
<td>System of institutions</td>
<td></td>
<td>Heterogeneous</td>
</tr>
<tr>
<td>Procedural</td>
<td></td>
<td>System of rules</td>
</tr>
<tr>
<td>Fundamental</td>
<td></td>
<td>Bounded</td>
</tr>
<tr>
<td>Narrative</td>
<td></td>
<td>Partial</td>
</tr>
<tr>
<td>Holistic</td>
<td></td>
<td>Formal</td>
</tr>
<tr>
<td>Individualistic (non-atomistic)</td>
<td></td>
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</tr>
</tbody>
</table>
The Business Enterprise: Institutionalist approach

The directing force of the capitalist system. (Veblen)

- An organized going concern, a collective agent, an emergent social institution
The Business Enterprise: Institutionalist approach

The directing force of the capitalist system. (Veblen)

■ An organized going concern, a collective agent, an emergent social institution

■ Accumulation of pecuniary wealth and power (survival and growth over time)
The Business Enterprise: Institutionalist approach

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- An organized going concern, a collective agent, an emergent social institution
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- The most powerful agent in the industrial society: business interest ↔ public interest
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- Control of prices and output
The Business Enterprise: Institutionalist approach

The directing force of the capitalist system. (Veblen)

- An organized going concern, a collective agent, an emergent social institution
- Accumulation of pecuniary wealth and power (survival and growth over time)
- The most powerful agent in the industrial society: business interest ↔ public interest
- Control of prices and output
- Business principles (emulation, efficiency, vendibility) become dominant over public (social) principle (cooperation, effectiveness, and reciprocity)
The Business Enterprise: Post Keynesian approach

Michal Kalecki, Alfred Eichner
The Business Enterprise: Post Keynesian approach

- Michal Kalecki, Alfred Eichner
- Degree of monopoly, Megacorp
The Business Enterprise: Post Keynesian approach

- Michal Kalecki, Alfred Eichner
- Degree of monopoly, Megacorp
- Strategic pricing and investment based on socio-economic structures and relations
The Business Enterprise: Post Keynesian approach

- Michal Kalecki, Alfred Eichner
- Degree of monopoly, Megacorp
- Strategic pricing and investment based on socio-economic structures and relations
- from micro to macrodynamics
Three pricing mechanisms in relation to production and costing structures of the enterprise.
Pricing

Three pricing mechanisms in relation to production and costing structures of the enterprise.

1. Mark-up pricing
2. Normal cost pricing
3. Target rate of return pricing
Three pricing mechanisms in relation to production and costing structures of the enterprise.

1. Mark-up pricing
2. Normal cost pricing
3. Target rate of return pricing

- administered prices
- stable prices
- reproduction, not market-clearing
Investment and Pricing
Aggregate output, employment, and distribution are mainly the results of strategic business activities circumscribed by the structure of industry.
Linking Micro and Macro

- Aggregate output, employment, and distribution are mainly the results of strategic business activities circumscribed by the structure of industry.

- No reason to assume that investment behavior is identical in each industry and over time.
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Ex: Concentration of industry → increasing average profit mark-up → stagnant investment and consumption → decreasing effective demand → decreasing output, income, employment, and growth.

For the persistent growth of the economy, private and public investment should be managed by active industrial policy.
Aggregate output, employment, and distribution are mainly the results of strategic business activities circumscribed by the structure of industry. No reason to assume that investment behavior is identical in each industry and over time. Ex: Concentration of industry → increasing average profit mark-up → stagnant investment and consumption → decreasing effective demand → decreasing output, income, employment, and growth. For the persistent growth of the economy, private and public investment should be managed by active industrial policy.
Capitalist economic system is coordinated by effective demand: Demand drives the economy.
Keynes’s Principle of Effective Demand

- Capitalist economic system is coordinated by effective demand: Demand drives the economy
- Persistent unemployment
Keynes’s Principle of Effective Demand

- Capitalist economic system is coordinated by effective demand: Demand drives the economy
- Persistent unemployment
- Significance of money and investment; *generalized* behavioral relations.
Long-period: ‘the center of gravitation’ in which the uniform rate of profit prevails; institution-free state.
Sraffian Long-period Approach to Effective Demand

- Long-period: ‘the center of gravitation’ in which the uniform rate of profit prevails; institution-free state.
- Effective demand in the long-period: theory of normal output determination.
Critiques of Keynes and Sraffians

- Keynes’s generality: independent of micro actions, relations, and industrial structures. Absence of enterprise investment.
Critiques of Keynes and Sraffians

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  ⇒ **Structure matters**: industrial structure, the degree of monopoly
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- Sraffian convergence to the LP equilibrium
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- Keynes’s generality: independent of micro actions, relations, and industrial structures. Absence of enterprise investment.
  - \( \Rightarrow \) Structure matters: industrial structure, the degree of monopoly
- Sraffian pure theory: institution- and behavior-free. Only the system matters.
  - \( \Rightarrow \) Agency matters. Institution results in space- and history-contingent actualization.
- Sraffian convergence to the LP equilibrium
  - \( \Rightarrow \) The cumulative evolutionary process does not necessarily end up with the pre-supposed long-period position.
Micro-analysis and Effective Demand

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- Kalecki, Eichner, Post Keynesian microeconomists
Microfoundations of Effective Demand

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- Kalecki, Eichner, Post Keynesian microeconomists
- Technical condition & market structure → Cost structure → Pricing → Production & Sales → Financing → Investment → Effective Demand → Output, Income, Distribution, and Employment
Structures, Causal Mechanisms, Agency, and Institutions

- Structure of production → output, employment, wage, profits, surplus, and income structures
- Causal mechanisms: Consumption (households), pricing and investment (business enterprises), government spending (the State)
- Institutions confine actions and the operations of causal mechanisms.
Structure of Economy

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Structure of Economy
Structure of Economy

[Equation 1]

\[
\begin{bmatrix}
g_{11} & \cdots & g_{1n} & l_{11} & \cdots & l_{1z} \\
g_{21} & \cdots & g_{2n} & l_{21} & \cdots & l_{2z} \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
g_{m1} & \cdots & g_{mn} & l_{m1} & \cdots & l_{mz}
\end{bmatrix}
\rightarrow
\begin{bmatrix}
q_1 \\
q_2 \\
\vdots \\
q_m
\end{bmatrix}
\]
Structure of Economy

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\[
\begin{bmatrix}
g_{11} & \cdots & g_{1n} & l_{11} & \cdots & l_{1z} \\
g_{21} & \cdots & g_{2n} & l_{21} & \cdots & l_{2z} \\
\vdots & & \vdots & \vdots & & \vdots \\
g_{m1} & \cdots & g_{mn} & l_{m1} & \cdots & l_{mz}
\end{bmatrix}
\rightarrow
\begin{bmatrix}
q_1 \\
q_2 \\
\vdots \\
q_m
\end{bmatrix}
\]  

(1)

\[
G + L \rightarrow Q_{d}
\]

Structure of Production

\[
Q_1 + Q_2 = Q
\]

Structure of Output

\[
Q_2 = Q_{2C} + Q_{2I} + Q_{2G}
\]

Structure of Final Demand
Structure of Economy

Microfoundations of Effective Demand

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\[
\begin{bmatrix}
g_{11} & \cdots & g_{1n} & l_{11} & \cdots & l_{1z} \\
g_{21} & \cdots & g_{2n} & l_{21} & \cdots & l_{2z} \\
\vdots & \cdots & \vdots & \vdots & \cdots & \vdots \\
g_{m1} & \cdots & g_{mn} & l_{m1} & \cdots & l_{mz}
\end{bmatrix} \rightarrow \begin{bmatrix}
q_1 \\
q_2 \\
\vdots \\
q_m
\end{bmatrix}
\]

(1)

\[G + L \rightarrow Q_d\]

Structure of Production

\[Q_1 + Q_2 = Q\]

Structure of Output

\[Q_2 = Q_{2C} + Q_{2I} + Q_{2G}\]

Structure of Final Demand

\[Gp_1 + Lw + \Pi = Q_{dp}\]

Monetary structure

\[Q_dBw = Lw\]

Employment structure

\[w = e(Lw)\]

Total wage bill

\[\pi = (Q'p) - e[Gp_1 + Lw]\]

Total profits

\[s = e(Q_{d2p_2})\]

Value of surplus

\[Q_{d2p_2} = Q_{d2Cp_2} + Q_{d2Ip_2} + Q_{d2Gp_2}\]

Monetary structure of final demand

\[e(Q_{d2p_2}) = c_wLw + c_c\Pi + re\Pi\]

National income
Causal Mechanisms

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\[
e Q_{d2Cp2} = c_wLw - kLw + c_c\Pi \\
e Q_{d2Ip2} = r\epsilon\Pi - f \\
e Q_{d2Gp2} = kLw + f \\
[m_i p_1 + n_i w][1 + r_i] = p_i
\]

Consumption (12)
Investment (13)
Gov. spending (14)
Pricing (15)
Price-Quantity Model

\[ [R][Mp_1 + Nw] = p \]
\[ A'Q + Q_2 = Q \]
\[ Q_d \hat{A}p + \hat{Q}_d p = Q_dp \]

Price model \hspace{1cm} (16)
Quantity model \hspace{1cm} (17)
Price-Quantity model \hspace{1cm} (18)
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\[
\begin{align*}
&\left\{ R; M, N, w, p_1, Q_{2C}, Q_{2I}, Q_{2G}; A, B, c_w, c_c, k, re \right\} \\
&\quad \to \left\{ p, Q_2, Q_1 \right\} \\
&\quad \to \left\{ Q_d p \right\} \\
&\quad \to \left\{ \frac{L}{\Pi} \right\}
\end{align*}
\]

- Indecomposable and irreducible emergent causal mechanisms
- \( p \) and \( Q \) are determined separately
- Technical conditions \((M, N, A, B), w, p, R, re, \) and \( f \Rightarrow \) Investment demand
Keynes’s Principle of Effective Demand

\[
\begin{align*}
\{ w, r \} & \rightarrow p_k^s \\
\{ f(MEC, i), f(LP, M) \} & \rightarrow p_k^d \\
\{ p_k^s, p_k^d \} & \rightarrow \{ p_k^*, I \} \\
Y &= C + I + G \\
C &= \alpha Y \\
I &= S \\
Z &= D
\end{align*}
\]

\[
\text{Multiplier : } \frac{dY}{dI} = \frac{1}{1-\alpha}
\]
### Table 7. The Use of Commodities by Industries: U.S, 2002

<table>
<thead>
<tr>
<th>Commodities/Industries</th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Finance</th>
<th>Government</th>
<th>Total intermediate uses*</th>
<th>Total final uses</th>
<th>Total commodity output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>55,800</td>
<td>138,434</td>
<td>1,510</td>
<td>1,551</td>
<td>216,512</td>
<td>35,794</td>
<td>252,306</td>
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<tr>
<td>Mining</td>
<td>386</td>
<td>139,358</td>
<td>1,451</td>
<td>9,497</td>
<td>242,059</td>
<td>-61,579**</td>
<td>180,481</td>
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<tr>
<td>Utilities</td>
<td>5,958</td>
<td>48,427</td>
<td>28,519</td>
<td>48,192</td>
<td>210,450</td>
<td>176,990</td>
<td>387,440</td>
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<tr>
<td>Construction</td>
<td>895</td>
<td>8,118</td>
<td>28,388</td>
<td>48,192</td>
<td>210,450</td>
<td>176,990</td>
<td>387,440</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>46,582</td>
<td>1,257,656</td>
<td>80,111</td>
<td>194,326</td>
<td>2,396,539</td>
<td>1,400,908</td>
<td>3,797,446</td>
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<tr>
<td>Wholesale trade</td>
<td>10,432</td>
<td>221,251</td>
<td>9,909</td>
<td>29,898</td>
<td>411,960</td>
<td>447,463</td>
<td>859,423</td>
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<tr>
<td>Retail trade</td>
<td>165</td>
<td>10,269</td>
<td>11,085</td>
<td>156</td>
<td>93,346</td>
<td>907,831</td>
<td>1,001,177</td>
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<tr>
<td>Transportation</td>
<td>7,590</td>
<td>117,205</td>
<td>27,436</td>
<td>35,469</td>
<td>395,428</td>
<td>189,589</td>
<td>585,017</td>
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<tr>
<td>Information</td>
<td>1,178</td>
<td>38,819</td>
<td>27,802</td>
<td>58,631</td>
<td>497,360</td>
<td>357,572</td>
<td>854,932</td>
</tr>
<tr>
<td>Finance, insurance</td>
<td>14,229</td>
<td>100,451</td>
<td>570,465</td>
<td>75,169</td>
<td>1,337,903</td>
<td>1,877,909</td>
<td>3,215,812</td>
</tr>
<tr>
<td>Professional services</td>
<td>4,767</td>
<td>310,604</td>
<td>239,495</td>
<td>197,095</td>
<td>1,728,656</td>
<td>384,383</td>
<td>2,113,039</td>
</tr>
<tr>
<td>Government</td>
<td>113</td>
<td>3,232</td>
<td>9,147</td>
<td>9,607</td>
<td>71,523</td>
<td>1,646,870</td>
<td>1,718,393</td>
</tr>
<tr>
<td>Total intermediate</td>
<td>151,875</td>
<td>2,501,094</td>
<td>1,097,334</td>
<td>801,947</td>
<td>8,267,088</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total value added</td>
<td>98,616</td>
<td>1,351,630</td>
<td>2,125,736</td>
<td>1,326,717</td>
<td>10,480,820</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total industry output</td>
<td>250,491</td>
<td>3,852,724</td>
<td>3,223,070</td>
<td>2,128,664</td>
<td>18,747,908</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Survey of Current Business 2003, Department of Commerce, U.S.

**Notes:** All numbers are in millions of Dollars

- * Total final uses are composed of consumption, inventories, net exports, and government consumption.
- **This value is negative since net exports is negative and greater than the sum of other final uses.
1. Introduction
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3. Veblen’s Micro-Macro Synthesis
4. Microfoundations of the Business Enterprise
5. Theories of Effective Demand
6. Microfoundations of Effective Demand

Figure: GDP Growth Rates: 1990-2007
### Microfoundations of Effective Demand

**Tae-Hee Jo**

1. **Introduction**
2. **Methodology of Heterodox Microfoundations**
3. **Veblen’s Micro-Macro Synthesis**
4. **Microfoundations of the Business Enterprise**
5. **Theories of Effective Demand**
6. **Microfoundations of Effective Demand**

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**Table:** U.S Capital Expenditures by Industry: 2000 to 2004

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total expenditures</strong></td>
<td>1,090</td>
<td>1,052</td>
<td>917</td>
<td>887</td>
<td>959</td>
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<tr>
<td>Forestry, fishing, agriculture</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Mining</td>
<td>43</td>
<td>51</td>
<td>42</td>
<td>51</td>
<td>54</td>
</tr>
<tr>
<td>Utilities</td>
<td>61</td>
<td>83</td>
<td>66</td>
<td>55</td>
<td>50</td>
</tr>
<tr>
<td>Construction</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>23</td>
<td>29</td>
</tr>
<tr>
<td><strong>Manufacturing</strong></td>
<td>215</td>
<td>193</td>
<td>157</td>
<td>149</td>
<td>157</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>34</td>
<td>30</td>
<td>27</td>
<td>26</td>
<td>32</td>
</tr>
<tr>
<td>Retail trade</td>
<td>70</td>
<td>67</td>
<td>59</td>
<td>60</td>
<td>72</td>
</tr>
<tr>
<td>Transportation</td>
<td>60</td>
<td>58</td>
<td>47</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td>160</td>
<td>145</td>
<td>88</td>
<td>81</td>
<td>83</td>
</tr>
<tr>
<td>Finance/insurance</td>
<td>134</td>
<td>131</td>
<td>128</td>
<td>121</td>
<td>153</td>
</tr>
<tr>
<td>Real estate, rental, leasing</td>
<td>92</td>
<td>83</td>
<td>95</td>
<td>88</td>
<td>92</td>
</tr>
<tr>
<td>Professional, science, technical services</td>
<td>34</td>
<td>30</td>
<td>26</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Management</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Administrative and support services</td>
<td>18</td>
<td>16</td>
<td>15</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Educational services</td>
<td>18</td>
<td>17</td>
<td>20</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Health care and social assistance</td>
<td>52</td>
<td>53</td>
<td>59</td>
<td>51</td>
<td>65</td>
</tr>
<tr>
<td>Arts, entertainment, and recreation</td>
<td>19</td>
<td>15</td>
<td>13</td>
<td>11</td>
<td>12</td>
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<tr>
<td>Accommodation and food services</td>
<td>26</td>
<td>21</td>
<td>22</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Other services</td>
<td>21</td>
<td>29</td>
<td>21</td>
<td>26</td>
<td>20</td>
</tr>
<tr>
<td><strong>Structure and equipment expenditures</strong></td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>


*Notes:* In billions of dollars. Covers only companies with employees.
## Contributions to GDP by Industry

### Table: Contributions to Percent Change in Real GDP by Industry, 2000-2004

<table>
<thead>
<tr>
<th>Industry</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GDP growth</strong></td>
<td>3.70</td>
<td>0.50</td>
<td>2.20</td>
<td>3.10</td>
<td>4.40</td>
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<tr>
<td>Private industries</td>
<td>3.48</td>
<td>0.51</td>
<td>1.97</td>
<td>2.66</td>
<td>4.02</td>
</tr>
<tr>
<td>Forestry/fishing/agriculture</td>
<td>0.12</td>
<td>0.00</td>
<td>0.02</td>
<td>0.02</td>
<td>-0.07</td>
</tr>
<tr>
<td>Mining</td>
<td>-0.04</td>
<td>-0.07</td>
<td>0.00</td>
<td>-0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Utilities</td>
<td>0.11</td>
<td>-0.17</td>
<td>0.10</td>
<td>0.05</td>
<td>0.11</td>
</tr>
<tr>
<td>Construction</td>
<td>0.03</td>
<td>-0.10</td>
<td>-0.14</td>
<td>0.01</td>
<td>0.10</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.92</td>
<td>-0.78</td>
<td>0.32</td>
<td>0.22</td>
<td>0.54</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>-0.03</td>
<td>0.13</td>
<td>0.13</td>
<td>0.15</td>
<td>0.19</td>
</tr>
<tr>
<td>Retail trade</td>
<td>0.30</td>
<td>0.54</td>
<td>0.54</td>
<td>0.36</td>
<td>0.36</td>
</tr>
<tr>
<td>Transportation</td>
<td>0.16</td>
<td>-0.02</td>
<td>-0.02</td>
<td>0.08</td>
<td>0.10</td>
</tr>
<tr>
<td>Information</td>
<td>0.22</td>
<td>0.15</td>
<td>0.15</td>
<td>0.43</td>
<td>0.44</td>
</tr>
<tr>
<td>Finance/insurance/real estate/rental</td>
<td>1.02</td>
<td>0.34</td>
<td>0.34</td>
<td>0.77</td>
<td>1.14</td>
</tr>
<tr>
<td>Professional services</td>
<td>0.37</td>
<td>0.28</td>
<td>0.28</td>
<td>0.23</td>
<td>0.55</td>
</tr>
<tr>
<td>Educational/health care/social service</td>
<td>0.19</td>
<td>0.29</td>
<td>0.29</td>
<td>0.23</td>
<td>0.21</td>
</tr>
<tr>
<td>Arts/ entertainment/accommodation/food</td>
<td>0.12</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.16</td>
</tr>
<tr>
<td>Other services</td>
<td>-0.01</td>
<td>-0.10</td>
<td>-0.10</td>
<td>0.07</td>
<td>0.17</td>
</tr>
<tr>
<td>Government</td>
<td>0.25</td>
<td>0.15</td>
<td>0.15</td>
<td>0.17</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Table: Number of Employees by Industry: U.S. 2000, 2002, and 2003

<table>
<thead>
<tr>
<th>Industry</th>
<th>2000</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total employees</td>
<td>114,065</td>
<td>112,401</td>
<td>113,398</td>
</tr>
<tr>
<td>Forestry/fishing/agriculture</td>
<td>184</td>
<td>181</td>
<td>181</td>
</tr>
<tr>
<td>Mining</td>
<td>456</td>
<td>466</td>
<td>455</td>
</tr>
<tr>
<td>Utilities</td>
<td>655</td>
<td>648</td>
<td>676</td>
</tr>
<tr>
<td>Construction</td>
<td>6,573</td>
<td>6,307</td>
<td>6,381</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>16,474</td>
<td>14,394</td>
<td>14,132</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>6,112</td>
<td>5,860</td>
<td>5,864</td>
</tr>
<tr>
<td>Retail trade</td>
<td>14,841</td>
<td>14,820</td>
<td>14,868</td>
</tr>
<tr>
<td>Transportation</td>
<td>3,790</td>
<td>3,581</td>
<td>4,068</td>
</tr>
<tr>
<td>Information</td>
<td>3,546</td>
<td>3,536</td>
<td>3,600</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>5,963</td>
<td>6,415</td>
<td>6,484</td>
</tr>
<tr>
<td>Real estate, rental, and leasing</td>
<td>1,942</td>
<td>2,017</td>
<td>2,045</td>
</tr>
<tr>
<td>Professional services</td>
<td>6,816</td>
<td>7,046</td>
<td>7,340</td>
</tr>
<tr>
<td>Management</td>
<td>2,874</td>
<td>2,914</td>
<td>2,879</td>
</tr>
<tr>
<td>Admin/support waste mgt/remediation</td>
<td>9,138</td>
<td>8,299</td>
<td>8,511</td>
</tr>
<tr>
<td>Educational services</td>
<td>2,532</td>
<td>2,702</td>
<td>2,777</td>
</tr>
<tr>
<td>Health care and social assistance</td>
<td>14,109</td>
<td>14,900</td>
<td>15,472</td>
</tr>
<tr>
<td>Arts/entertainment</td>
<td>1,741</td>
<td>1,801</td>
<td>1,833</td>
</tr>
<tr>
<td>Accommodation and food</td>
<td>9,881</td>
<td>10,049</td>
<td>10,440</td>
</tr>
<tr>
<td>Other services</td>
<td>5,293</td>
<td>5,420</td>
<td>5,367</td>
</tr>
</tbody>
</table>


Note: Numbers are in thousands.
The principle of effective demand without industrial effects has limited practical implications.
1. The principle of effective demand without industrial effects has limited practical implications.

2. Industrial variations in investment, contributions of each industry to GDP, industry-specific employment pattern → Concrete picture of the generation of and changes in GDP, income, employment, and growth