

Designing US Economy Exit from the Stern Crisis

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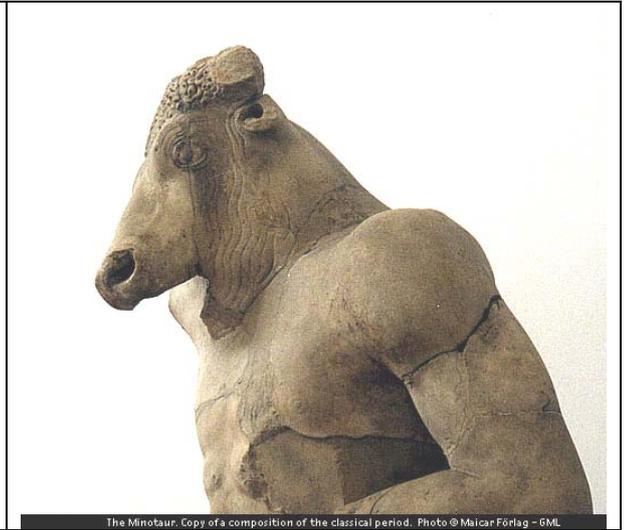
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France, début de XIXe siècle: Ariane et Thésée. Photo © Maicar Förlag - GML



The Minotaur. Copy of a composition of the classical period. Photo © Maicar Förlag - GML

*Exploring laws of capital accumulation
 We're in struggle on income distribution.
 The SD models are Ariadne's thread
 In combating ominous Minotaur's threat.*

Introduction

“The superficiality of Political Economy shows itself in the fact that it looks upon the expansion and contraction of credit, which is a mere symptom of the periodic changes of the industrial cycle, as their cause.” (Marx K. Capital. V. I, chapter 25).

The paper challenges beliefs that

risk of the next Great Depression has passed (Wall Street Journal, July 14, 2009);

recession started in December 2007 ended a couple of months ago (Ibid.).

This paper leans against vested interests by

elucidating how in the long run finance-lead capital uses jobs destruction for raising rate of profit and mass of profit;	suggesting when the American economy will upturn depending on economic policies.
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1. Relative and absolute plethora of capital in the US economy

The mobilising policy carried out since 2001 through 2007 facilitated the U.S. power while the labour income share shrank. This policy contained seeds of its own negation since capital itself remained the real barrier of capitalist production (Ryzhenkov 2005).

1.1. Capital as production barrier

Periodical crises are manifestation of conflict between expansion of production and production of surplus value. Over-accumulation of capital has paved the way for the present acute economic and financial crisis. This crisis has symbolised the defeated and discredited mainstream neo-conservative economic policy.

Relative excess of capital

A declining rate of profit since 2005 and diminishing rate of surplus value since 2007 are evidences for relative excess of capital (Figure 1).

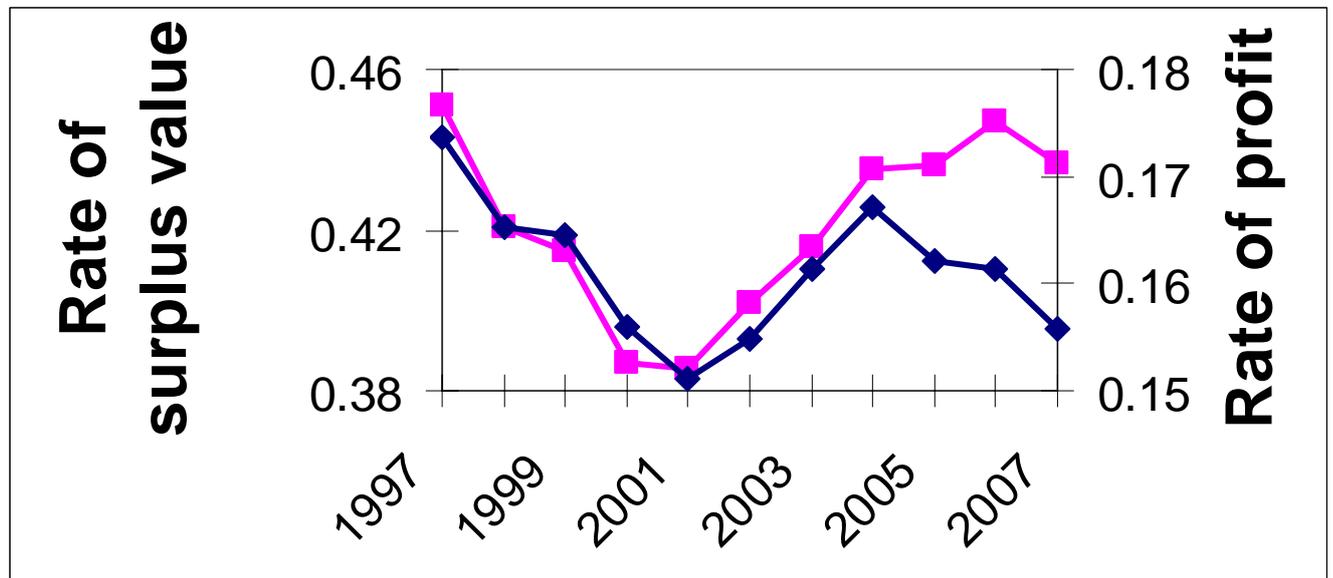


Figure 1. Profit rate (diamond, right) and **rate of surplus value** (square, left), 1997–2007

1.2. Absolute excess of capital

There is absolute excess of capital and over-production if the increased capital produced just as much, or even less, surplus value than it did before its increase. When **CL-IR** governs capital accumulation, this condition turns into $X \leq \nu$ (the target employment ratio is equal to or lower than actual one) for the increased capital.

In the finished business cycle, the condition $X = 0.945 \leq \nu$ was valid in 2005–2007.

2. Re-formulating Hypothetic Law of Capital Accumulation for the US Economy (HL-IR)

Output-capital ratio ($1/s$) represents a «proxy» of utilization of the productive capacity. A bit lagging pro-cyclical nature of **profit investment share**: profit investment share depends strongly negatively on **capital-output ratio** (Figure 2).

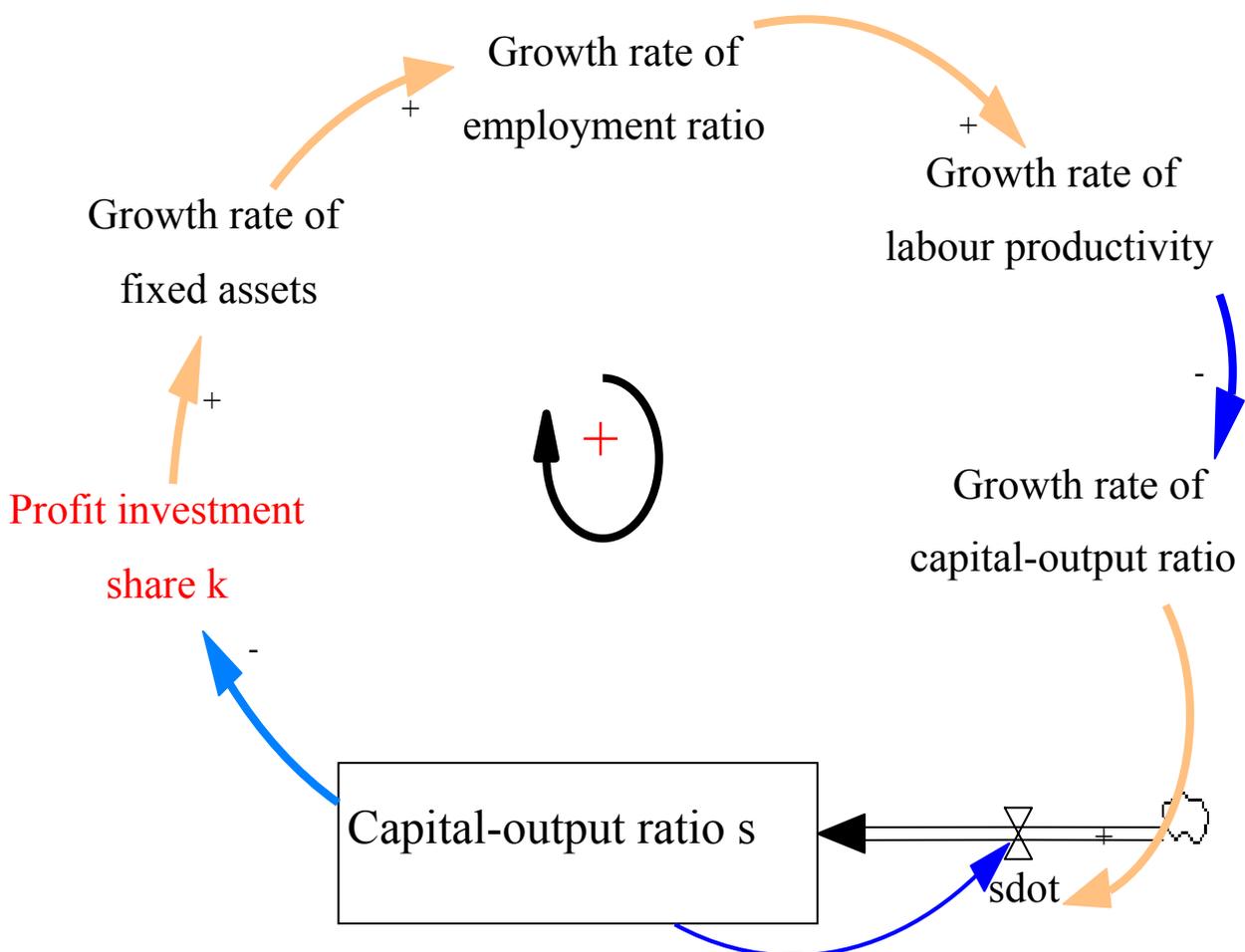


Figure 2. Endogenous **profit investment share** reinforcing economy of scale in **HL-IR** and **CL-IR**

Other main (state, or stock) variables of **HL-IR** are (Figure 3) **labour productivity** (output per worker), **employment ratio** and **relative labour compensation** (unit value of labour force).

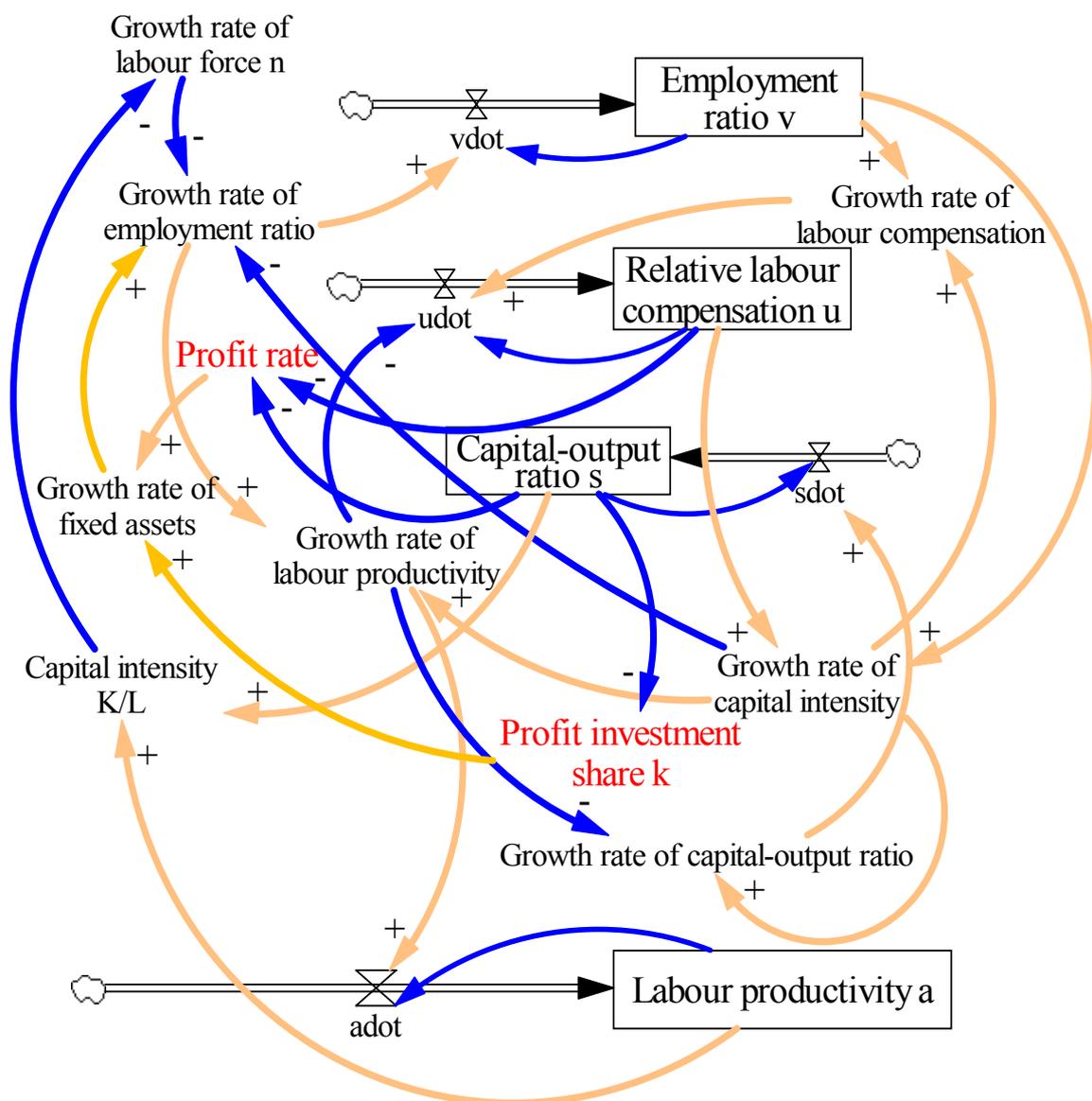


Figure 3. Causal loop diagram of the **HL-IR** deterministic form

Profit is monetary form of surplus value. **HL-IR** generates long waves (Table 1).

Table 1. **Former** and **current** long waves¹

INDICATOR	PEAK		TROUGH	
	observed	simulated	observed	simulated
profit rate	1966	1969	1982	1982
	1997	1999	...	2015
	...	2027		
employment ratio	1969	1969	1982	1983
	2000	2000	...	2017
	...	2029		

¹ See Figures 18 and 20. **HL-IR** is altered in 2008.

3. Re-formulating Control Law of Capital Accumulation (**CL-IR**)

Based on the US macroeconomic data for 1969–2007, computer simulation runs (through 2060) exhibit how a postponed non-aggressive application of the control law (**CL-IR**) in 2012 and afterwards could smooth out long waves of capital accumulation and shorten a period of fluctuations from 24–30 to 14–16 years in the restructured US economy compared to evolution based on **HL-IR**.

Control law **CL-IR** (Figure 4) enforces stabilisation of total surplus value, particularly, by creating an anticipatory negative 2nd order feedback loop (Figure 5).

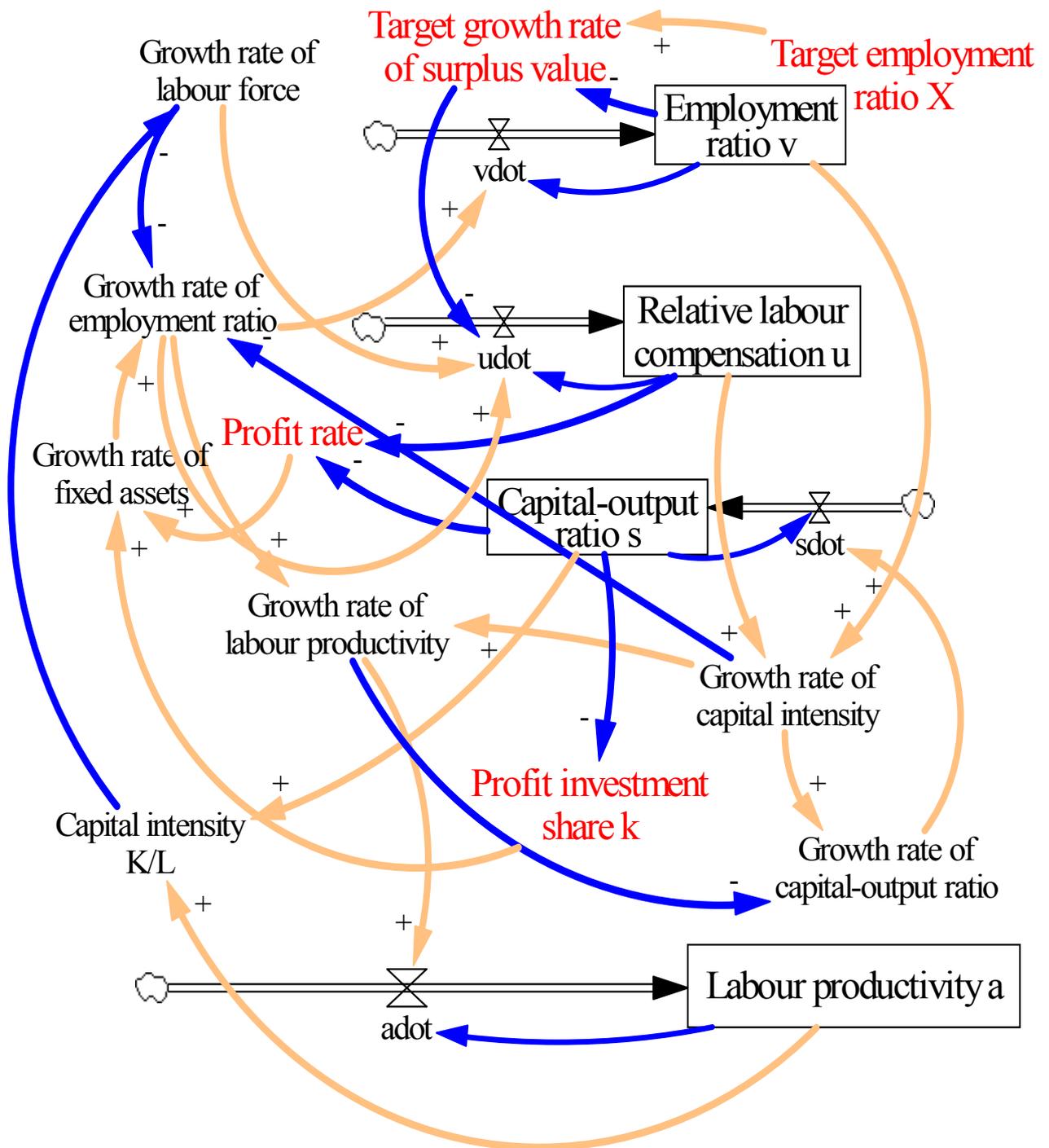


Figure 4. Causal loop diagram of the control law (CL-IR) deterministic form¹

¹ A simplified extended Kalman filtering (its *Vensim* version) enabled, first, identification of HL-IR and CL-IR unobserved parameters, and, second, behaviour reproduction tests of their *probabilistic forms* over 1969–2007.

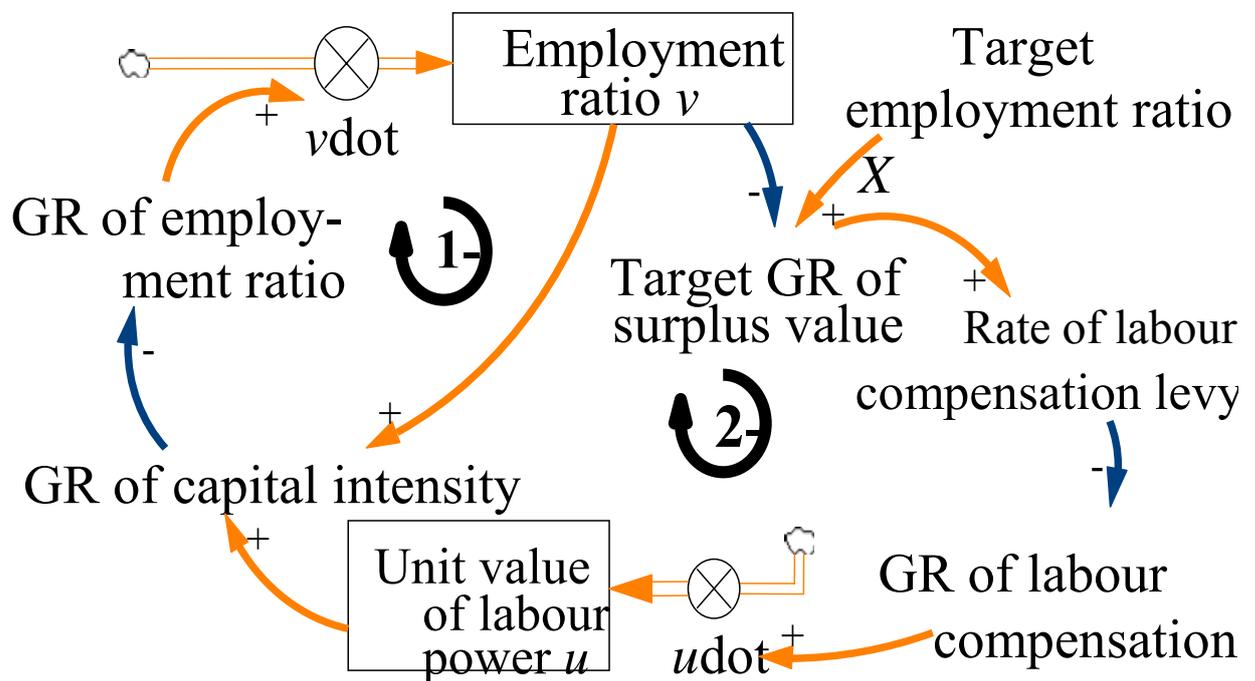


Figure 5. The 1st in **HL-IR** and in **CL-IR** and 2nd order negative feedback loops in **CL-IR** only (GR is for growth rate)

4. **HL-IR** and **CL-IR** Historical Fit

HL-IR and CR-IR probabilistic forms are to pass behaviour reproduction tests. In particular, the Theil inequality statistics (Table 2) are used for estimating historical fit.

Rather small root-mean-square errors as the percentage of the means (RMSE as percentage of the mean) and prevailing non-systematic errors of incomplete co-variation (UC) over bias (UM) and over difference in variation (US) show that these probabilistic forms track

observations of the major variables in the basal period agreeably (Table 2). Figures 17, 18 and 20 support this conclusion demonstrating a certain likeness between simulated and realised (observed) magnitudes in the basal period 1969–2007.

Table 2. Decomposition of errors for 1969–2007

VARIABLE	UM	US	UC	$\frac{\sqrt{MSE}}{mean}$, PER CENT
a	0.278	0.023	0.699	1.90
s	0.011	0.120	0.870	0.19
v	0.024	0.198	0.778	0.17
u	0.190	0.028	0.781	1.51
k	0.031	0.006	0.964	11.23
$(1 - u)/s$	0.183	0.008	0.809	3.71

A postulated in **CL-IR** negative association of the growth rate of surplus value with the actual employment ratio probably roughly characterised 2001–2007 taken as a whole (Figure 6).

The observed employment ratio v has become lower than target X in 2008 and in 2009. Its decline has been accompanied by decreasing total profit. Therefore **CL-IR** has not been operative even

roughly in 2008 and in 2009. It is likely, that altered **HL-IR** has been operating instead.

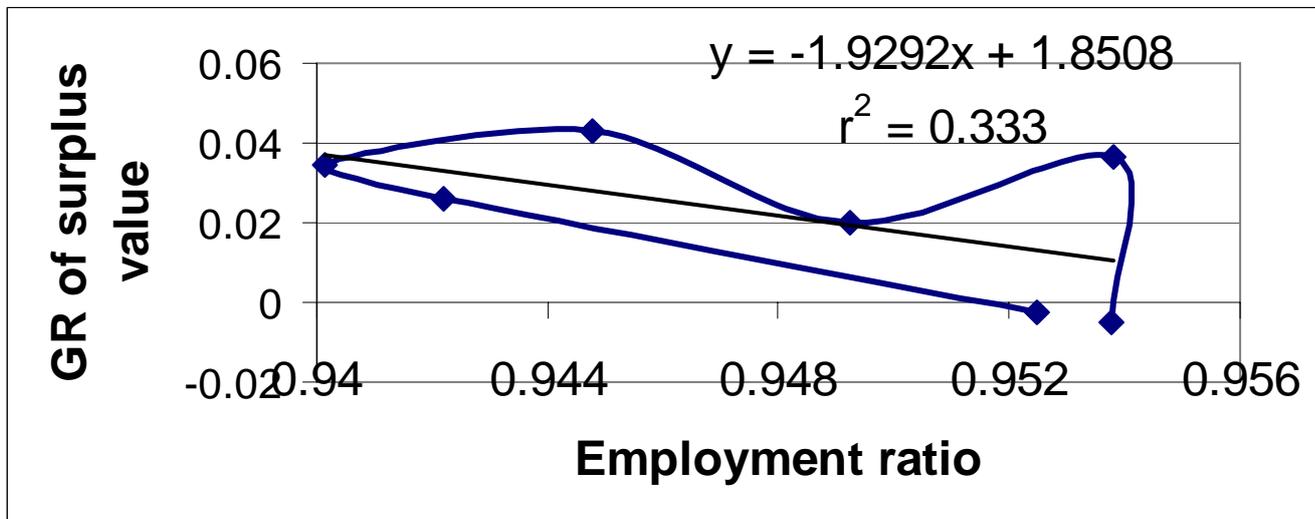


Figure 6. Evidence for **CL-IR**: employment ratio and growth rate of surplus value, 2001–2007, clockwise (GR is for growth rate)



Figure 7. Probable operation of altered **HL-IR** in 2008–2011 and of altered **CL-IR** in 2012–2019 (clockwise) based on CBO projections (GR is for growth rate)

5. Prospective Scenarios

CBO data and projections give additional tentative support for this reservation (Elmendorf 2009). There is no expectation of the negative association of the employment ratio and growth rate of profit, required by **CL-IR**, in 2008–2011 and there is indeed such expectation for 2012–2019 (Figure 7).

CL-IR was violated to labourers' disadvantage in the basal period. The observed increment of the labour compensation in 2003–2007 over 2002 was 4.9 per cent; the required one was 7.6 per cent (Figure 8).

The observed increment of total surplus value in 2003–2006 over 2002 was 14.1 per cent; the required by **CL-IR** was 5.8 per cent (Figure 9). Although applying this unaltered **CL-IR** does not stop over-accumulation completely, it abates over-accumulation strongly (for 2008–2060 normalised standard deviation of employment ratio in **Scenario IV** would be 0.003 – cf. 0.022–0.034 in Scenarios **II**, **III** and **I**).

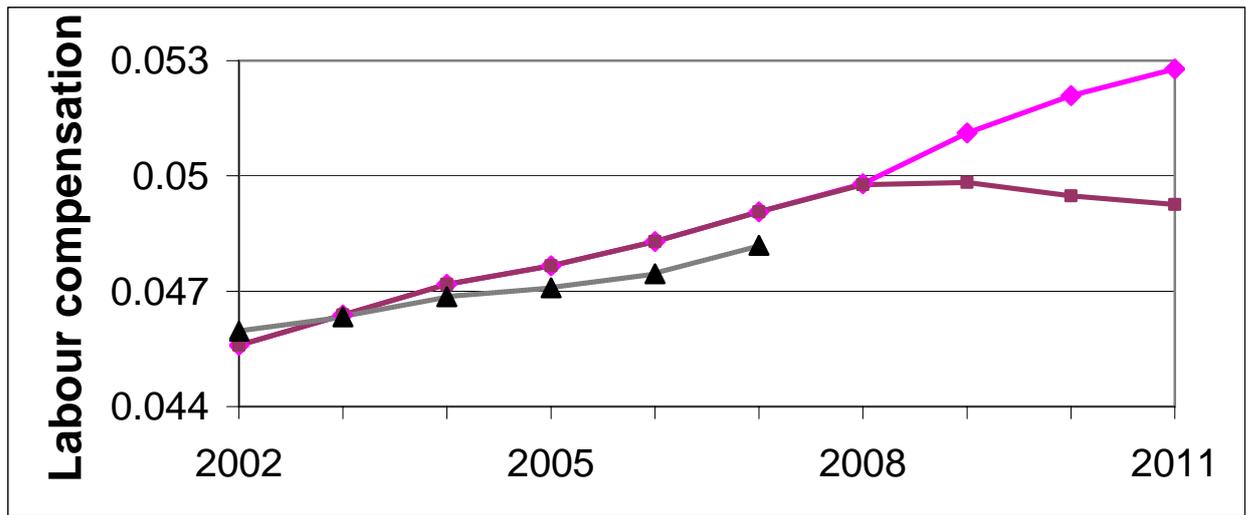


Figure 8. Observed (triangle) 2002–2007 and simulated 2002–2011 labour compensation (Scenarios I–III – diamond, Scenario IV – square, thousands \$ 2000 per worker per year)

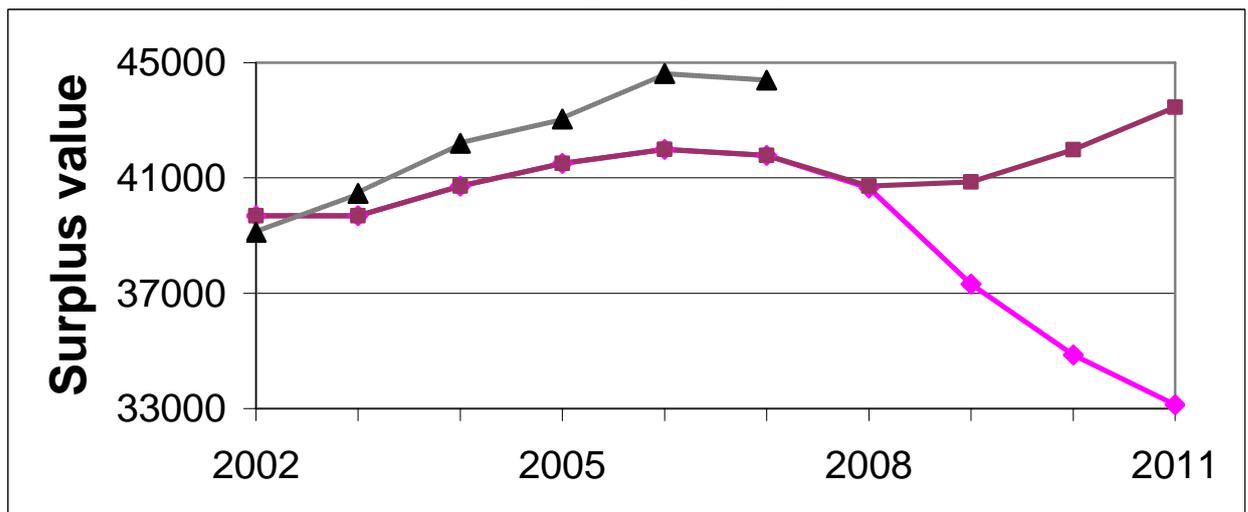


Figure 9. Observed (triangle) 2002–2007 and simulated 2002–2011 surplus value (Scenarios I–III – diamond, Scenario IV – square, thousands workers)

Figures 10–13 reveal that unaltered **CL-IR** can be used as a benchmark for over-accumulation and over-production caused by the violation of this control law in 2002–2007. Extra over-investment (Figure 10) was in

2006 and 2007 due to extra over-production (Figure 11), extra profit share (Figure 12) and extra profit investment share (Figure 13).

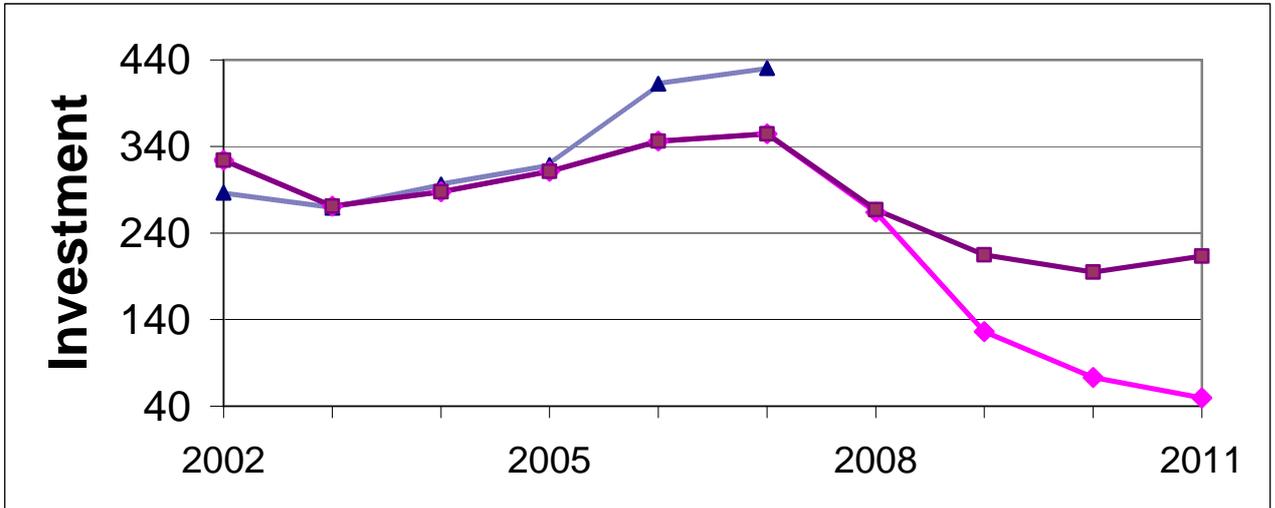


Figure 10. Observed (triangle) 2002–2007 and simulated 2002–2011 net investment (Scenarios I–III – diamond, Scenario IV – square, billions \$ 2000 a year)

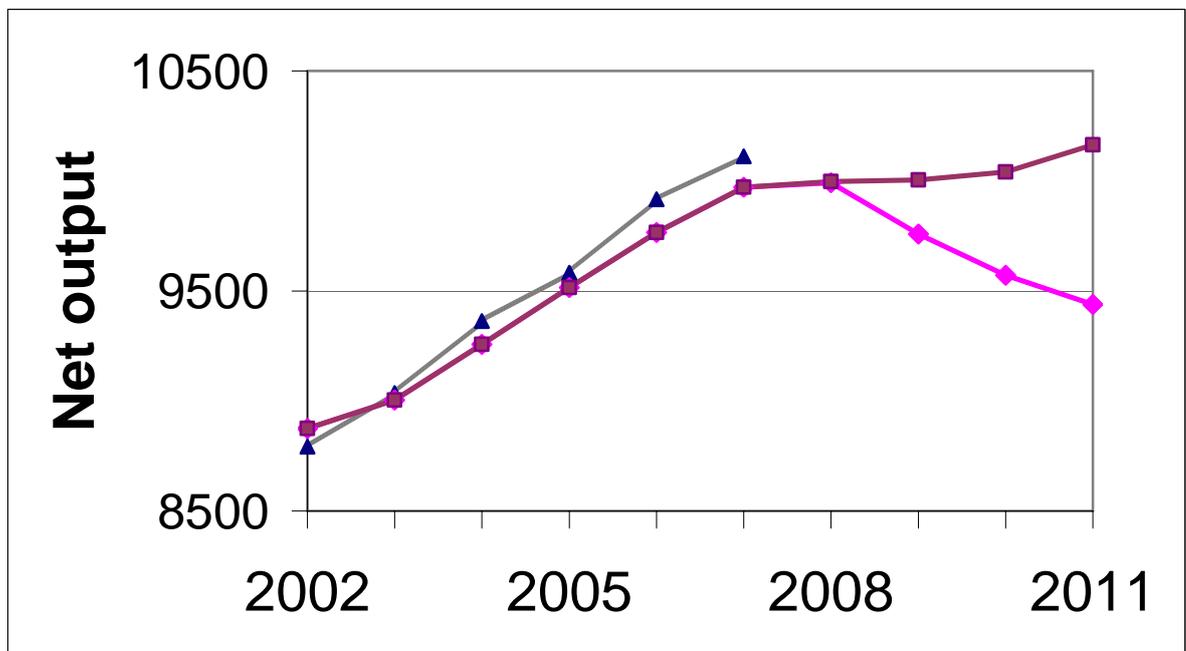


Figure 11. Observed (triangle) 2002–2007 and simulated 2002–2011 net national product (Scenarios I–III – diamond, Scenario IV – square, billions \$ 2000 a year)

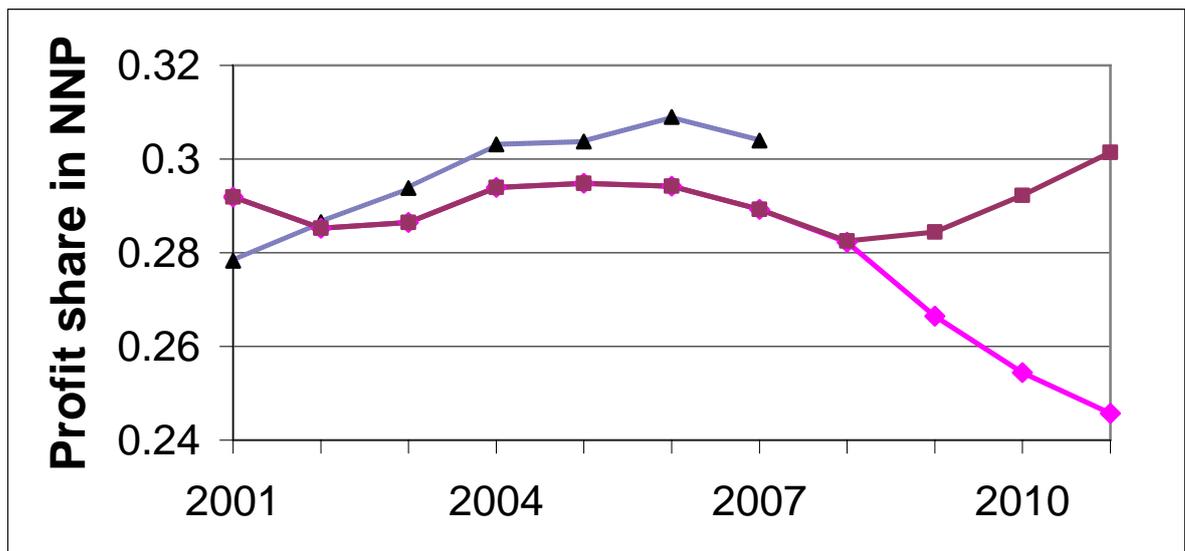


Figure 12. Observed (triangle) 2002–2007 and simulated 2002–2011 profit share (Scenarios I–III – diamond, Scenario IV – square)



Figure 13. Observed (triangle) 2002–2007 and simulated 2002–2011 profit investment share (Scenarios I–III – diamond, Scenario IV – square)

A ratio of respective observed magnitude of a variable to its simulated magnitude according to probabilistic form of unaltered **CL-IR** represents a shortage (≤ 1) or excess (>1) coefficient for the basal period 2002–2007;

similarly, a ratio of respective simulated magnitude of a variable for Scenarios I–III to its simulated magnitude in Scenario IV represents a shortage (≤ 1) or excess (>1) coefficient for years 2008–2009 (Table 3).

Data in Table 3 are in agreement with the fact that the economic decline in 2009 is deeper than in 2002.

Table 3. Variables' shortage coefficients for 2002, 2008–2009 and excess coefficients for 2006–2007

YEAR	PROFIT INVESTMENT SHARE	PROFIT SHARE IN NNP	NET OUTPUT	NET INVESTMENT
2002	0.889	1.005	0.991	0.885
2006	1.117	1.050	1.015	1.191
2007	1.139	1.051	1.014	1.214
2008	0.990	0.999	0.999	0.988
2009	0.642	0.937	0.975	0.586

The neo-conservative mobilising policy tightened workers' belts persistently in 2001–2007. This policy, possibly, determined the coefficient for profit share in NNP slightly higher than 1 in 2002. Still the product of profit share in NNP and profit investment share ($0.893 < 1$) indicates deficiency of investment compared with the magnitude required by **CL-IR** in that year too.

Table 4. Years of the first match with maximal economic magnitudes achieved in 1995–2008¹

VARIABLE	SCENARIO			
	inertia I based on altered HL-IR	stabilising II (aggressive) based on altered HL-IR and CL-IR	stabilising III (non-aggressive) based on altered HL-IR and CL-IR	stabilising IV based on unaltered CL-IR
Net output	2022	2015	2018	2008
Profit	2023	2013	2018	2010
Surplus value	2024	2013	2020	2011
Rate of surplus value	2025	2013	2020	2012
Profit rate	2051	2014	2034	outside reach
Employment	2026	2015	2023	2012
Employment ratio	outside reach	2016	outside reach	outside reach

¹ See Figures 14–25. All scenarios enhance output per worker (in decreasing order over 2008–2060: III, IV, II, I).

We see that unaltered CL-IR could stabilise economic growth on a transient to a limit cycle with small amplitude (in the mathematical sense) by accel-

erating accumulation in crisis phase of growth cycles and by slowing down accumulation in boom phase (cf. Flaschel 2009: 133–144).

This counter-cyclical policy implies conscious appropriate decreases in relative labour compensation and increases in profit investment share in relation to their inertia magnitudes in crisis phase of growth cycles. The opposite relationships are to be maintained by a social controller in boom phase.

Capital rejects unaltered **CL-IR** as a trap: it does not provide the maximal profit rate as in 1966 (0.182). A strive of capital dominated by its relentless financial arm to higher profit(ability) hides behind *explosive nature* of capitalist reproduction (Table 4, Figures 14–25).

After capital over-accumulation in 2005–2007 **HL-IR** and **CL-IR** are *altered* (respectively, in 2008 and 2012): the desired (by capital) employment ratio v_c ($v_c < X$) is plummeted, therefore influence of disparity between observed and desired employment ratios ($v - v_c$) on growth rate of capital intensity is strengthened (for $v > v_c$). This alteration enables increasing capital intensity (Figure 25), reducing employment right away in 2008–2009 and cutting labour costs over long term.

Altering CL-IR raises profit share in net output substantially in Scenarios II and III whereas profit share in net output tends to increase much slower in Scenarios IV and I over long term (Figure 16).

Fluctuations of capital-output ratio are contained in smaller range than in basal period in all four Scenarios (Figure 17). It is lower over 2008-2060 on the average in Scenarios IV and III than in Scenarios I and II.

Altering HL-IR and CL-IR makes employment ratio lower, in particular, in inertia Scenario I (Figure 20). Businesses trim costs by cutting payrolls, especially in aggressive Scenario II (Figure 21).

Over 2008–2060, unaltered CL-IR (Scenario IV) is characterized by smallest amplitude of profit rate oscillations, whereas average profitability is lowest in inertia Scenario I. Altering HL-IR in 2008 and CL-IR in 2012 raises surplus value, profit and average profitability in Scenario III and especially in aggressive Scenario II (Figures 14–16 and 18, Table 5).

Smallest enlargements of labour productivity and net output (Table 4, Figures 19) will be in Scenario I, biggest ones – in Scenario III that is leader in raising capital intensity (Figure 25).

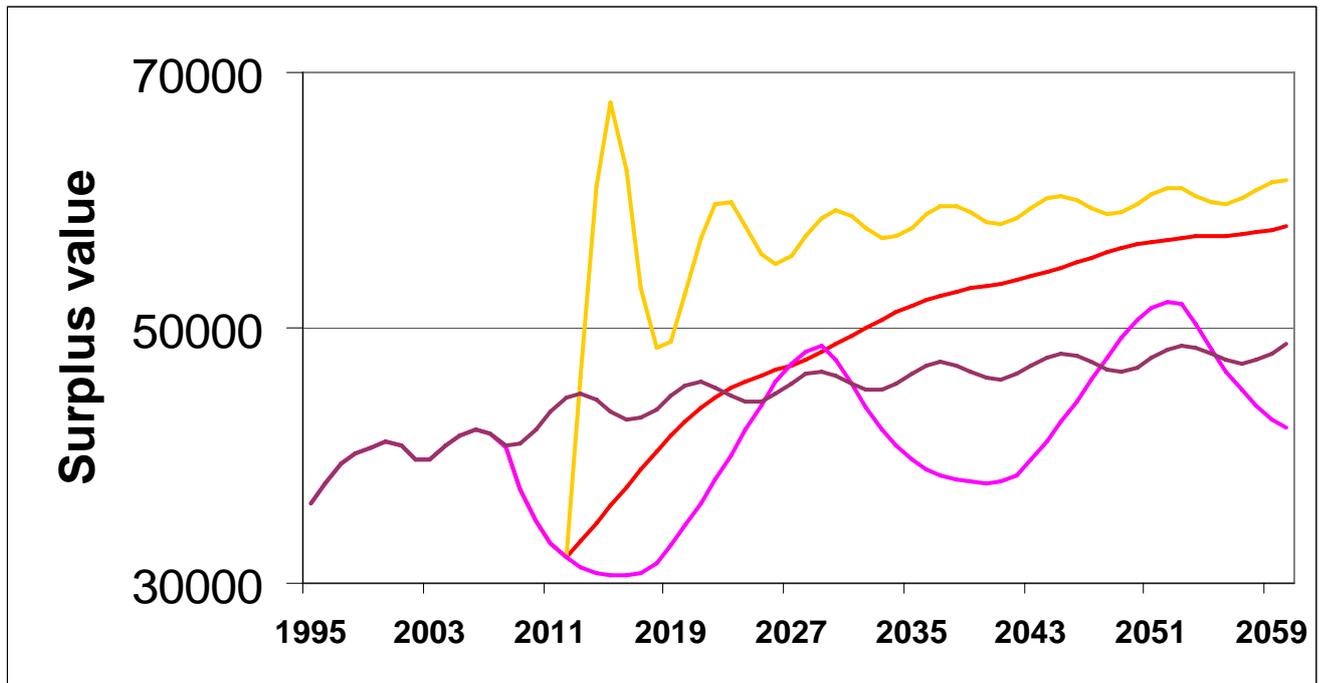


Figure 14. Surplus value (thousands of workers) in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1995–2060

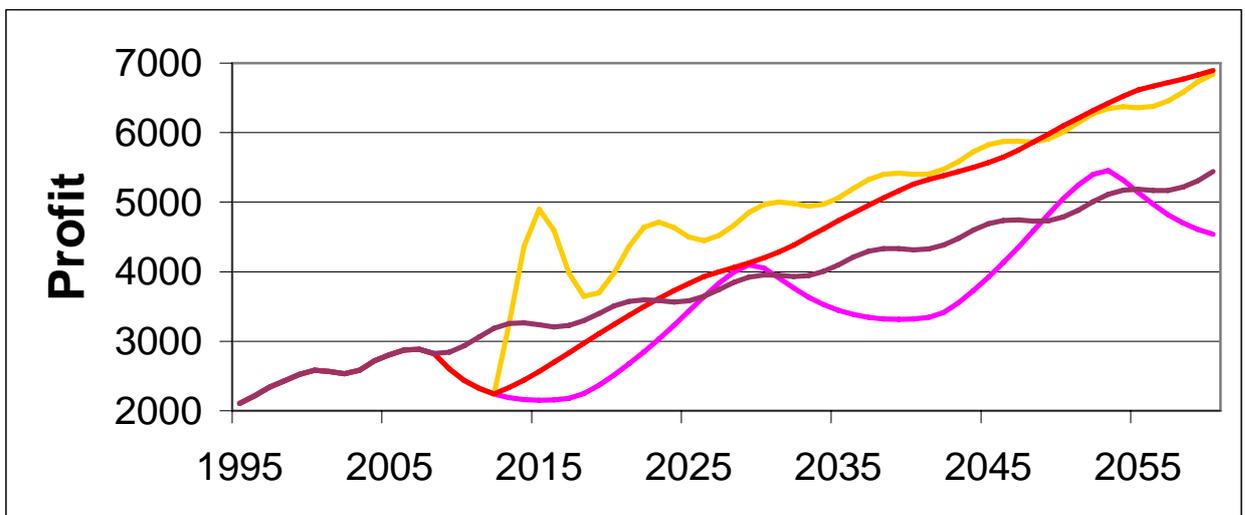


Figure 15. Profit (billions 2000 \$ a year) in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1995–2060

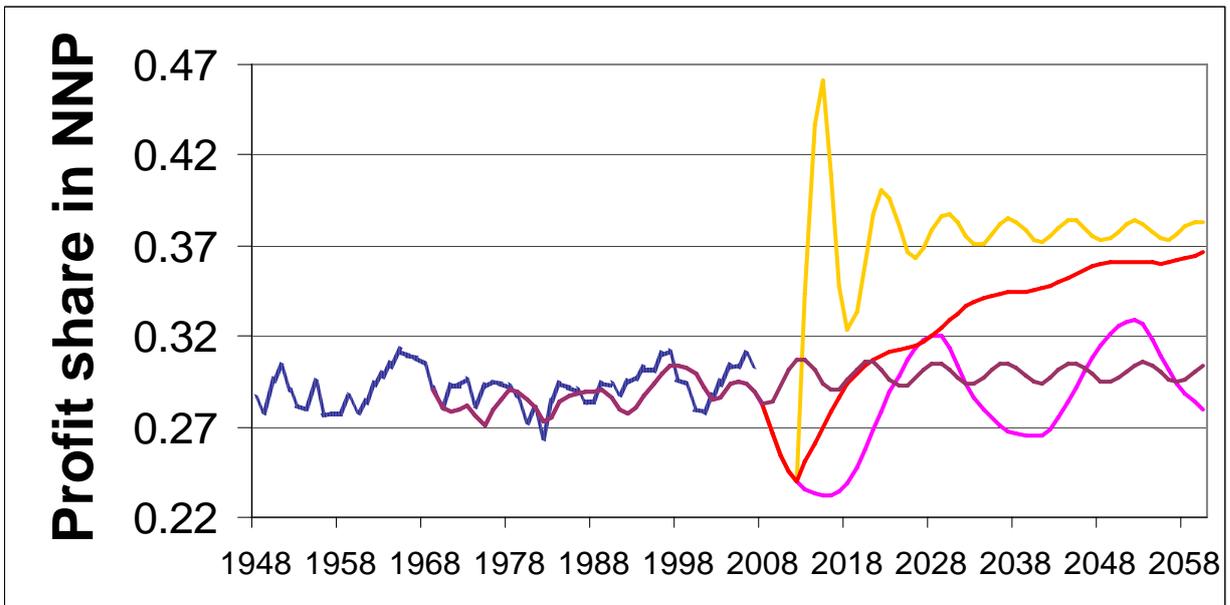


Figure 16. Profit share in net output real 1947–2007, in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1969–2060

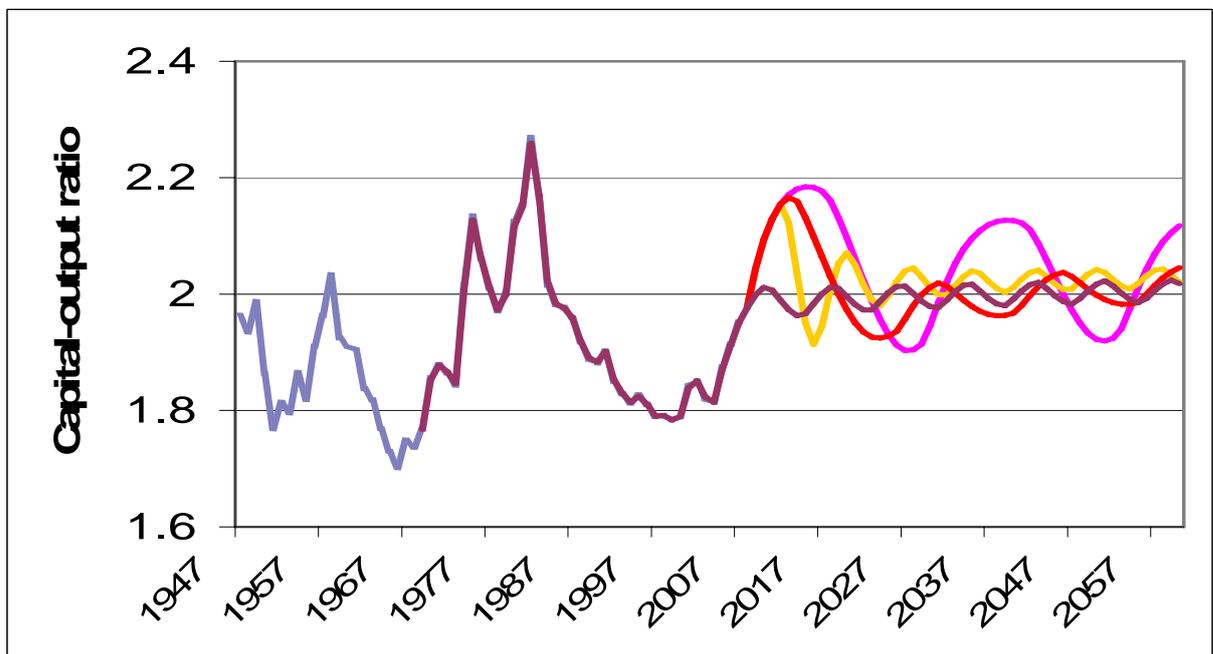


Figure 17. Capital-output ratio (years) real 1947–2007, in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1969–2060

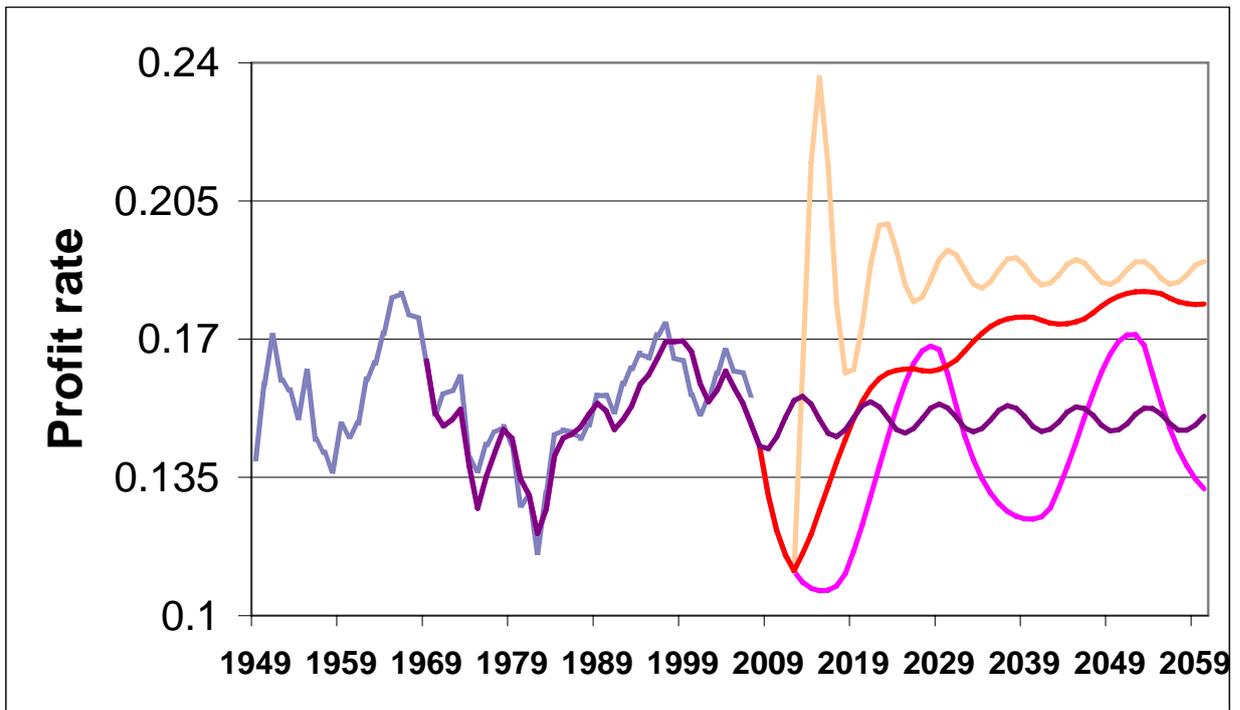


Figure 18. Profit rate observed 1949–2007 and simulated in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1969–2060

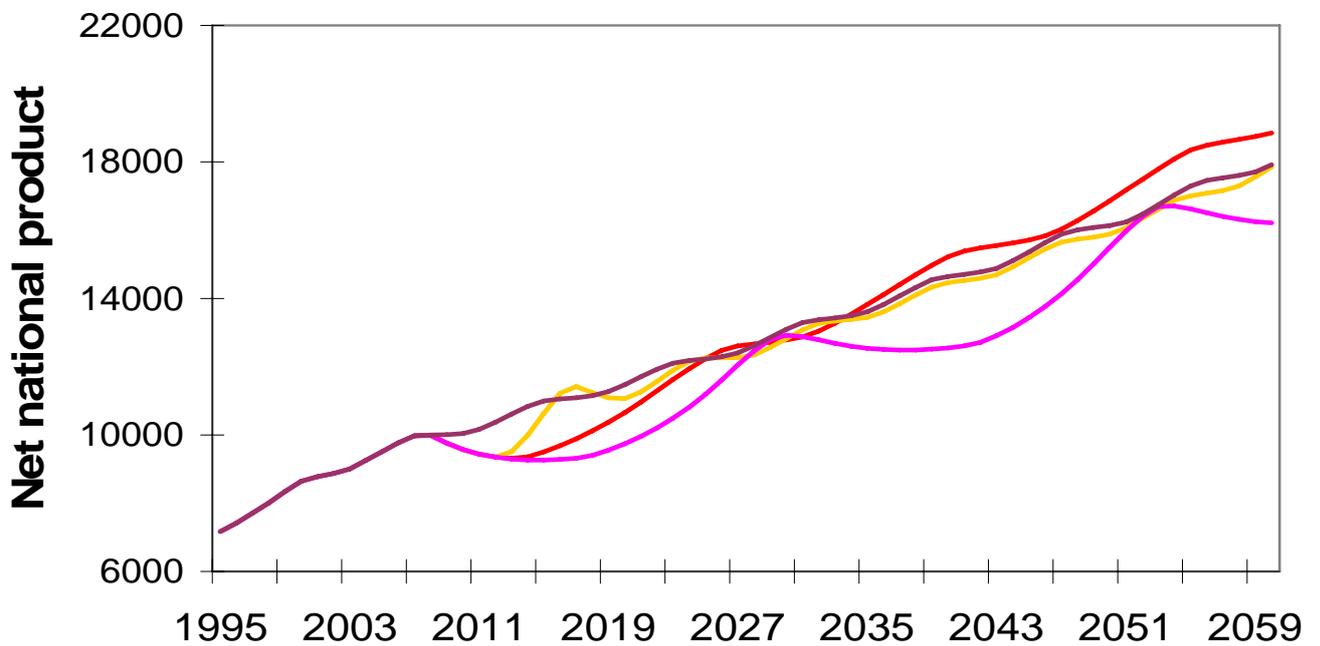


Figure 19. Net output (billions 2000 \$ a year) in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1995–2060

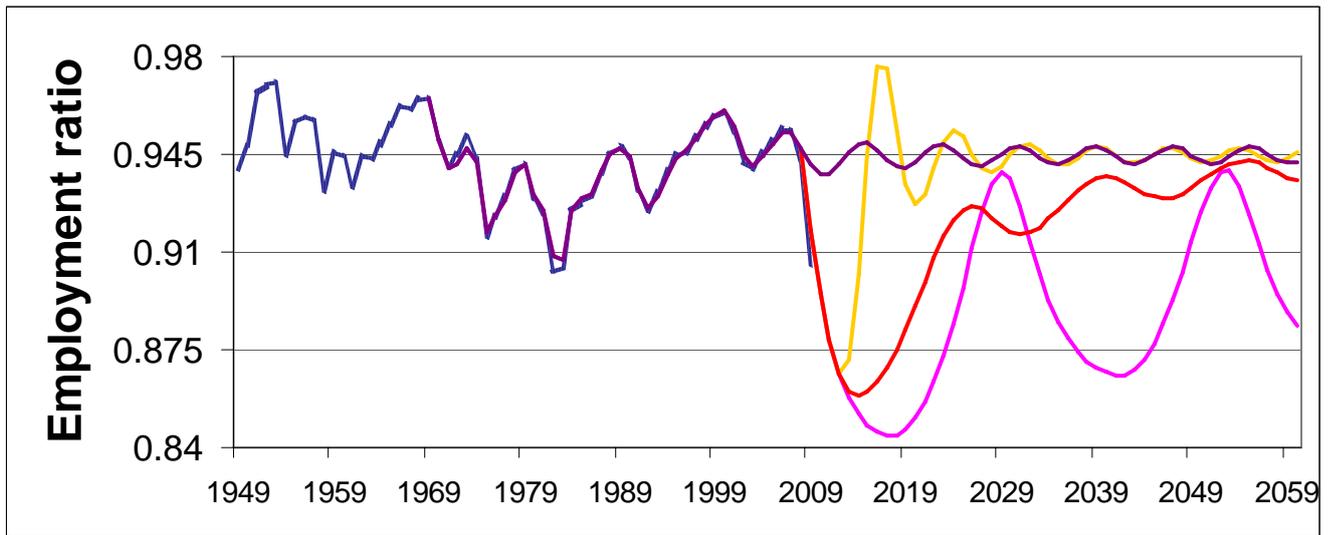


Figure 20. Employment ratio observed 1949–2009 and in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1969–2060

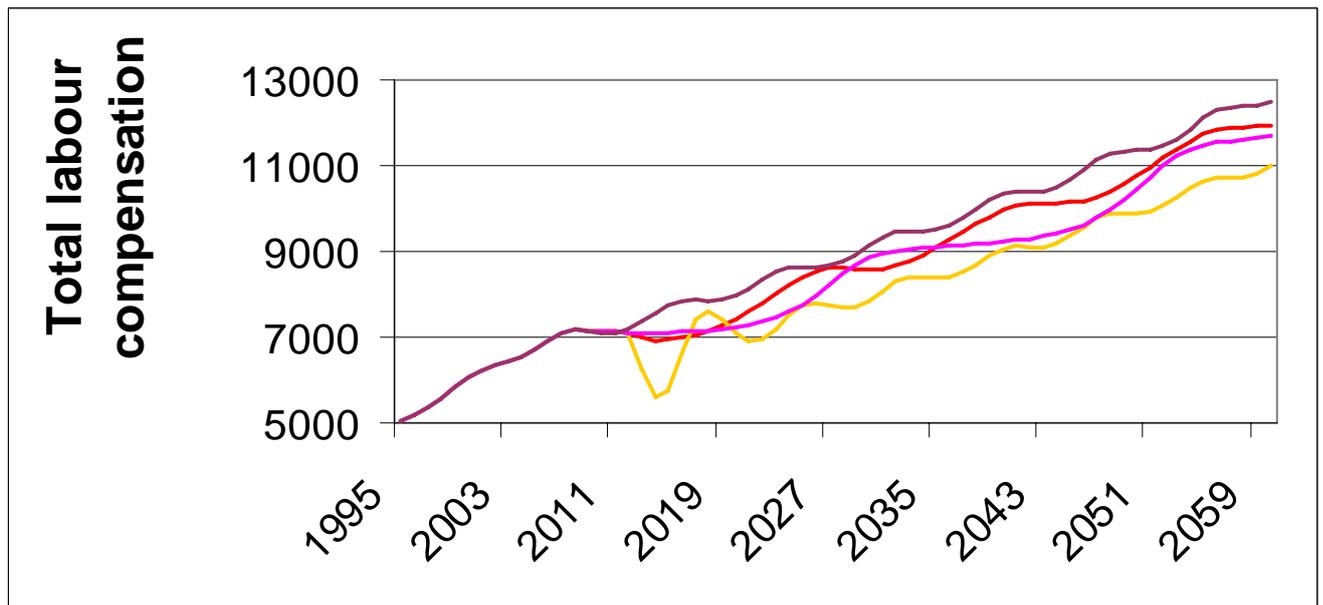


Figure 21. Total labour compensation (billions 2000 \$ a year) in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1995–2060

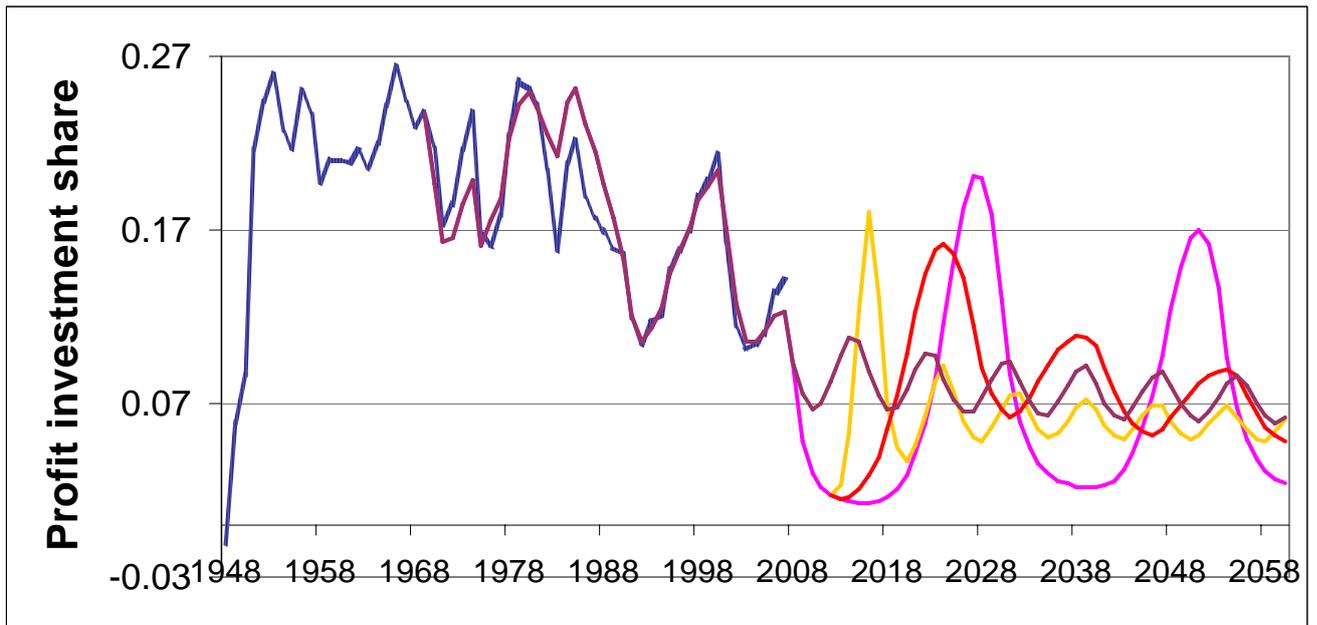


Figure 22. Profit investment share real 1948–2007 and in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1969–2060

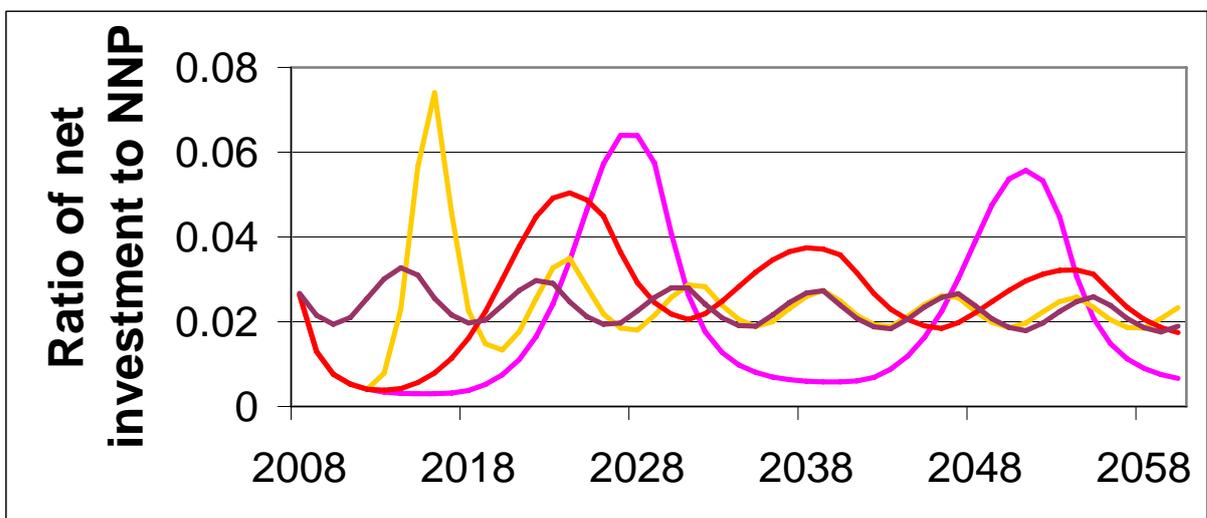


Figure 23. Ratio of net investment to net output in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 2008–2060

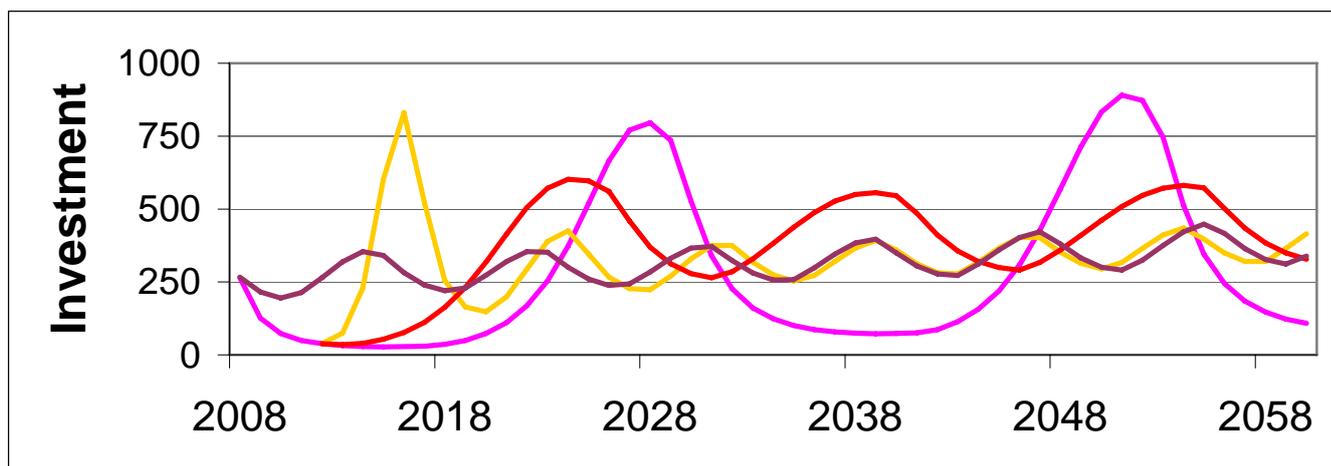


Figure 24. Net investment (billions \$ 2000 a year) in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 2008–2060

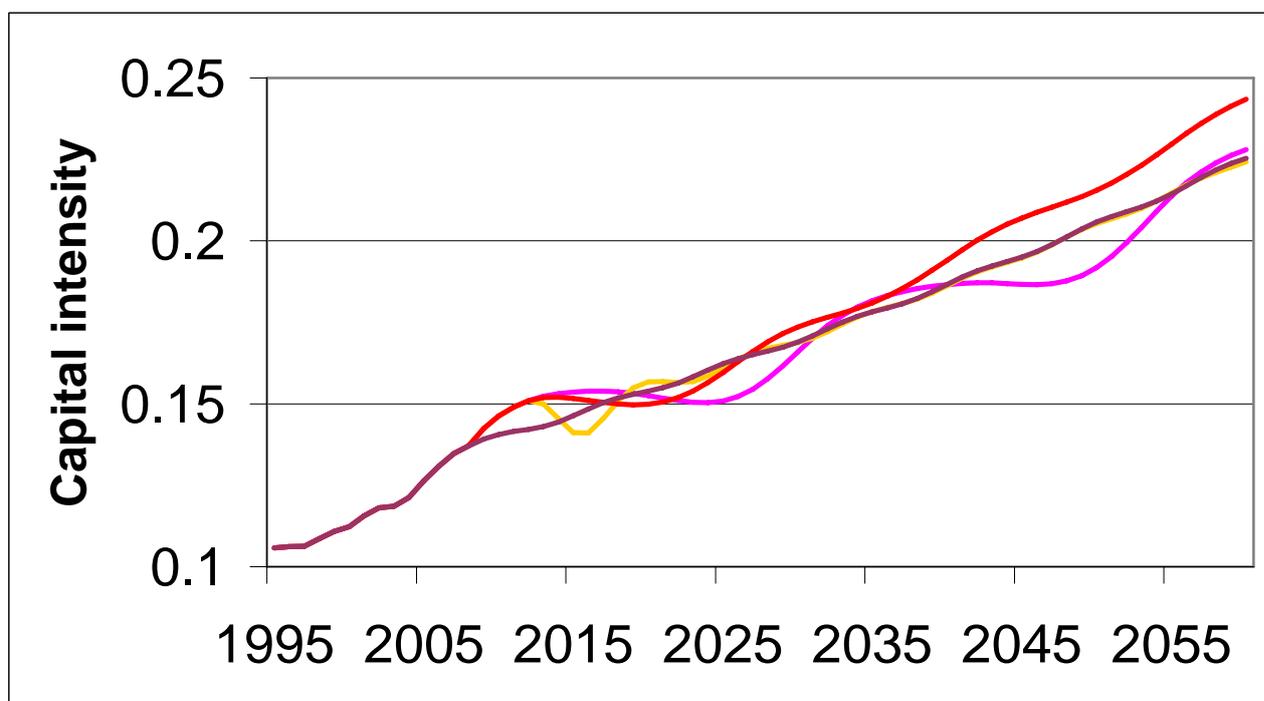


Figure 25. Capital intensity (millions \$ 2000 per worker) in **inertia I**, stabilising Scenarios **II**, **III** and **IV**, 1995–2060

Labour market became **Achilles' heel** of US economy (Figure 20). The official unemployment rate is maximal since 1983 (about 9.5 per cent in June

2009); in Scenarios I–III employment will fall in 2012 near to the observed levels of 1999–2000. Mass lay-offs are **Mercury’s wings** of long-term profit and profit rate (Figures 14–16 and 18).

Table 5. Average magnitudes of the **HL-IR** and **CL-IR** variables in Scenarios I–IV and their ranks in decreasing order, 2008–2060

SCENARIO	PROFIT SHARE		PROFIT INVESTMENT SHARE		SHARE OF NET INVESTMENT IN NNP	
	average	rank	average	rank	average	rank
I	0.283	4	0.069	3	0.021	4
II	0.367	1	0.062	4	0.023	2
III	0.326	2	0.077	2	0.025	1
IV	0.299	3	0.078	1	0.023	3

Table 5 (continued)

SCENARIO	NET OUTPUT		NET INVESTMENT		PROFIT	
	average (trillions \$ 2000)	rank	average (trillions \$ 2000)	rank	average (trillions \$ 2000)	rank
I	12.6	4	0.28	4	3.6	4
II	13.5	3	0.31	3	5.0	1
III	13.8	1	0.36	1	4.6	2
IV	13.7	2	0.32	2	4.1	3

Table 5 compares relative intensity of investment activity in the Scenarios I–IV over 2008–2060. Profit investment share in **Scenario III** is lower on the average than in **Scenario IV** but higher than in Scenarios **I**

and II (see also Figure 22). Net investment and their ratio to net output are highest in **Scenario III** (Figures 24 and 23); investment in **Scenario IV** is lower on the average than in **Scenario III** but higher than in Scenarios I and II (Figure 24).

Conclusion

A secular decline in **profit investment share** depending on capital-output ratio substantially neutralises the secular tendencies of output-capital ratio and profit rate to fall. **CL-IR** with endogenous **profit investment share** can substantially abate over-accumulation. In the basal period, extra (in relation to **CL-IR** magnitudes) over-investment was due to additional over-production, extra profit share and extra profit investment share (in relation to **CL-IR** magnitudes).

A strive of capital dominated by its relentless financial arm to higher profit and higher profitability hides behind the *explosive nature* of capitalist reproduction. Still after the defeat of the neo-conservative mobilising policy in 2007–2008 there is hardly place for stabilising policy with the same or similar aggressiveness as in 2002–2007.

The lower observed growth rate of real labour compensation in 2002–2007 than required by **CL-IR** has contributed to sharp capital over-accumulation in 2005–2007.

The capital endeavour to higher profitability alters HL-IR and CL-IR. Capital acts to recover profitability over a long term of about half a century to a maximal height after the Second World War observed in 1966. These efforts underlie the recent sharp decline of output, profit and employment.

In the **inertia Scenario I**, HL-IR (altered in 2008) shapes long swings with a period of about 24–30 years. A limit cycle is simulated with a period of fluctuations of about 27 years. Other characteristic of this **Scenario I** is reinforcement of the tendencies of profit rate to fall until 2015 and of employment ratio to decline until 2017.

CL-IR (altered in 2012) smoothes long swings and shortens their periods in Scenarios **II** (aggressive) and **III** (non-aggressive) to 8 and 14–16 years, respectively.

Falling short to impose unaltered **CL-IR** in 2002–2007 or improve upon it in 2008–2060 (**Scenario IV**) is the labour defeat!

Recovery of net output and employment in **Scenario III** based on altered HL-IR (2008–2011) and on altered **CL-IR** (2012–2060) starts in 2014. **Scenario III** may represent a new social compromise after compromise embodied in **stabilising Scenario IV** not succeeded in 2002–2008, especially taking into account international competition of national economies.

The present stern crisis of the capital accumulation is more fundamental than conjuncture crisis. Apart from Scenarios II and IV, it will last in Scenarios III and I until 2018–2022 when the pre-crisis maximum of net output will be restored and 2023–2026 when the pre-crisis maximum of employment will be reached again.

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