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# Understanding the Economic Benefit of National Infrastructure Systems

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# Background

The question is not *if*

infrastructure and economic

activity are correlated but *how*

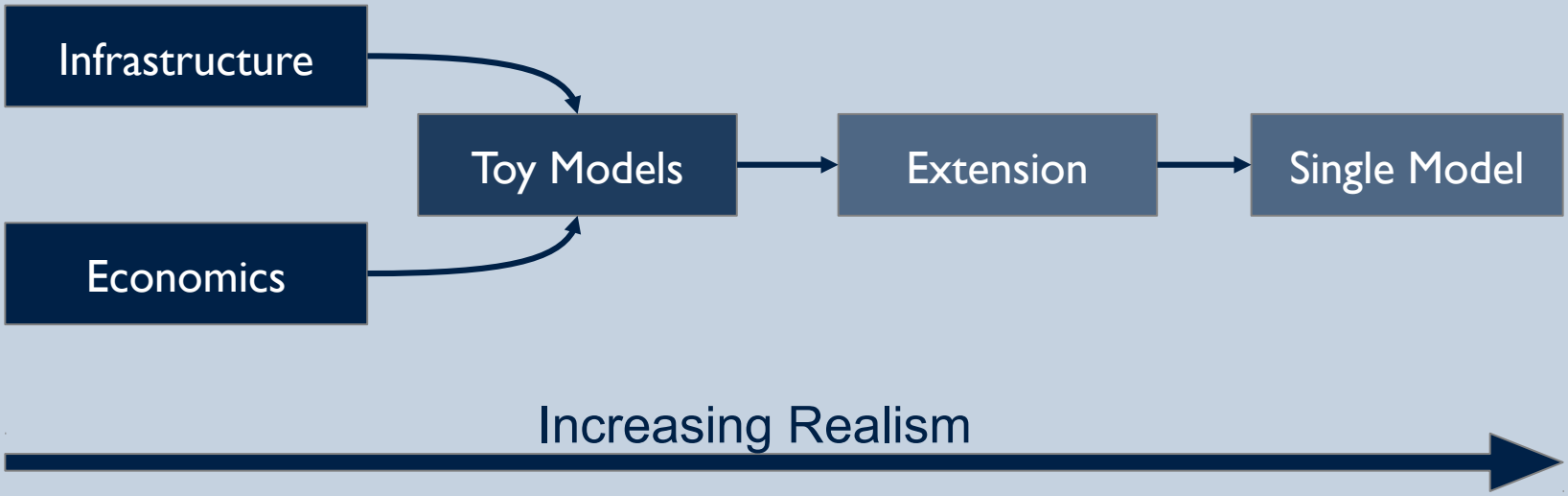
and the processes behind this.

# Background

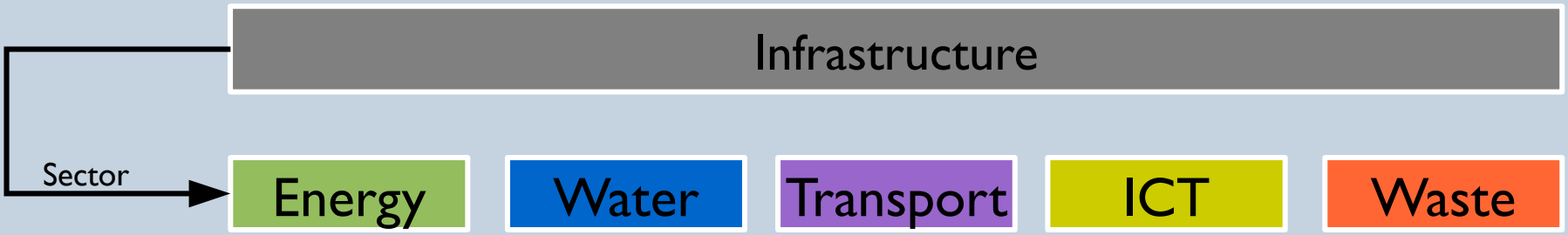
- Current models represent congestion effects
- Cambridge Capital Controversy
- Network externalities
- No spatiality

# Aim

The aim is to construct a candidate endogenous growth model that internalises the economic impact of infrastructure systems.



# Economic Impacts of Infrastructure



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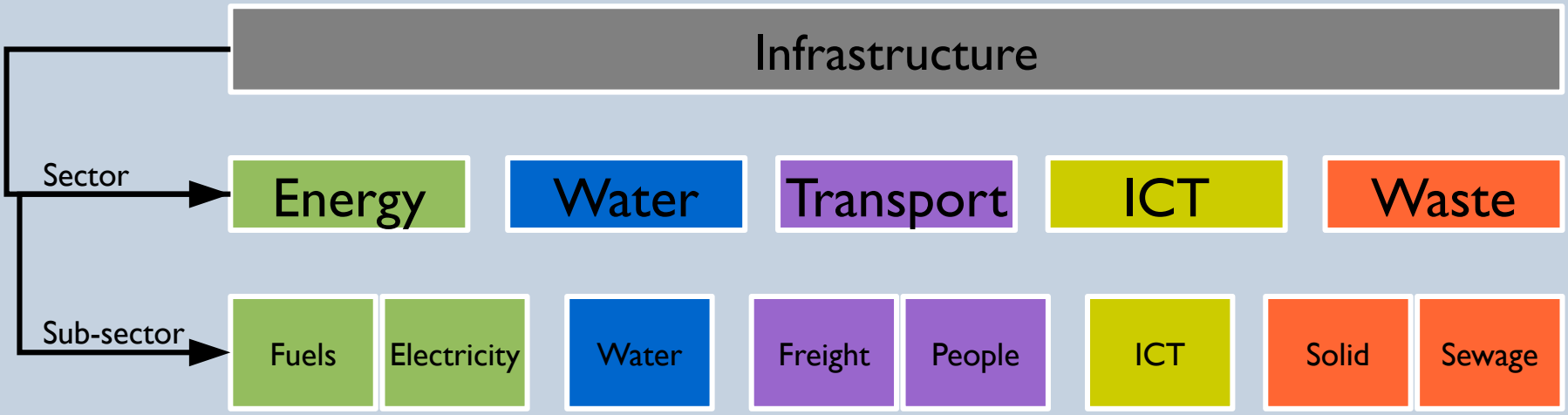

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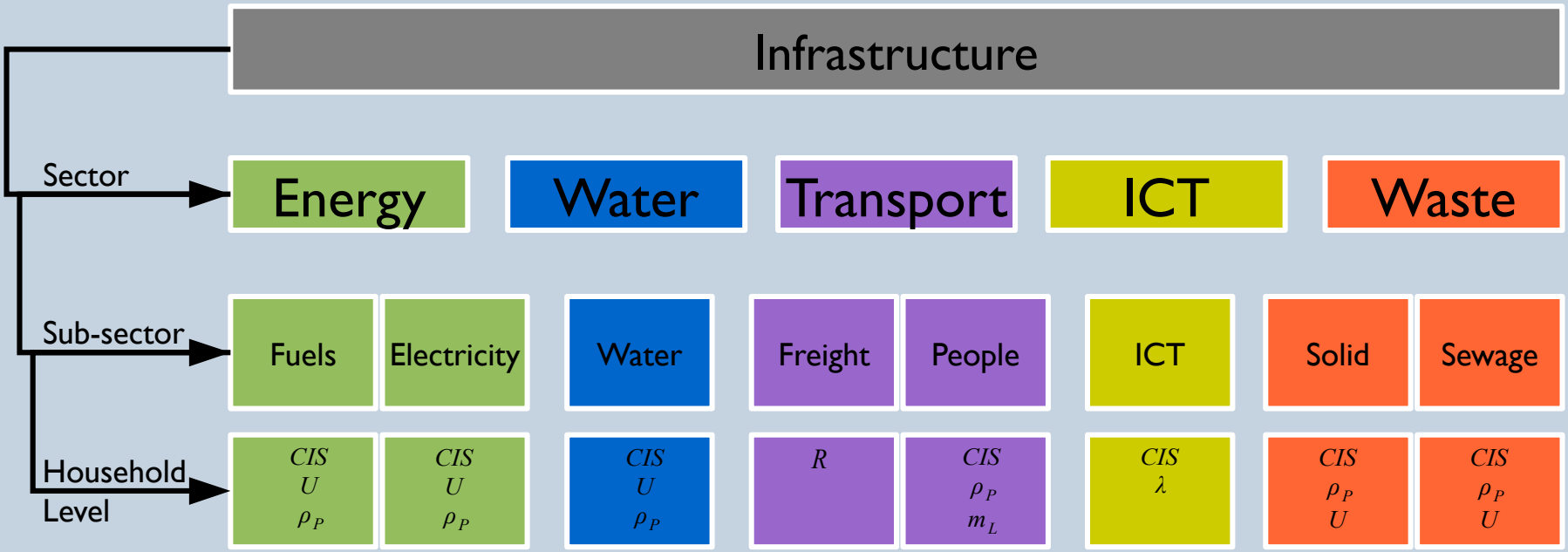

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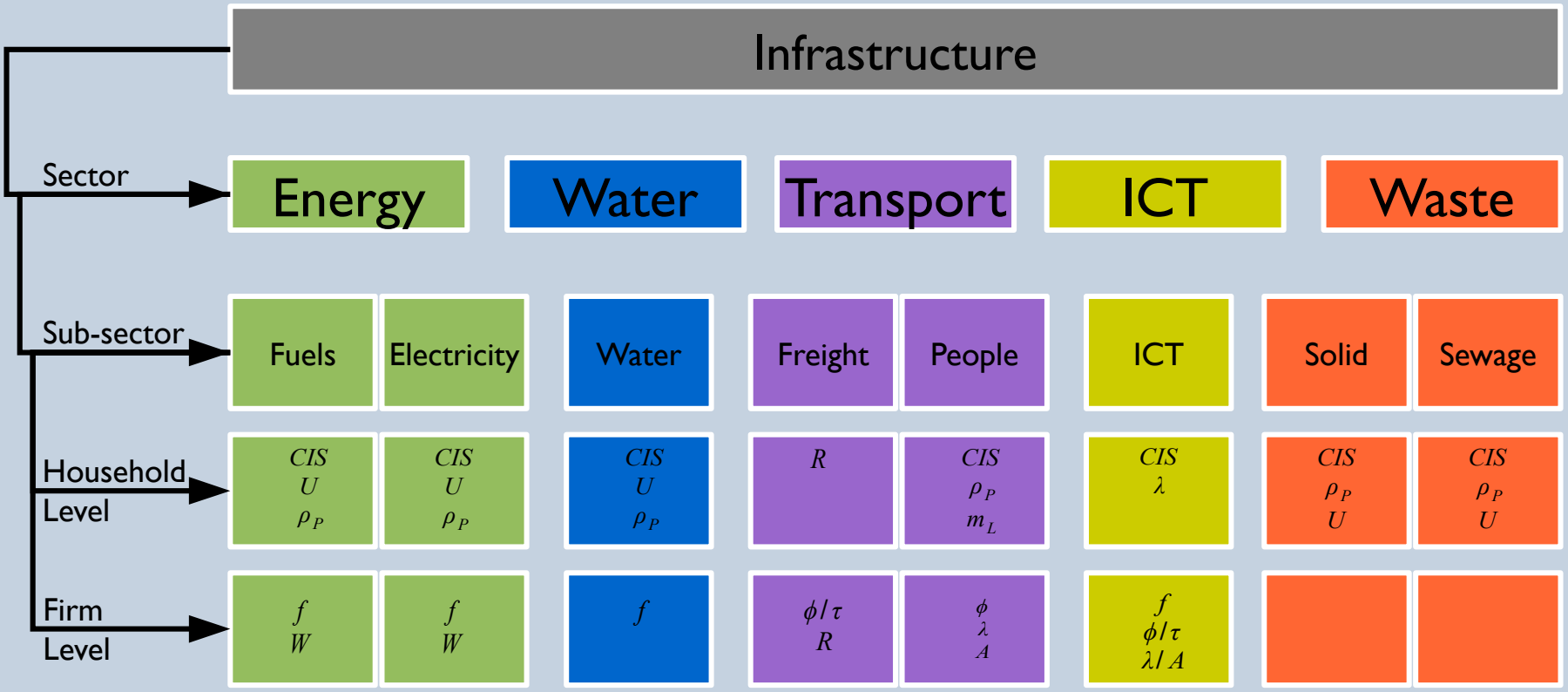


# Growth Theories

# Growth Theories

Romer-Lucas

NEG-Growth

Energy Economics

Neo Marxian

# Growth Mechanisms



Energy Economics : Useful Work ($W$) & Exergy Conversion Efficiency ($f$)

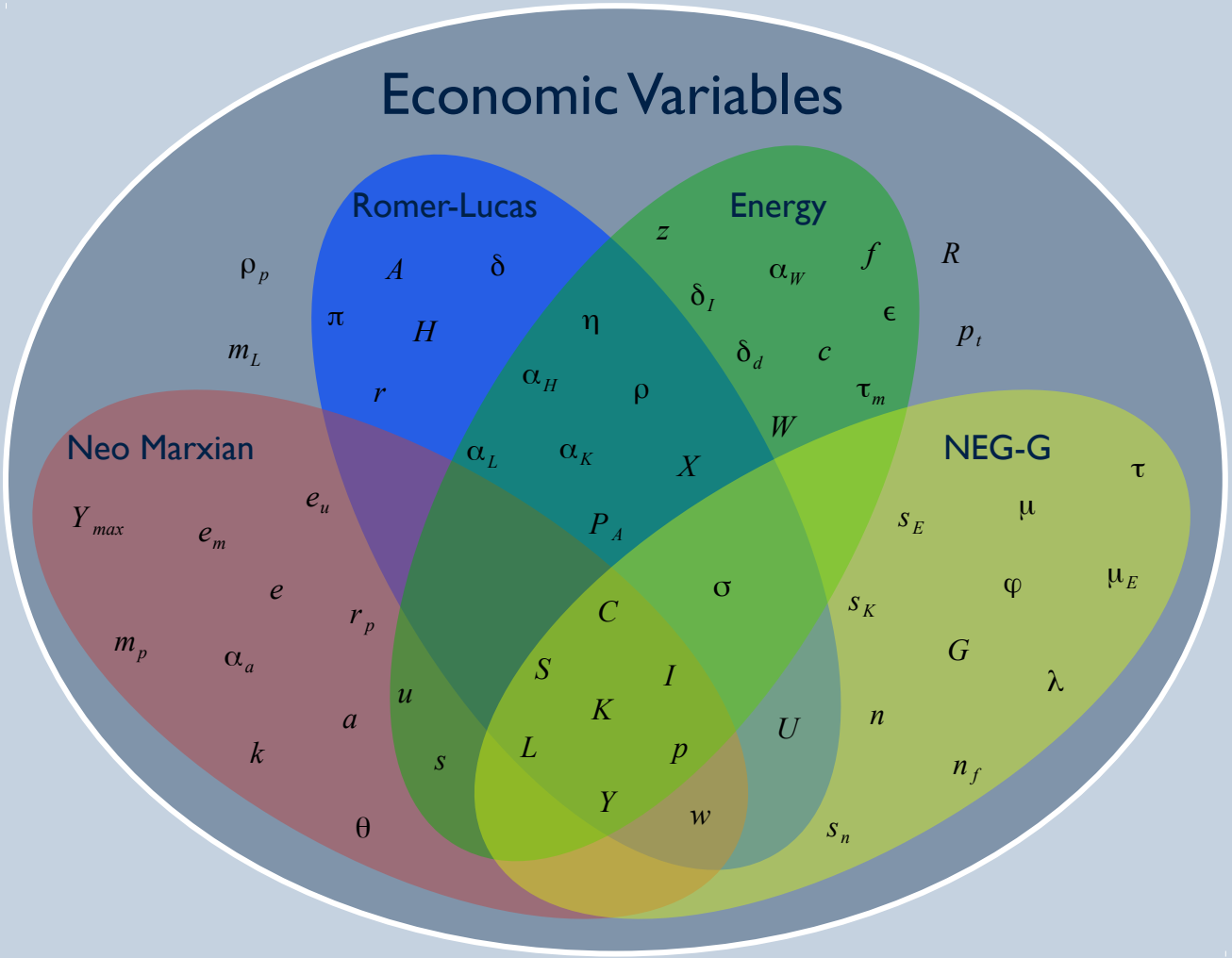
Romer-Lucas : Technology Accumulation ($A$)

NEG-G : Trade ($\tau$,$\varphi$) & Technology Diffusion ($\lambda$)

Neo-Marxian : Due to productivity increases

All make use of *C/I/S*

# Common Features



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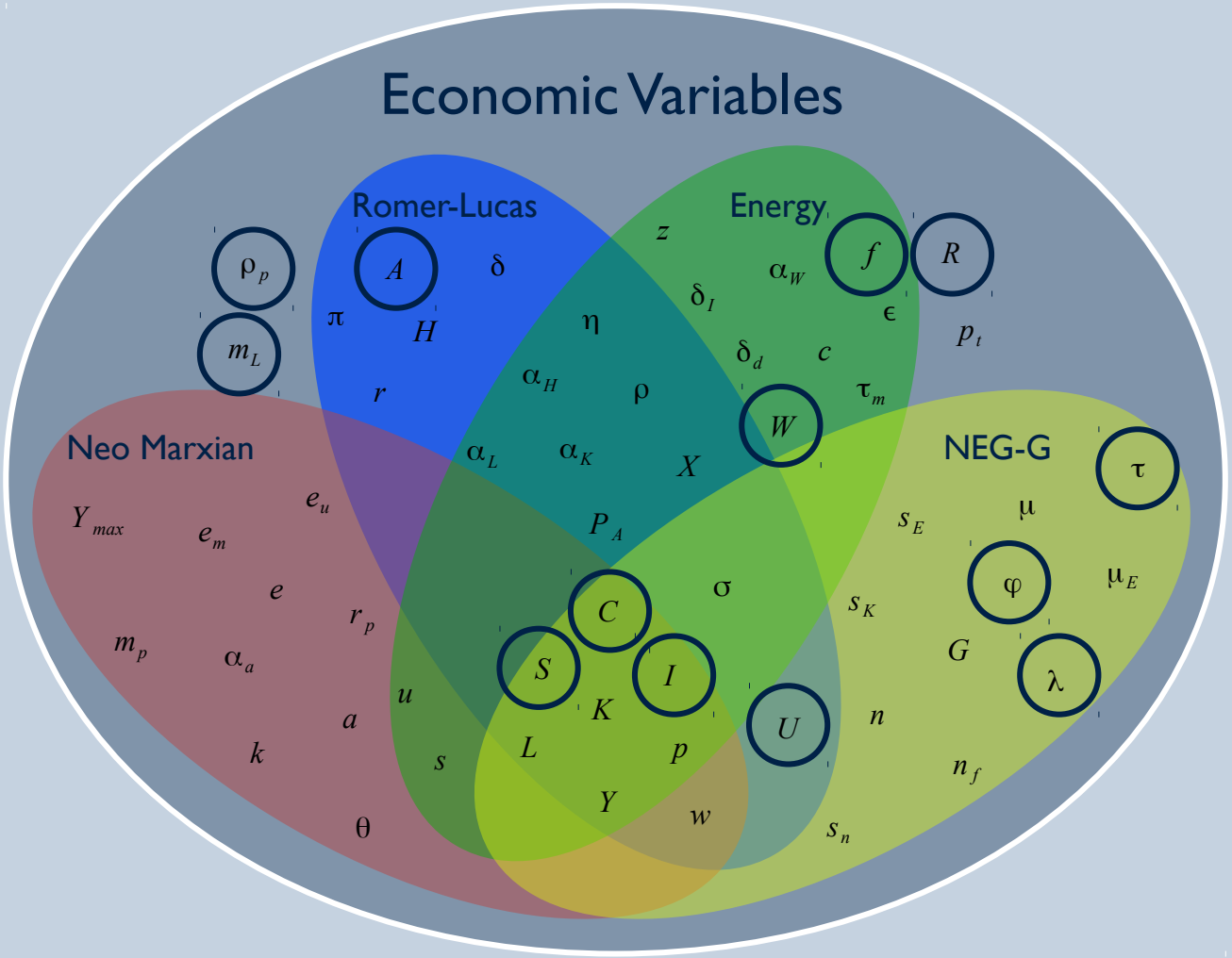

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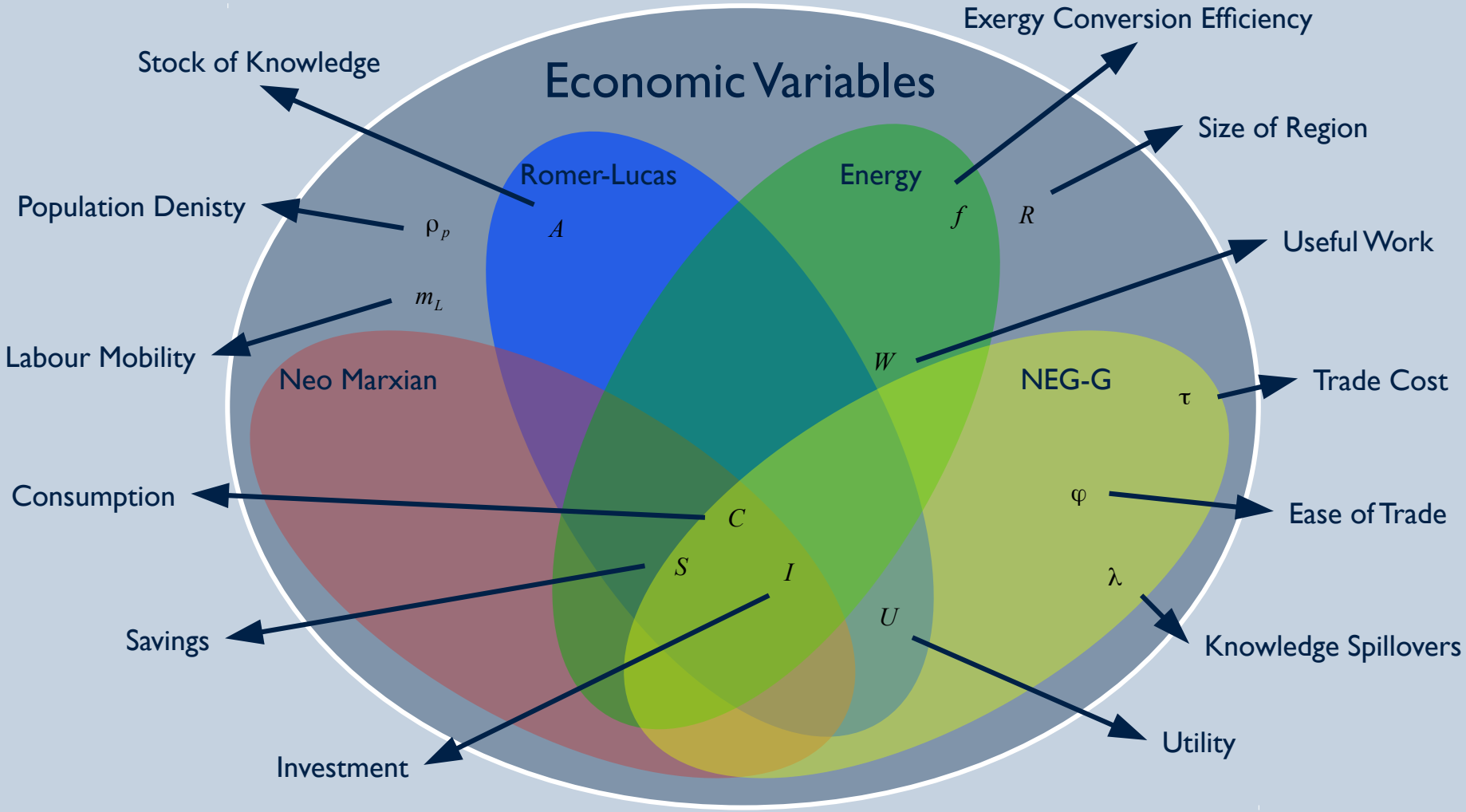

# Moving Forward

Two possibilities:

Direct factor of production → Not likely a primary input

Indirect Effects via variables → More complex picture

Either way we need to introduce

Infrastructure producing sector

# Moving Forward

Constructing toy models for the 3 frameworks

| | | |
|---|---|---|
| Energy Economics | : | $W(\Omega,\theta,\ldots), f(\Omega,\theta,\ldots)$ |
| Romer-Lucas | : | $A(\Omega,\theta,\ldots)$ |
| NEG-G | : | $\tau(\Omega,\theta,\ldots),\varphi(\Omega,\theta,\ldots),\lambda(\Omega,\theta,\ldots)$ |

As well as for *C/I/S*

# Moving Forward

Improving models by including:

-Schumpeterian model of innovation

-Spatiality, network of regions

-Inclusion of important additional parameters

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