

Discussion of the Survey Reports on Energy Efficiency and Renewable Energy

OECD CONFERENCE ON “HOUSEHOLD BEHAVIOUR
AND ENVIRONMENTAL POLICY”

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Outline

1. Introduction
2. Reflections on the Energy Efficiency Report
3. Reflections on the Renewable Energy Report
4. Conclusions: Behaviour Towards EE and RES-E
5. Suggestions For Part 3: Adoption of Eco-Innovations
 - Diffusion Literature as Theoretical Framework
 - Develop the Concept of Induced Diffusion
 - Applied to Adoption of Energy Efficiency Innovations
 - Applied to Green Energy Tariffs

1. Introduction

- Two interesting reports (esp. International comparisons)
- Methodologically sound
 - Web based survey > potential for bias?
 - i.e. excludes non- tech users? e.g. elderly and vulnerable (on social security)
 - EE progs. tackle social as well as env. concerns in UK so elderly and vulnerable important
- PEM 2003 and PEM 2004
 - Survey + Focus groups = Enhanced Understanding

2. Energy Efficiency Report

- Wide ranging paper tackling 8 dependent variables but concerned with three ways of saving energy
 - (1) number of appliance (2) behaviour (3) adopt EE measures
- Socio-demographic (age) structure of households (number of adults and children) and tenure (ownership: a proxy for wealth?) determine whether appliances are owned and how many.
- It would be interesting to link these factors to demographic changes (pop. growth, ageing and longevity) and rising affluence
- Behaviour and adoption of EE measure associated env. concern
- But in Tinch et al. (2003; 2004) comfort & savings override env.?

3. Renewable Energy Report

- Concerned with (1) how much households are WTP (2) Role of attitudes in shaping WTP
- Confirms (1) WTP little (2) env. concern and membership matter
- Country heterogeneity: explained by culture and media (Bass)?
- Interesting question is proportion of household that are WTP
 - (a) Compares to actual adoption (very large differences: why?)
 - (b) How this alters over time (WTP rises with env. concern)
- (a) touched on and perhaps could have been explored further ...
- Growing list of reasons in the literature (Bias, free rider, trust...)
- (b) Dutch WTP collapsed (23% vs 57%)? Price rises + trust issues

4. Conclusions on Behaviour

- Demand driven by appliances (quality, quantity and use)
- Demand for energy is quite inelastic > SMART consumers?
- Behavioural change is difficult to achieve
- Heterogeneity means one size does not fit all (Kristrom 2009)
- Consumer confidence and trust is critical and fragile (UK EE advice & green tariffs) (Diaz-Rainey & Ashton 2009; 2008)
- Inertia w.r.t. energy efficiency and w.r.t. Switching (confusion)
- + Bounded rationality(CWI vs. DG) implies
- = need for regulation as well as incentives markets
- Comfort and savings vs env. motivation?

5. Diffusion Theory

- **Diffusion:** Spread of innovation to its potential market over time
- **Adoption:** Focus on individual choices
- Two relevant traditions in diffusion and adoption research
 - (1) economics hurdle-rate models and
 - (2) epidemic models (Bass Model: communication channels)
- Choice depends on unit of measurement (Kemp 1997)
- Rogers (1995): Adopter characteristics: socio-econ., personality...
- Need to reconcile existing literatures with diffusion theory
 - EE: Barriers/Efficiency Gap & Finance Theory
 - Green energy: WTP CV literature

5. Induced Diffusion

Induced diffusion

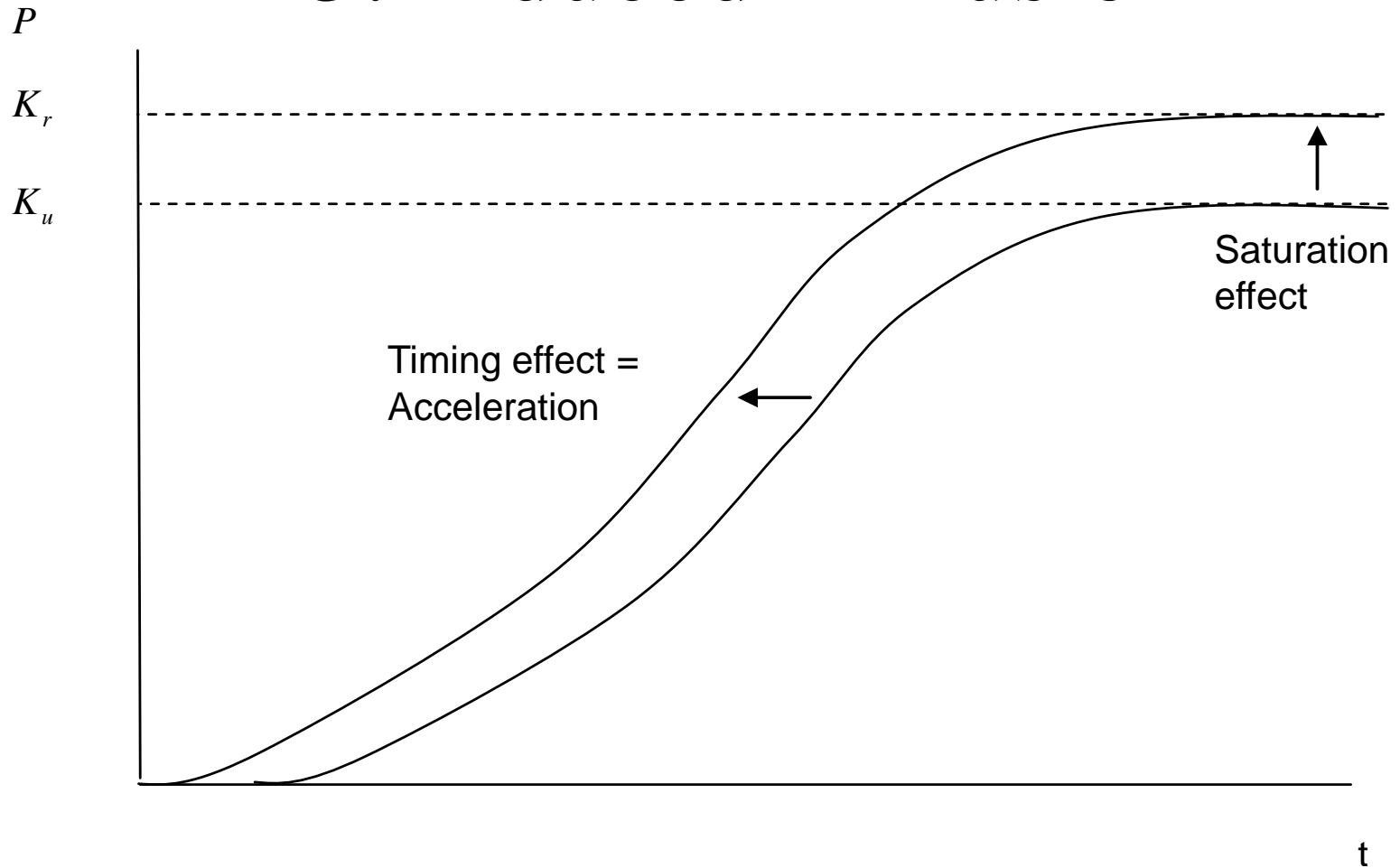
- Without (government) intervention, diffusion does not account for externalities (pollution, security of supply)
- Term used but not defined (in social science)

Generic definition: Any intervention that aims to alter the speed and/or total level of diffusion of an innovation by directly or indirectly internalising positive and/or negative externalities

Reviews: Contrasting conclusion

- Jaffe et al. (2002) - Review of TC and Environmental policy
- Diaz-Rainey (2009) – Interdisciplinary review

5. Induced Diffusion

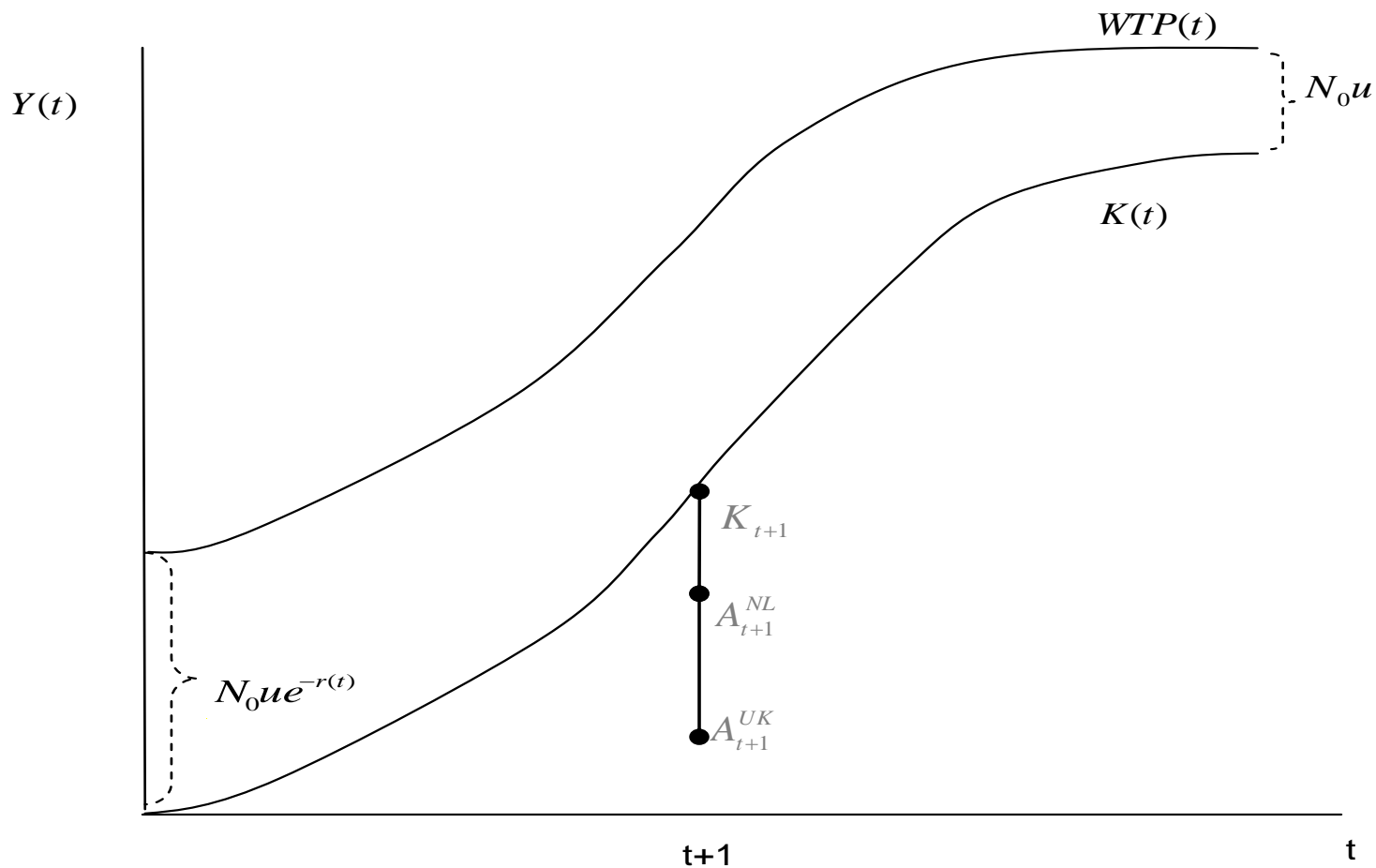


Key: P = cumulative market penetration of an innovation; t = time; K = saturation

5. Adoption of EE measures

- Diaz-Rainey & Ashton (2009) using PEM 2003 and PEM 2004 surveys: Multiple EE innovations
- Results broadly consistent with diffusion theory
 - Earlier (later) adopters from higher (lower) socio econ.
Earlier adopters less fatalistic. Dataset not ideal
- Tenure variables important
- Inertia (the most powerful force of all)
- Desire to save money and increase comfort
- Policies to induce diffusion: investment support schemes appear to have induced diffusion while information based instruments have had no effect

5. Diffusion Model of an Induced Environmental Market (Diaz-Rainey & Tzavara 2009)



References on Energy Efficiency

- Diaz-Rainey, I, Ashton, J (2009) ‘Domestic energy efficiency measures, adopter heterogeneity and policies to induce diffusion’. Proceedings, 6th International Conference on the European Energy Market, Leuven
- Tinch, R, Peters, M, Monahan, J, Metcalf, P, Diaz-Rainey, I (2004) Powergen Energy Monitor 2004, Powergen UK, pp.1-92
- Tinch, R, Peters, M, Diaz-Rainey, I, Monahan, J, Waddams, C, Tovey, K (2003) Powergen Energy Monitor 2003, Powergen UK, pp.1-104

References on Green Energy Markets

- Diaz-Rainey, I, Tzavara, D (2009) ‘A diffusion model of an induced environmental market: Reconciling differences between willingness to pay and adoption’, Proceedings, 6th International Conference on the European Energy Market, Leuven
- Diaz-Rainey, I, Ashton, J (2008) ‘Stuck between a ROC and a hard place? Barriers to the take-up of green energy in the UK’, Energy Policy, 36:8, 3053-3061

References on Induced Diffusion

- Diaz-Rainey, I (2009) ‘Induced diffusion: Definition, review and suggestions for further research’. Available at SSRN