

Double Moral Hazard and the Energy Efficiency Gap

Louis-Gaëtan Giraudet (CIRED)

Sébastien Houde (U. Maryland)

PSL Seminar – Paris Dauphine – April 15, 2015

Moral Hazard: e.g. Home Energy Retrofit



2013 Winner

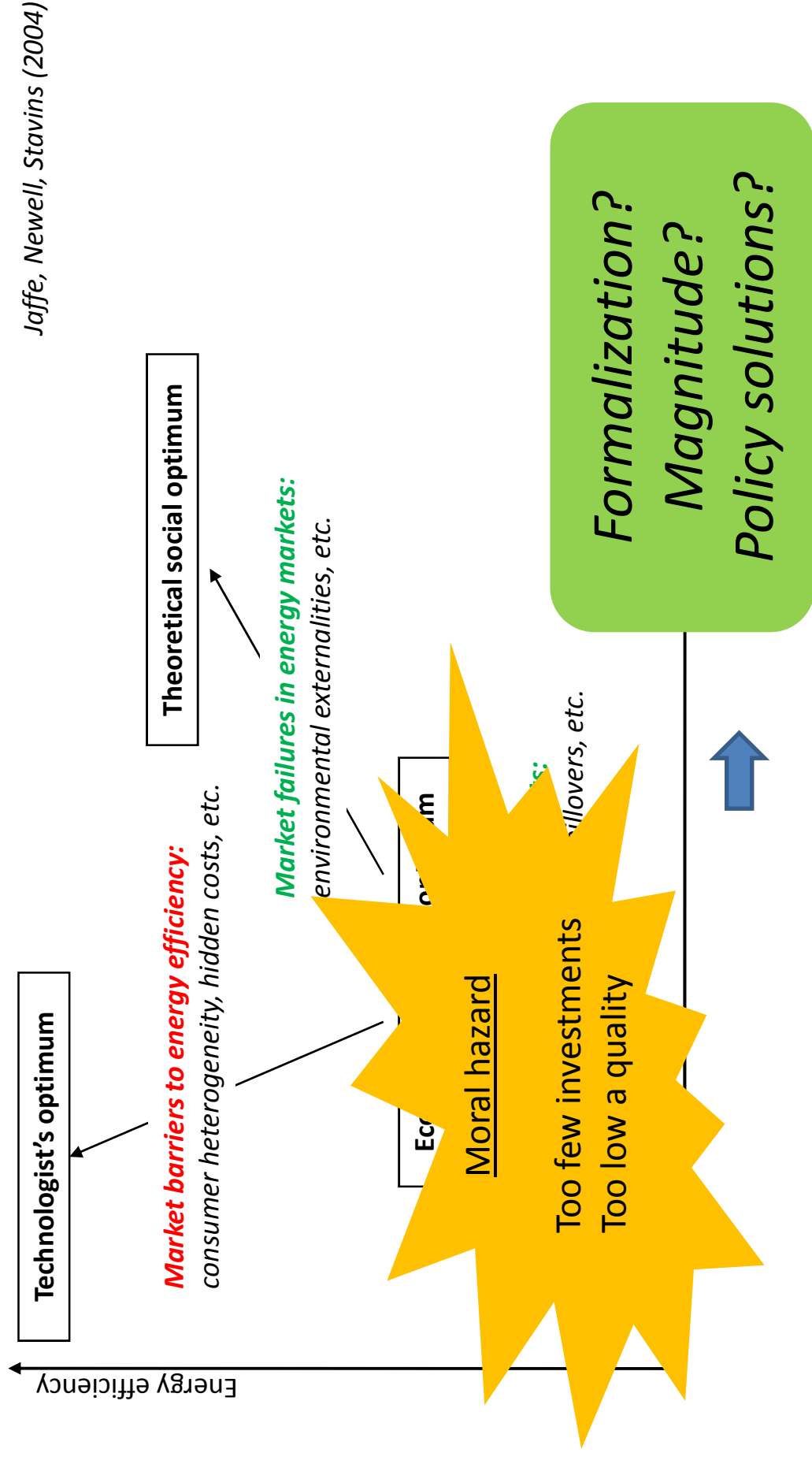
“Best Construction Defect” Photo Contest

Awarded by AQC, the French Construction Quality Agency



check out more! <http://www.qualiteconstruction.com/manifestations/concours-photo/2013.html>

The Energy Efficiency Gap

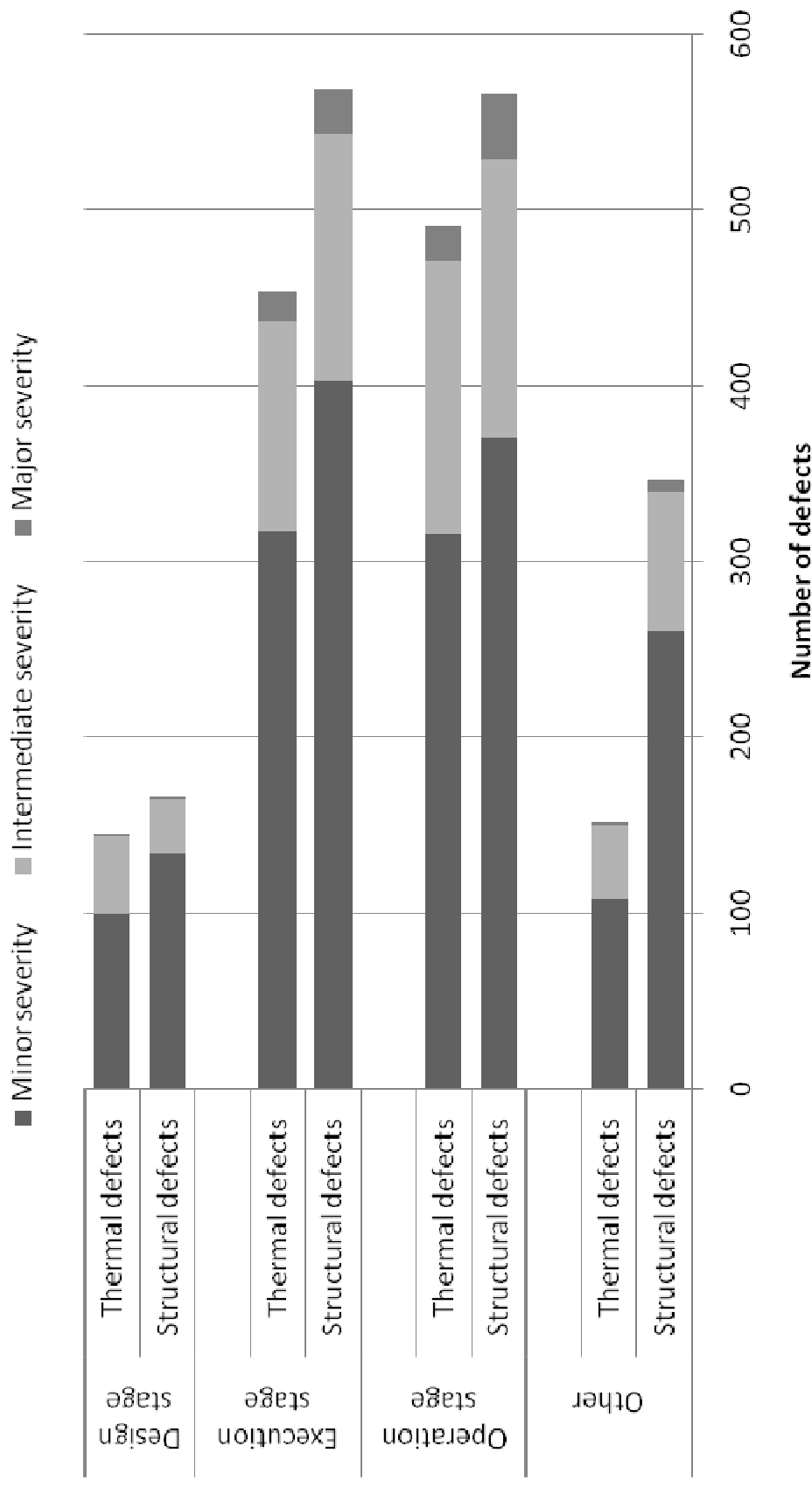


Jaffe, Newell, Stavins (2004)

Suggestive evidence

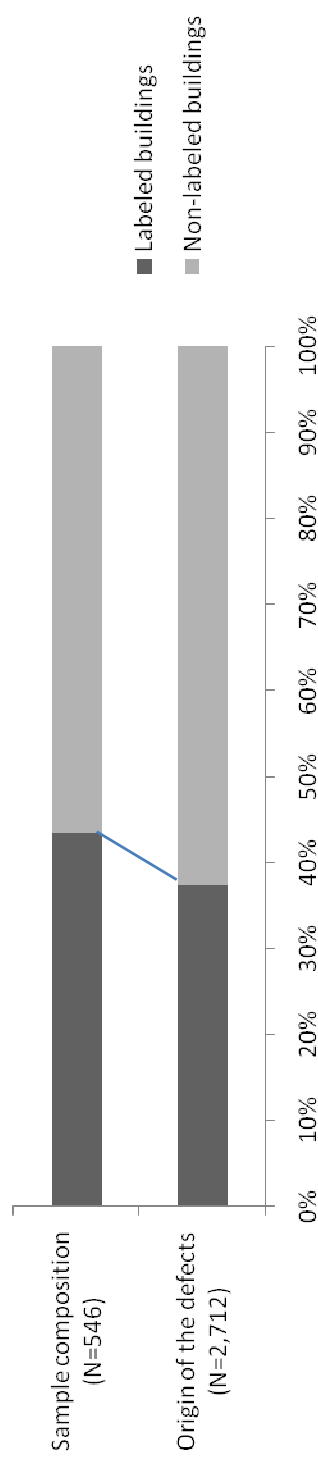
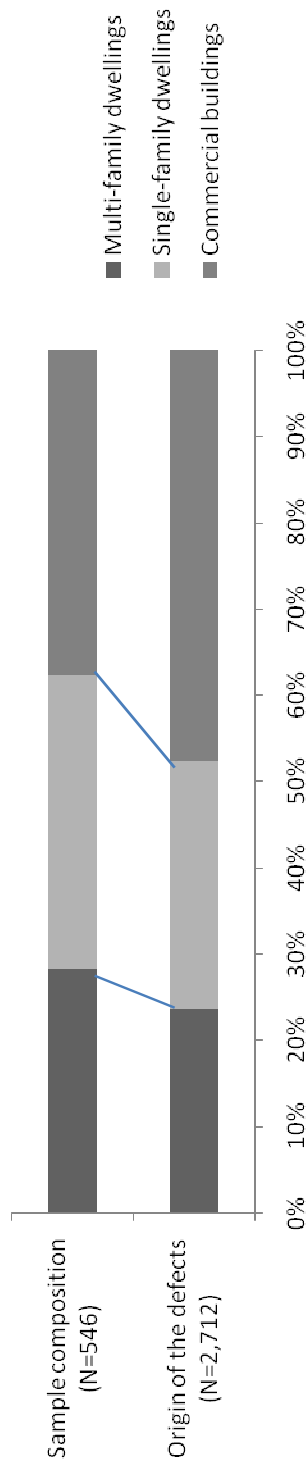
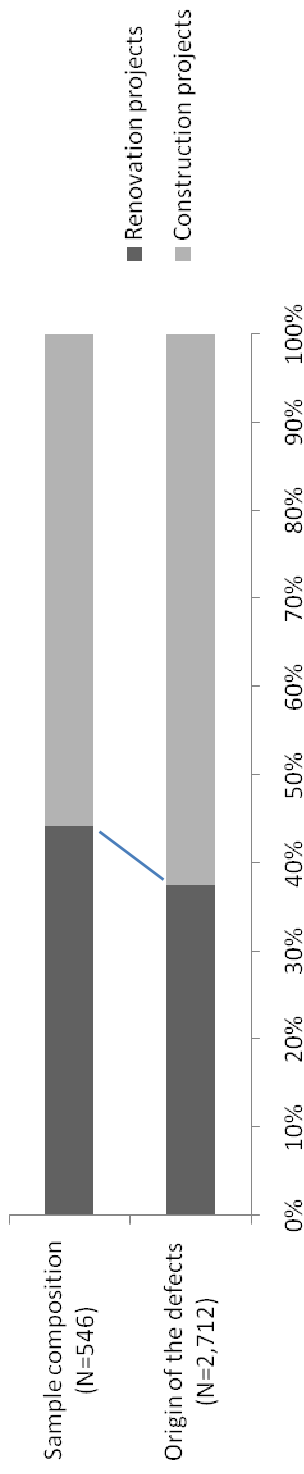
Data: AQC (France)

AQC Audits of ‘Bâtiments basse consommation’



Overall frequency of defects (per building): median 4, mean 5.1, standard error 4.9

Distribution of Defects by Building Characteristics



Model

Data: RECS (US)

Two Hidden Actions

Energy use for space heating

$$\tilde{E}(s, q)$$



Homeowner's **energy service**

→ *unobservable to the contractor*

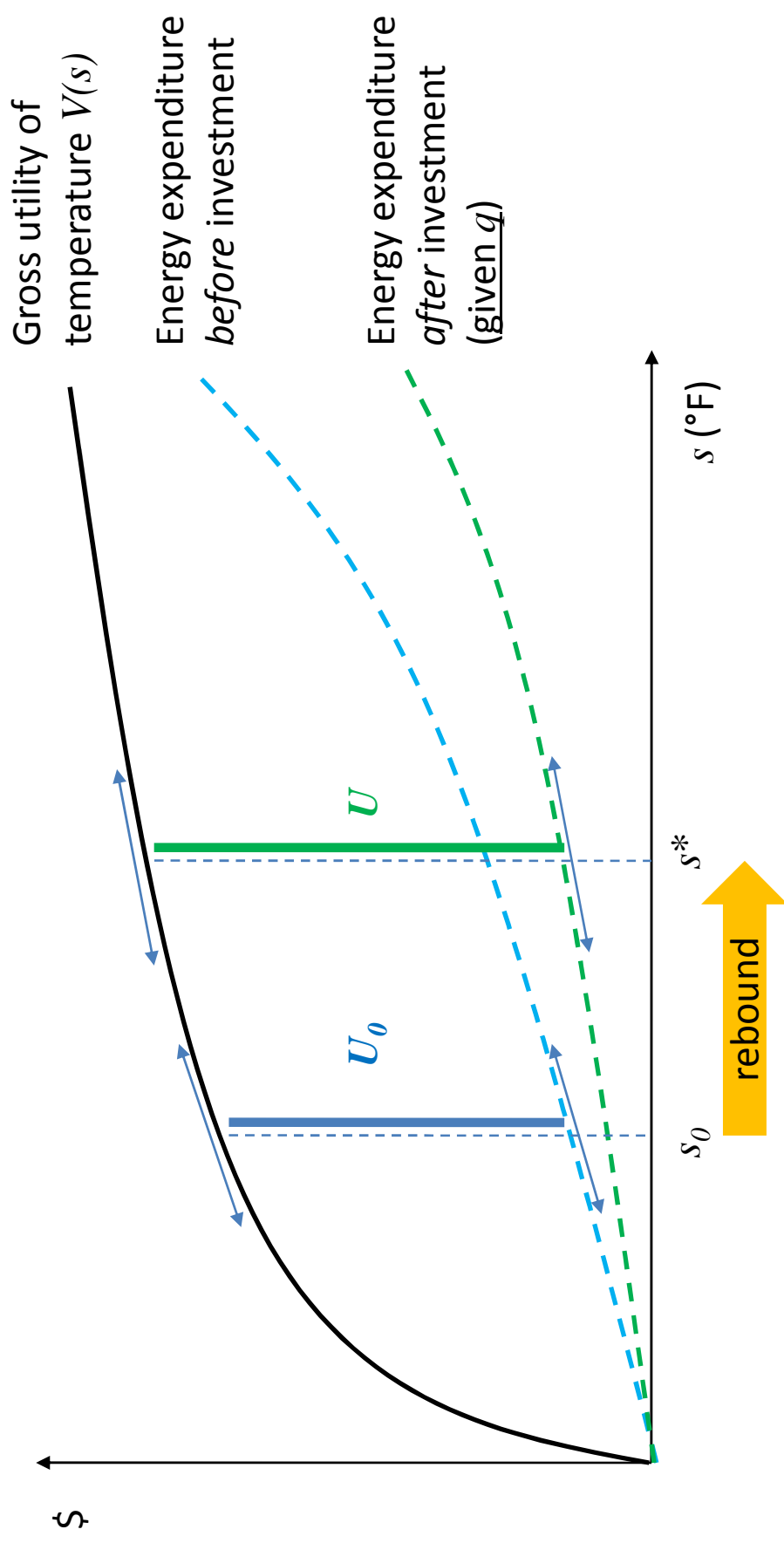


Contractor's **quality** of installation

→ *unobservable to the homeowner*

Consumer sets s , given q

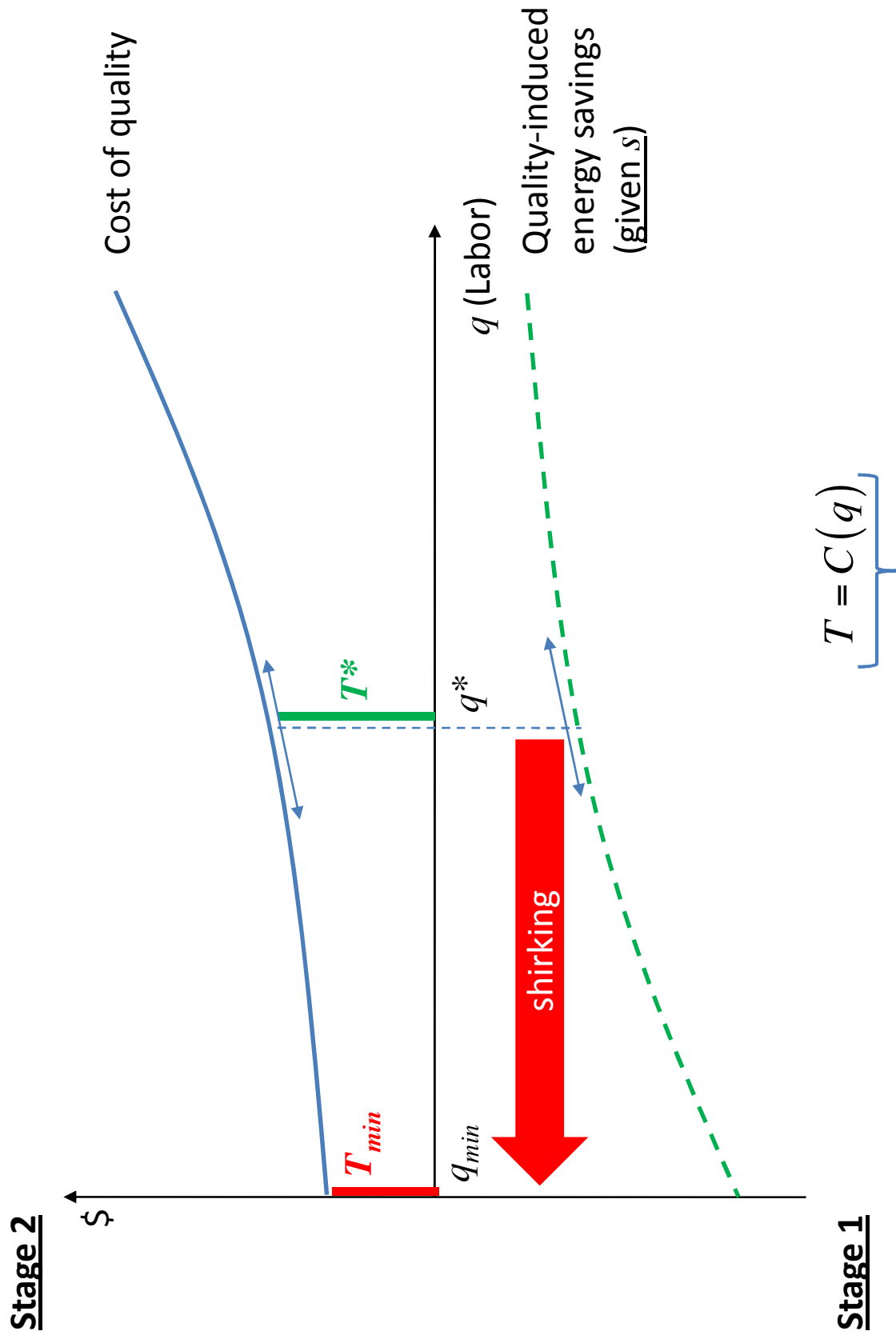
Stage 2



Stage 1

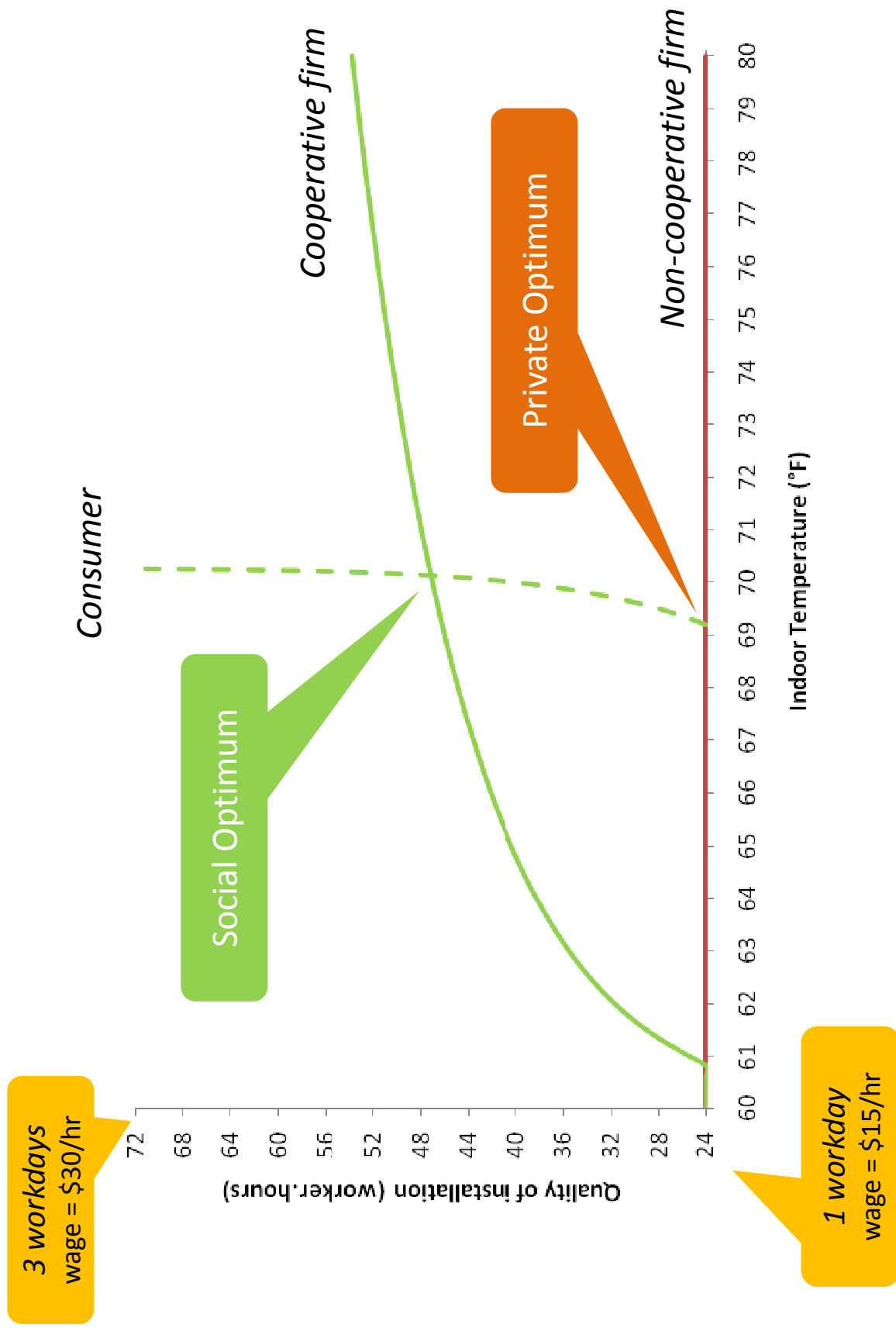
Participation iif $U - U_0 \geq T$

Firm sets q , given s



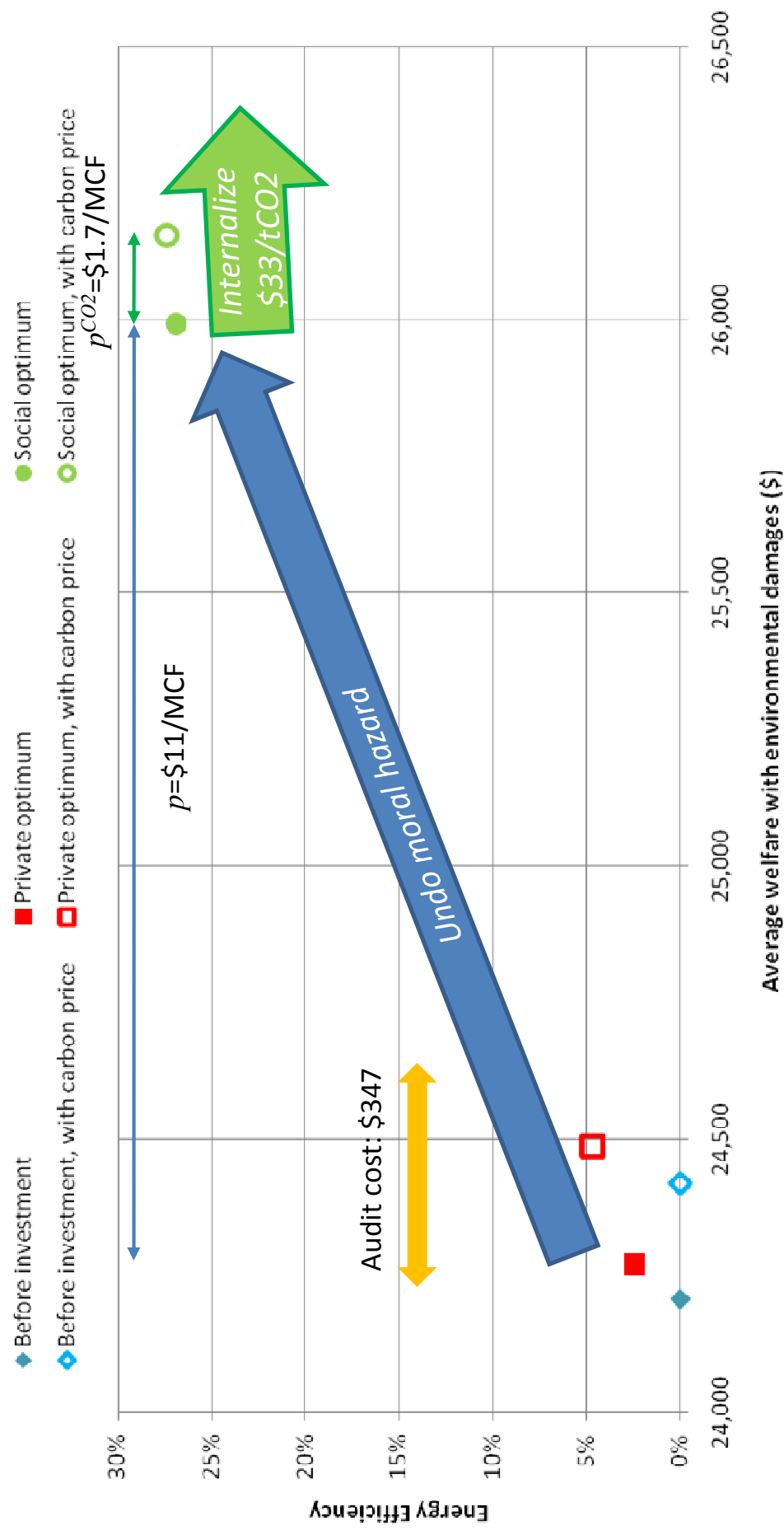
Assumption: Perfect competition

Best Response Equilibria (e.g. insulation)

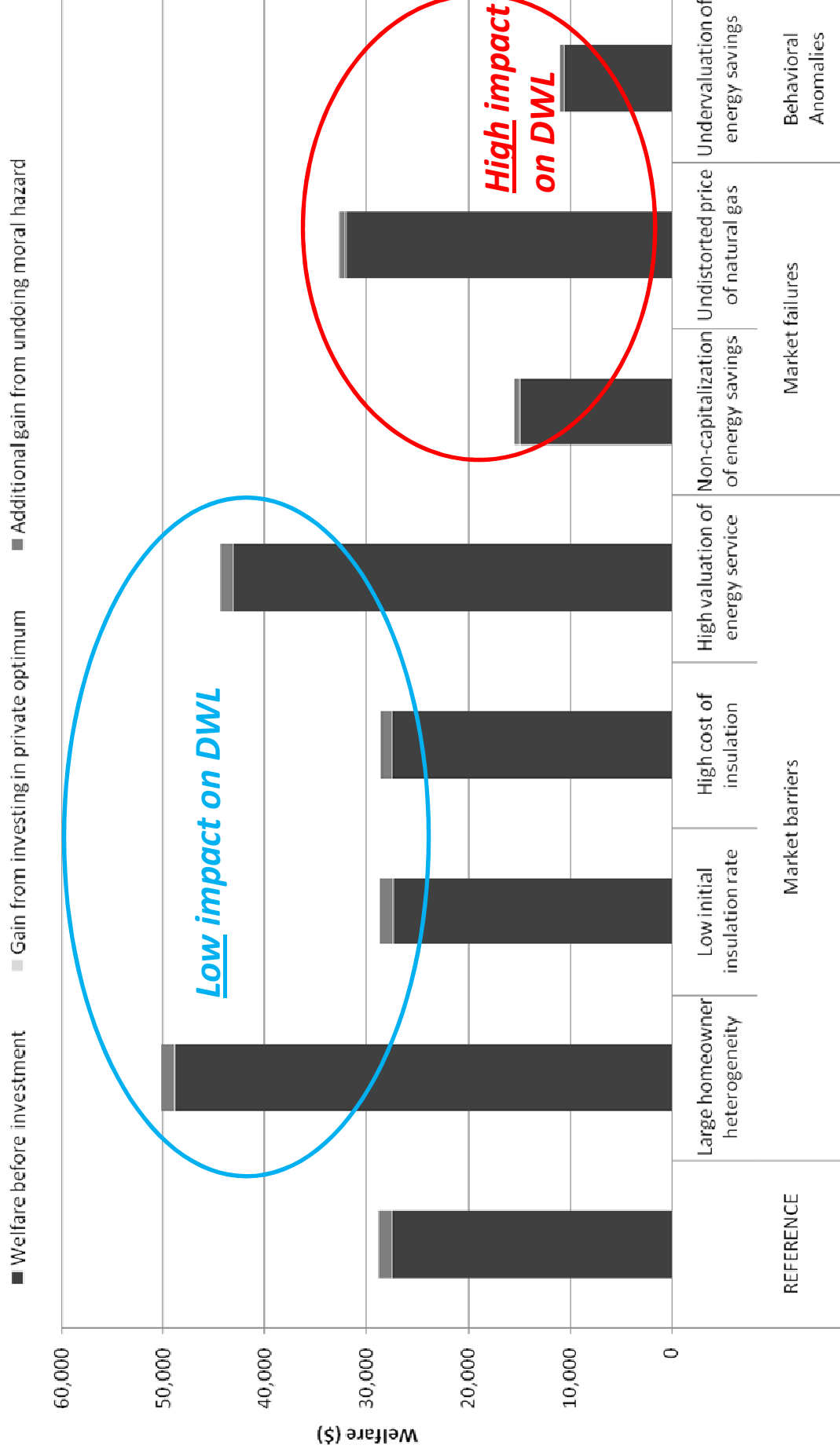


Magnitude

Energy Efficiency Gap



Sensitivity Analysis of Deadweight Loss



Implied discount rates: 15-35% (against 7%)

Engineer’s Heuristics as a Sufficient Statistic

Discounted monetary savings

Upfront cost

$$\Delta_q W \geq -p \Delta_q E(s, q) \Gamma(r, l) - \Delta_q C(q)$$

Economic information needed

NOT needed: Rebound effect ($V(s)$)

Scenario	REF	1	2	3	4	5	6	7	8
Exact DWL	1,258	1,239	1,206	1,085	1,260	517	486	289	1,258
Suff. Stat.	1,158	1,158	1,158	997	1,158	473	443	263	1,158
Approximation	-7.9%	-6.5%	-3.9%	-8.1%	-8.1%	-8.6%	-9.0%	-9.1%	-7.9%

Policy solutions

Remedies Found in the Marketplace (U.S.)

Voluntary certifications



**CERTIFIED
PROFESSIONAL**



Incentives



**Calculate Your
Savings
Now!**



CLICK HERE TO SEE YOUR SAVINGS!

Solutions politiques: France

Eco-conditionnalité des aides

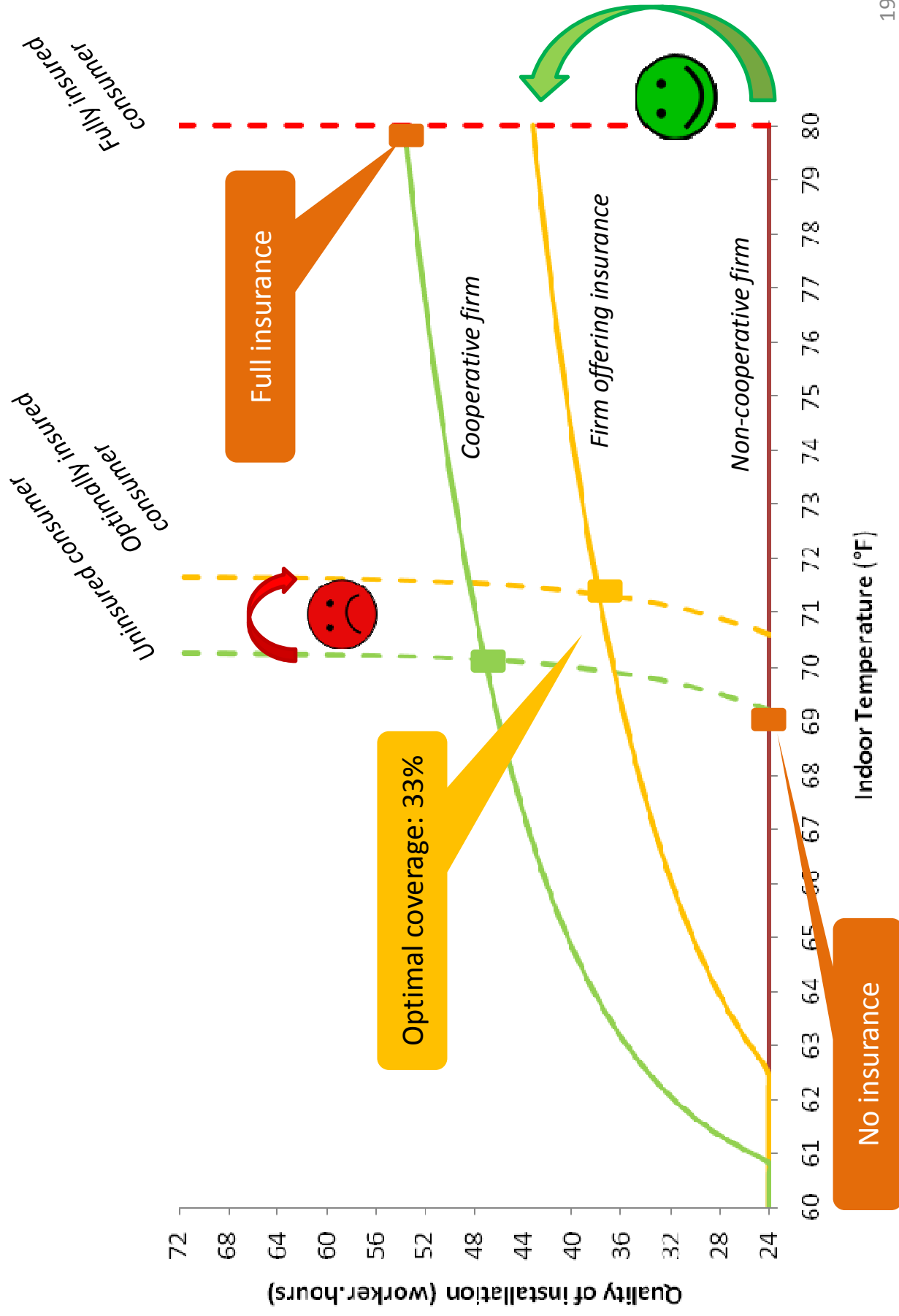


Garanties énergétiques contractuelles

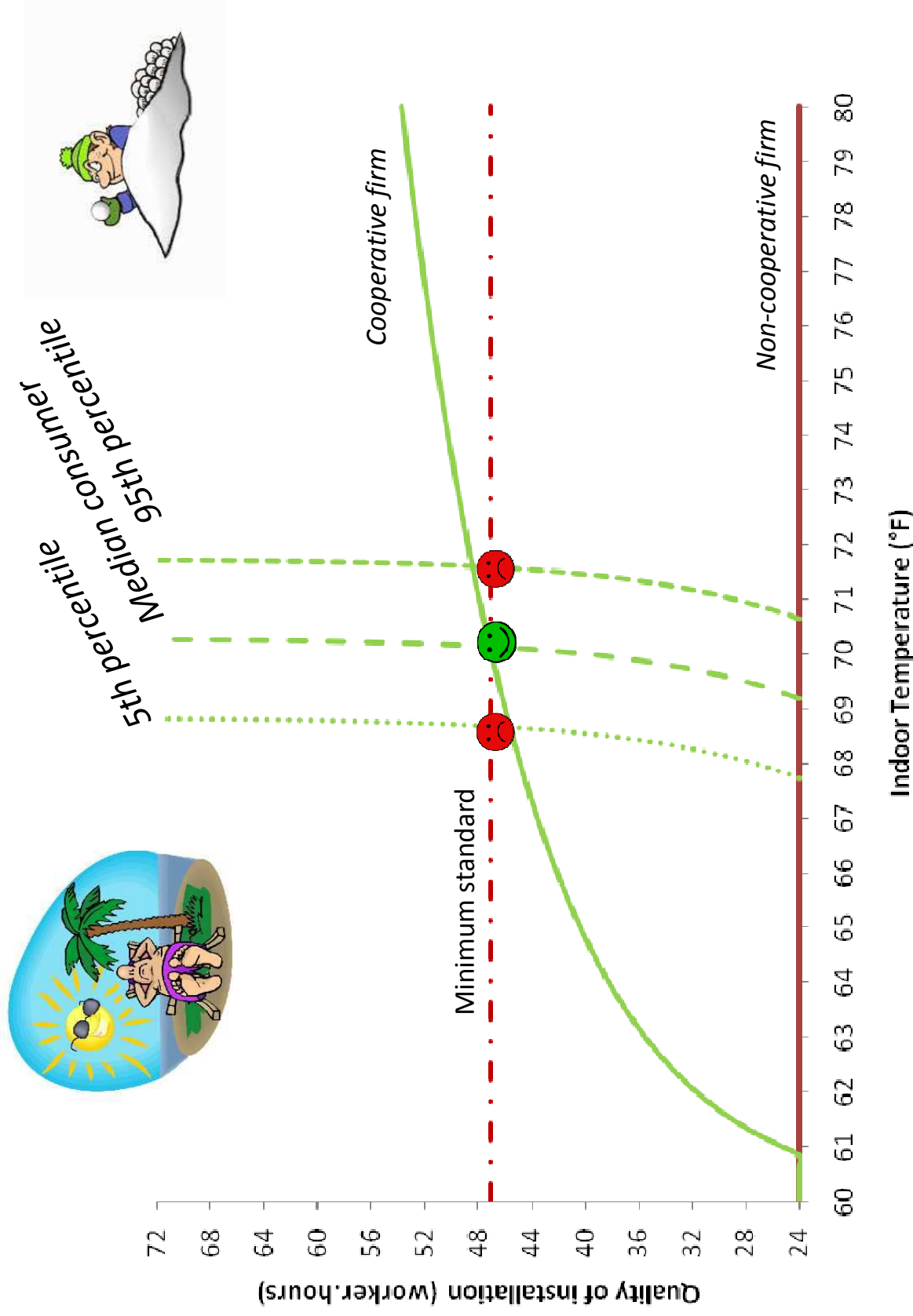
- “sur la performance intrinsèque” (GPEI)
- “de résultat sur l’usage” (GRE)



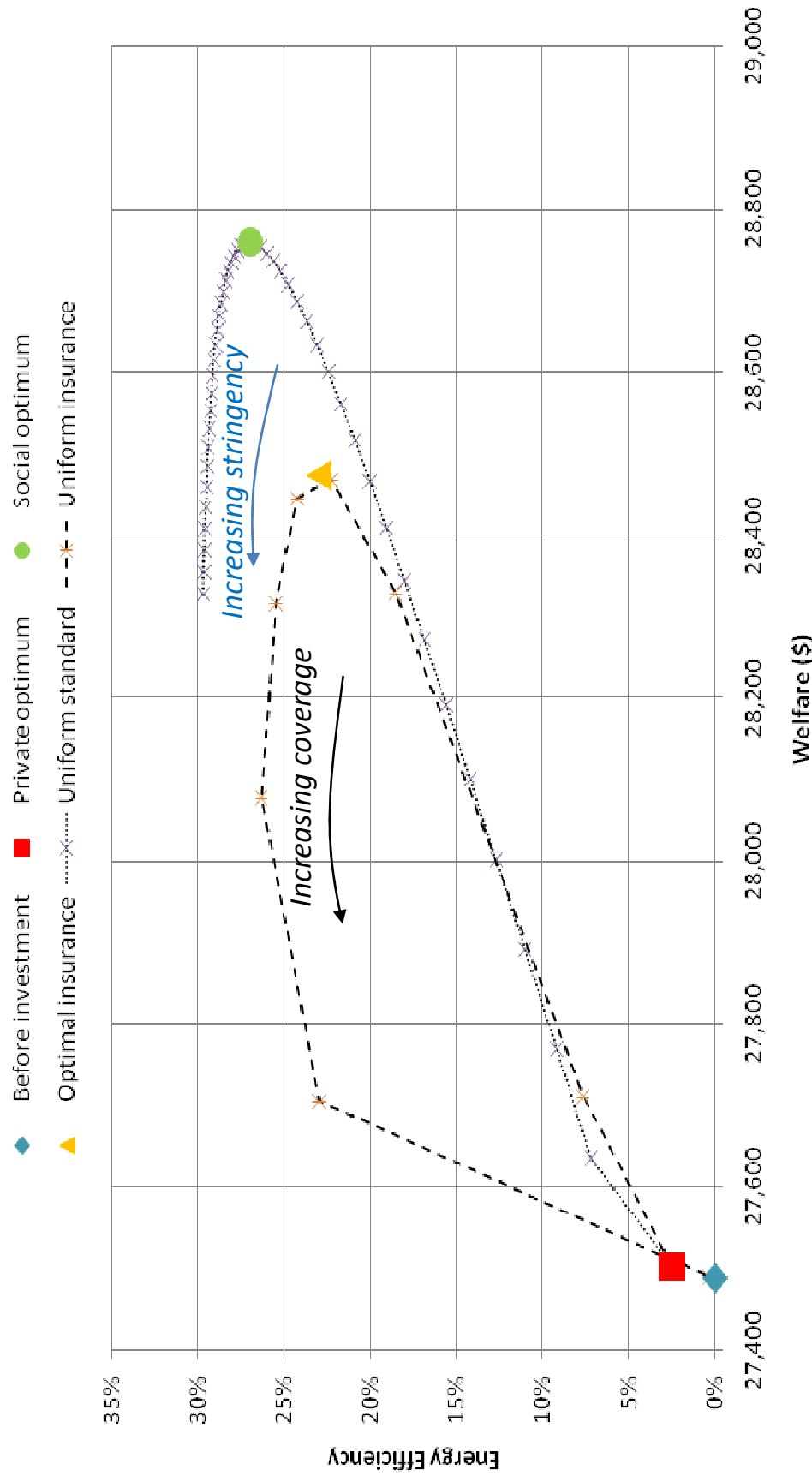
Energy-Savings Insurance



Minimum Quality Standard

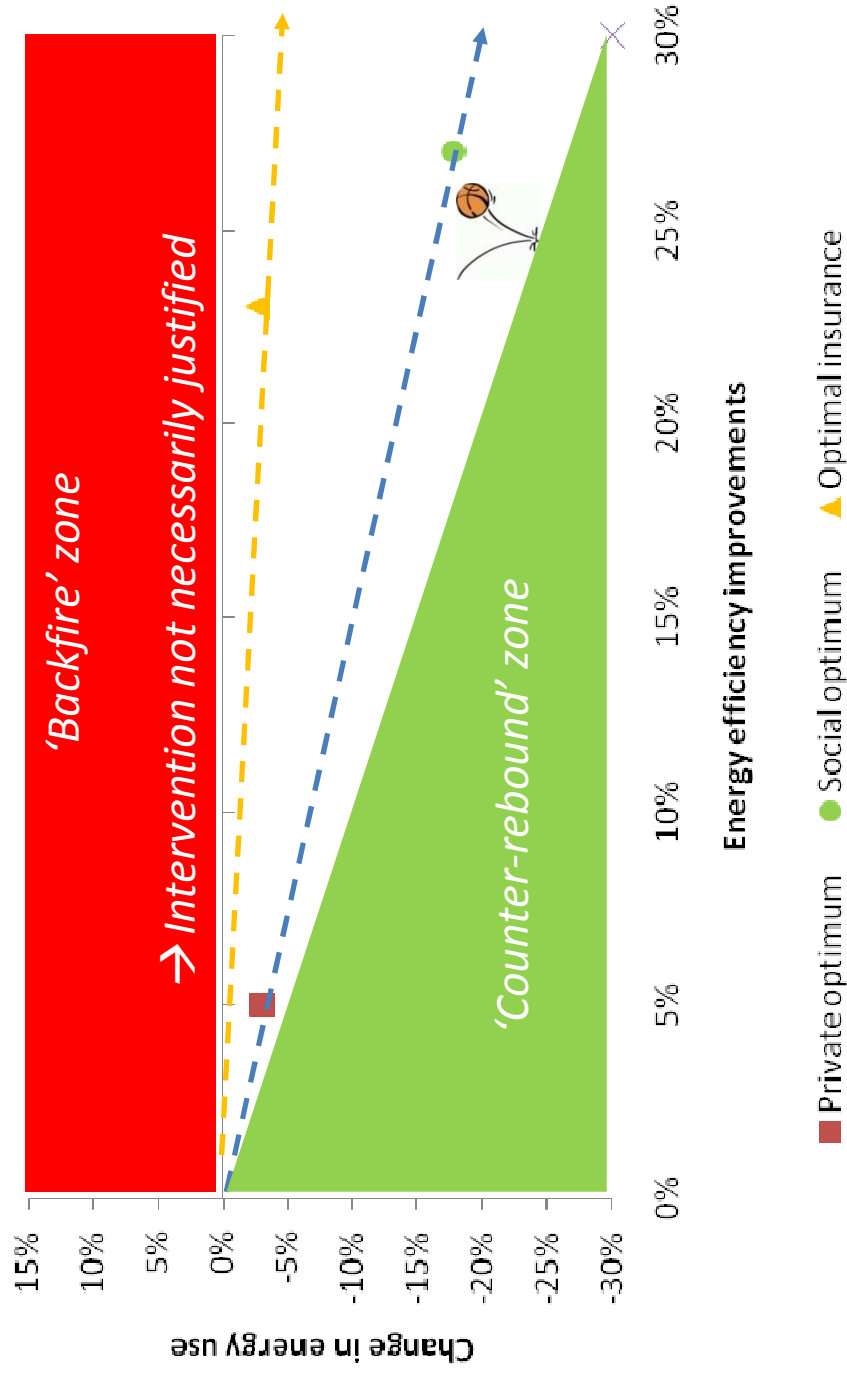


Uniform Standards and Insurance

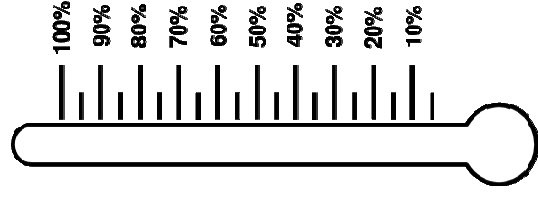


Deadweight loss from second moral hazard with insurance...
but, unlike standard, no control cost.

Rebound Effects



Consumer's
moral hazard



Consumer's
reoptimization
after retrofit

Conclusions



Formally, moral hazard can plausibly cause an energy efficiency gap (too low a quality, too few investments)



Quantitatively, it motivates public intervention beyond what is needed to internalize energy-use externalities



Policy solutions are only second-best. The merit order depends on control costs versus second moral hazard