

Introduction

To exploit the potentials of macroeconomic agent based models towards understanding technology role in energy input and policies for stimulating these technology investments, we extend an existing model to understand these developments. We present trends in manufacturer technology levels due to tax on energy input and subsidy receipts only when a producer procures a capital purchase of the best capital machine according to vintage and productivity.

Research Question

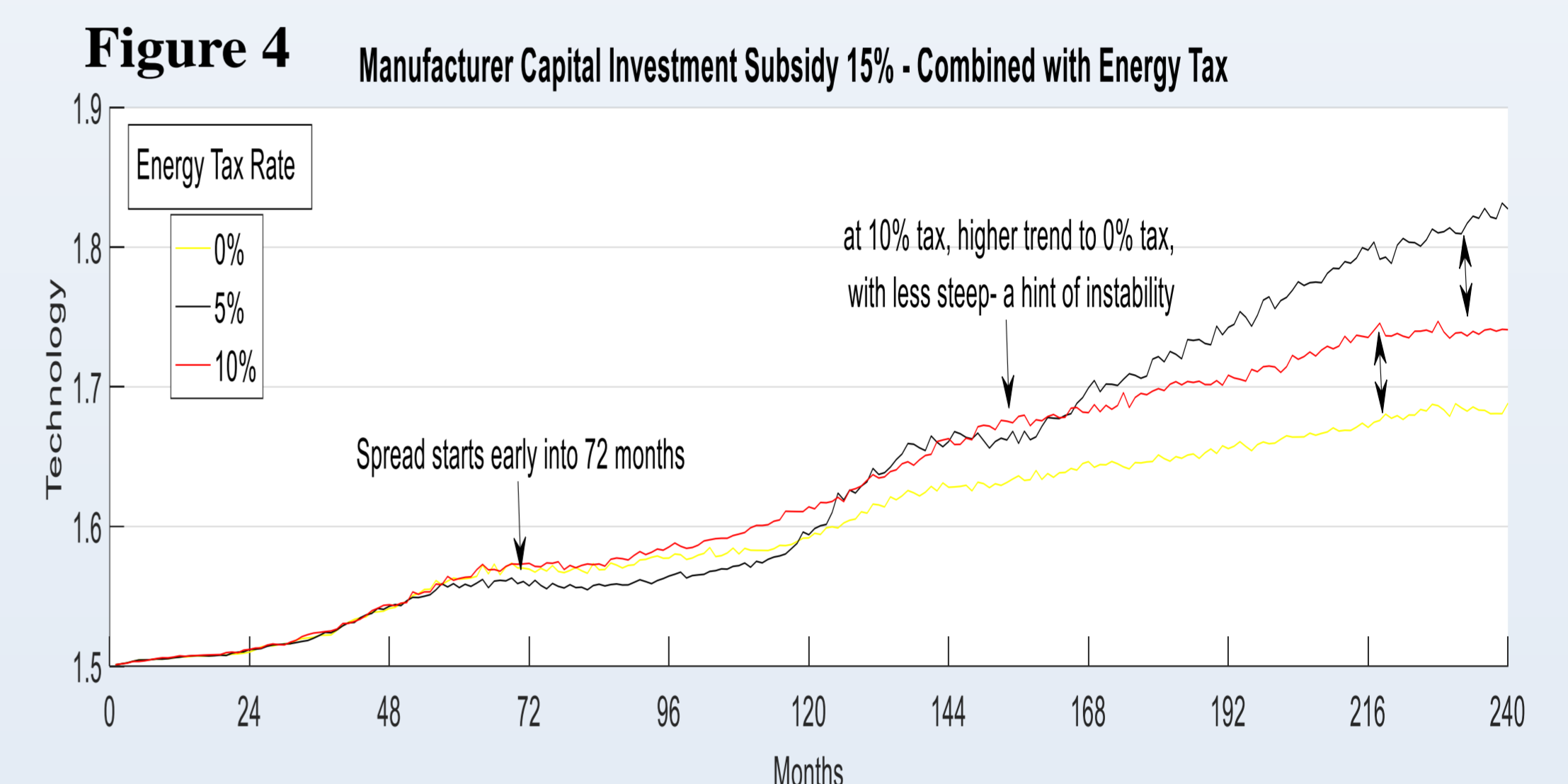
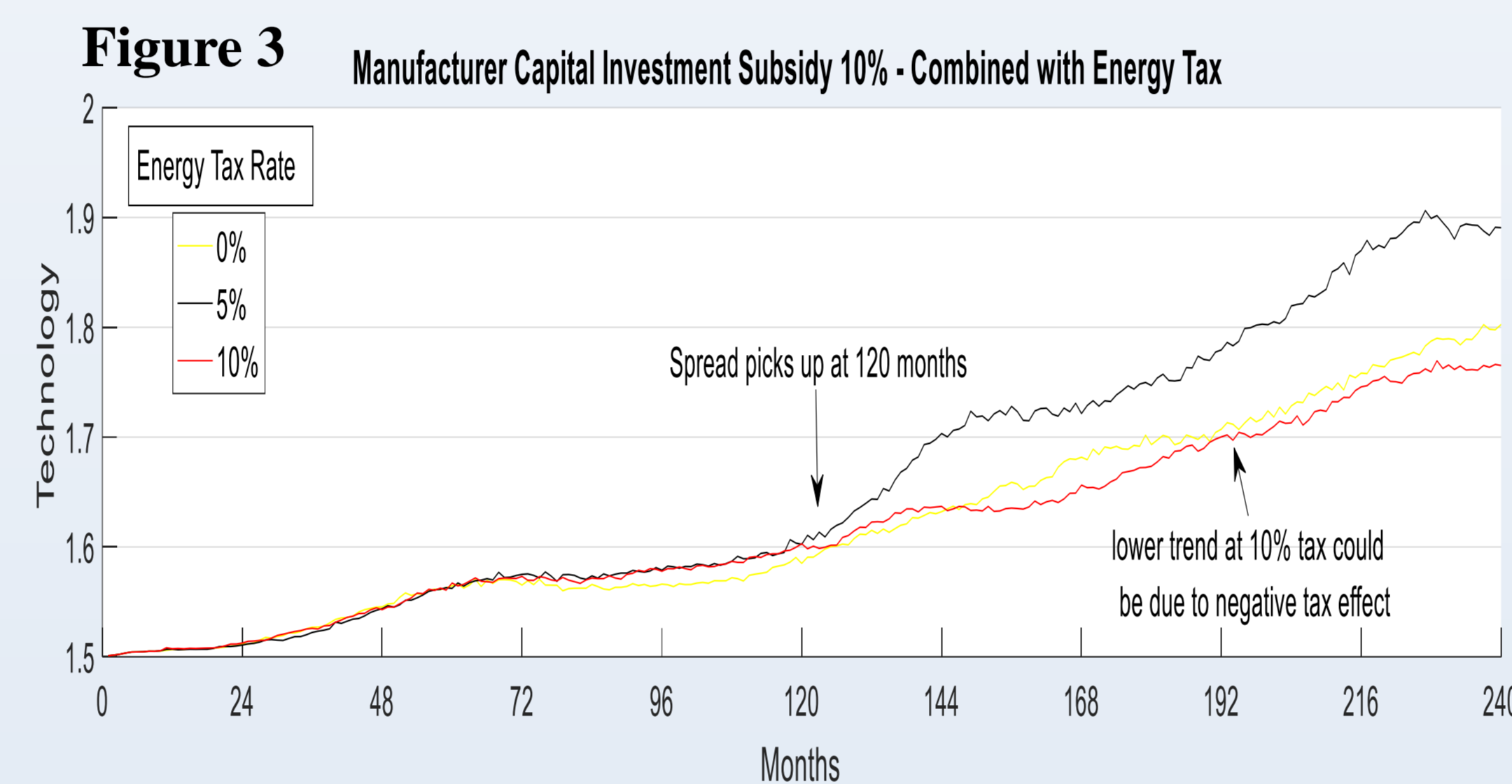
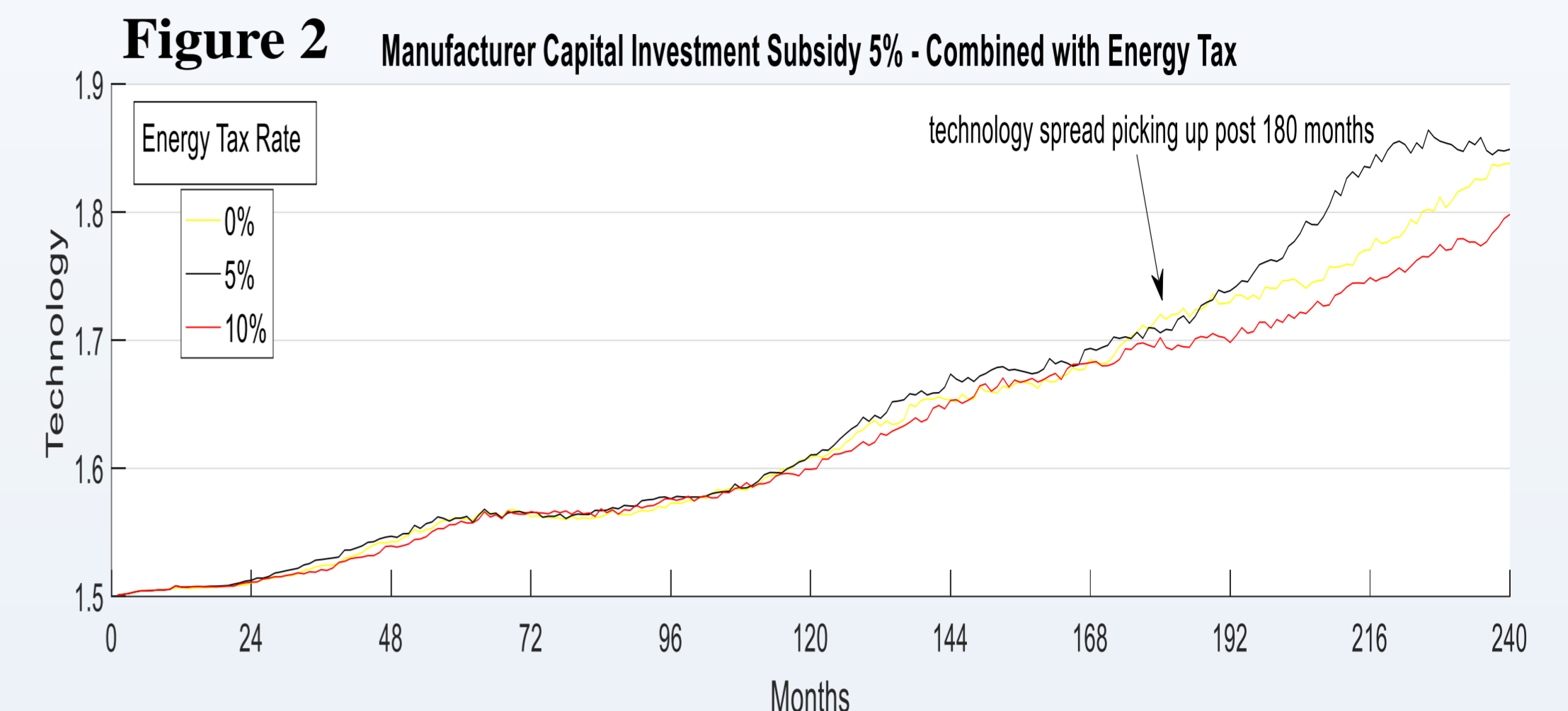
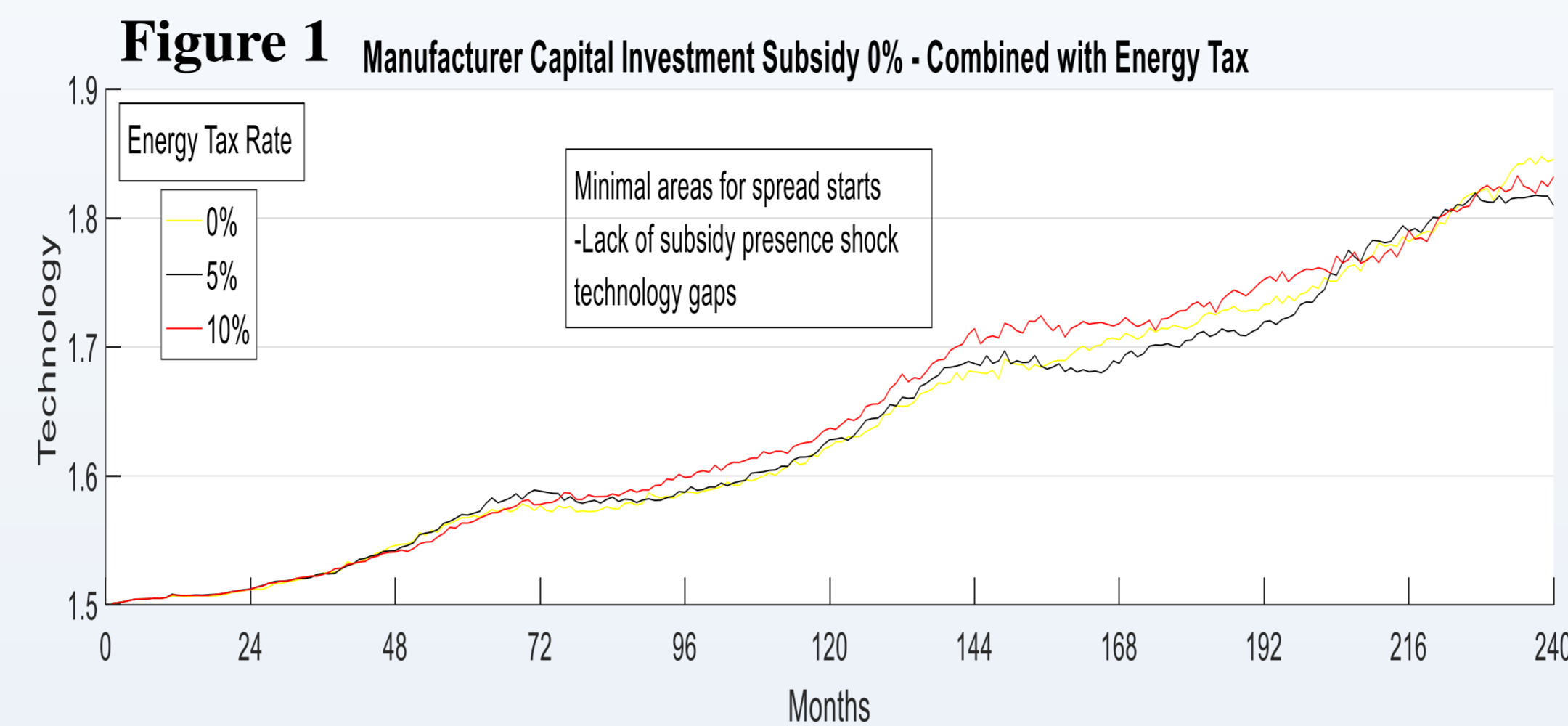
How effective are policy incentives to influence consumer behaviour and stimulate industry technology investment at aggregated macroeconomic levels?

Methodology

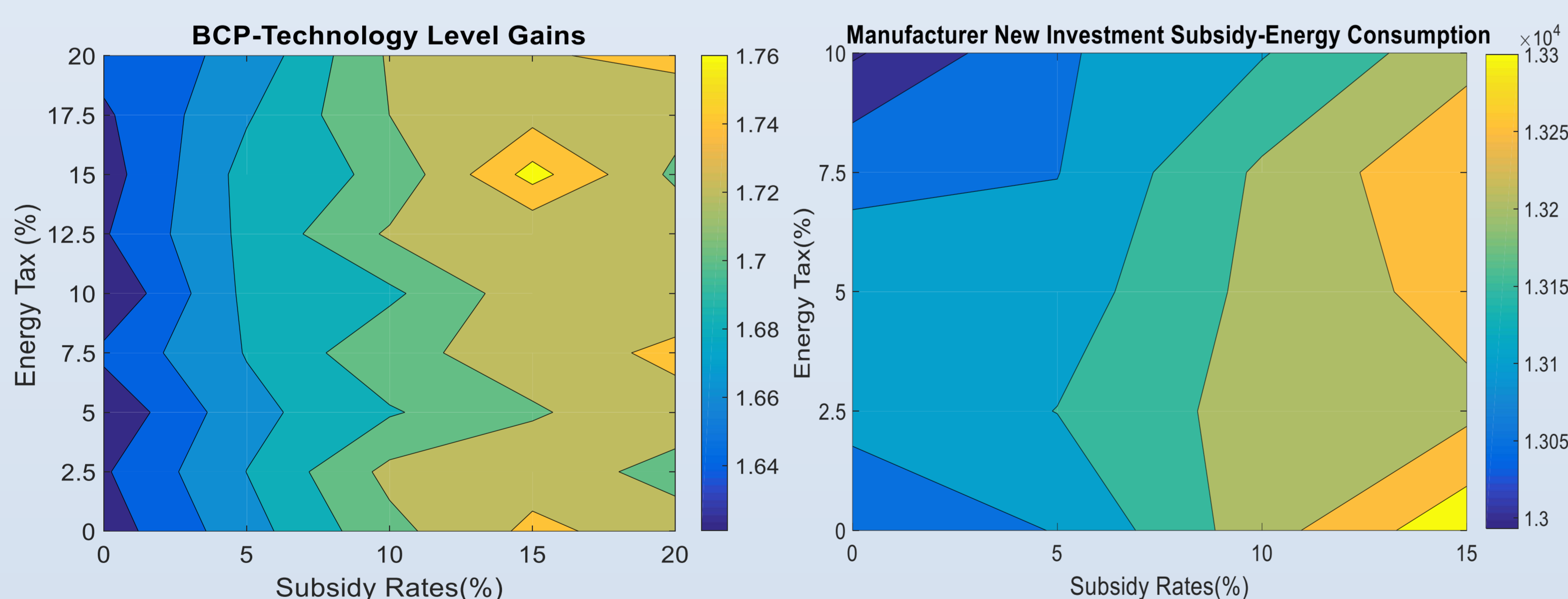
- ❖ Macroeconomic Agent based Model
- ❖ Hypothetical agent representation: energy supplier, producers (investment & manufacturer), distribution center, household, statistics office, bank, central bank & government.
- ❖ Production Function: Leontief input-output
- ❖ Production inputs: Energy, Capital & Labor
- ❖ Energy demand - Production divided by technology - Q_t^{prod} / α_t .
- ❖ 20 years trend & aggregated simulation average - Energy Tax & Subsidy

Findings

- ❖ Subsidy 0% → Technology spread period is not so evident → Figure 1
- ❖ Subsidy 5% → Technology spread period evident after 180months → Figure 2
- ❖ Subsidy 10% → Technology spread period evident after 120months → Figure 3
- ❖ Subsidy 15% → Technology spread period evident after 72months → Figure 4



20 years results from Averaged Policy Scenarios – Technology & Energy Demand



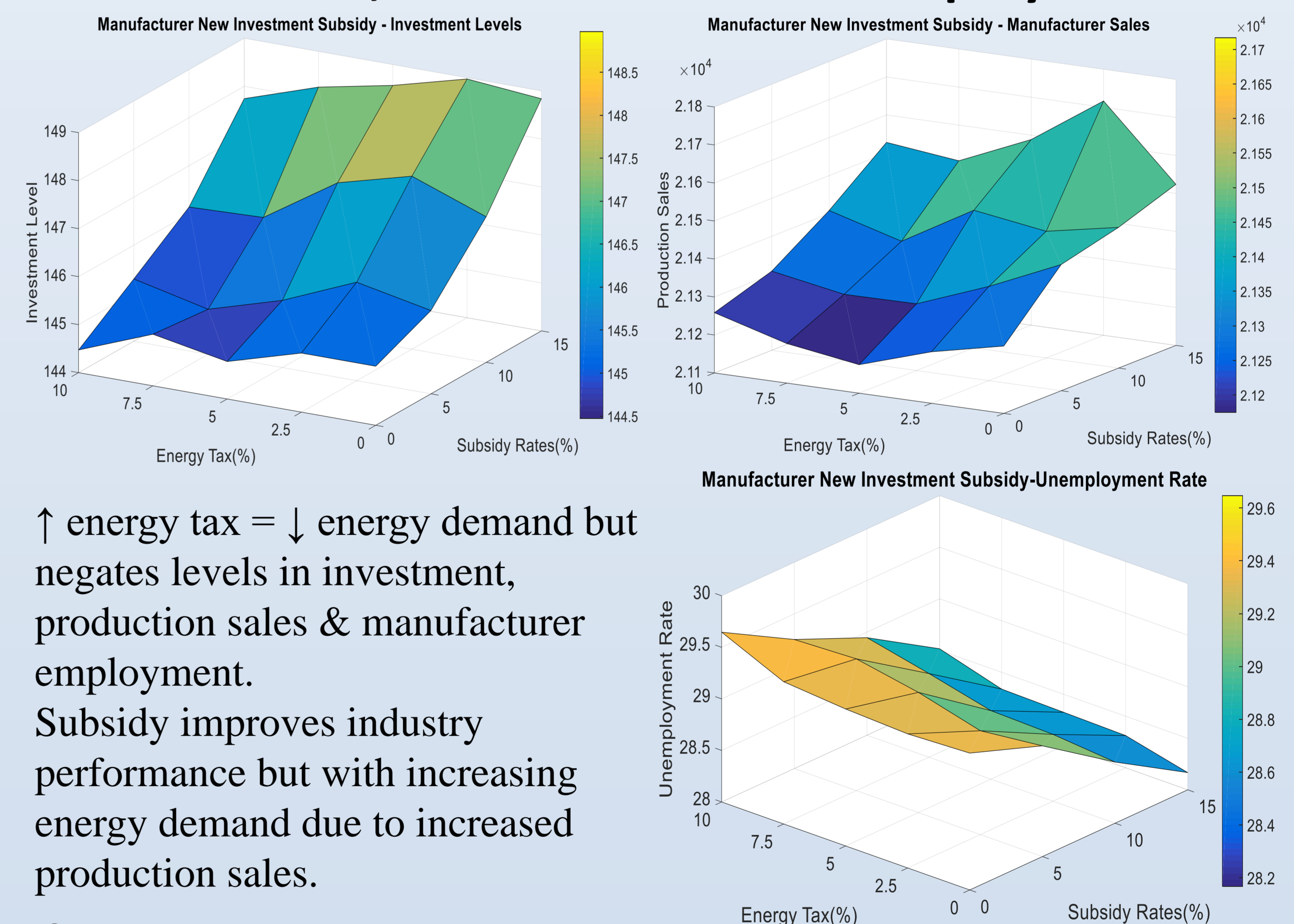
BCP denotes Best capital criteria purchase

- Higher technology level triggers partial ↓ in energy levels = ↑ energy efficiency
- Higher energy tax with no subsidy triggers lower energy consumption
- Technology gains low with ↑ energy tax with no subsidy presence
- Technology gains not hindered with ↑ energy tax when with subsidy presence

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Investment, Production Sales & Employment



- ↑ energy tax = ↓ energy demand but negates levels in investment, production sales & manufacturer employment.
- Subsidy improves industry performance but with increasing energy demand due to increased production sales.

Conclusion

- ❖ A phase II study to initiate comparison of technology performance due to subsidy payment type subject to best capital criteria purchase threshold.
- ❖ Subsidy effect on technology spreads pick up at different periods between tax rates.

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