Timing and duration of IT regimes

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Shifts in monetary policy

- Inflation Targeting popular and ever more widespread in industrialised and emerging economies
- broad academic support
  consistent with new-keynesian view
  on monetary transmission
  of time-consistent rules-constrained policy
  and political change
- Financial Crisis ended a spell of rules-based time consistent monetary policy that started in the mid-80s
- does this also announce the end of IT?

Key

- changes in policy regimes occur in response to economic or political events
- examine monetary regime changes
  method
  - IV probit (regime)
  - duration model
- main finding
  - adoption of IT was favoured by past economic instability
  - policy switches become more likely after a crisis
  - but this works both ways: exit from IT?

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Window dressing

"good luck"
in the 90s and 00s

Financial Crisis
underlying changes to
monetary policy

real threats to IT

- no guide (target or forward guidance)
- fiscal policy

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IT+

"good luck"
in the 90s and 00s

IT had effects
"good policy"

Financial Crisis
underlying changes to
monetary policy

IT+
modify but maintain
cope with changes

real threats to IT

- no guide (target or forward guidance)
- fiscal policy

threats, but modify by
adding financial instability and
protecting independence

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Window dressing

The death of IT
(Frankel, 2012)

Central banks should be
concerned that they may be
pushed into a corner

Forward guidance (Praet,
2012)

Nominal GDP targeting
(Carney, 2012)

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Window dressing

The death of IT
(Frankel, 2012)

Central banks should be concerned that they may be pushed into a corner,

Forward guidance (Praet, 2012)

Nominal GDP targeting (Carney, 2012)

IT+

The new normal of monetary policy

Cheap talk is no alternative to IT (Posen, 2012)

Make IT more flexible (Svensson, 2011)

IT is like GDP targeting …

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Shifts in monetary policy

- is crisis response an anomaly with a secret hope that things will turn normal? or is this a shift once more in central bank policy? a 'reverse Volcker' moment to tackle debt?

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Shifts in monetary policy

- is crisis response an anomaly with a secret hope that things will turn normal? or is this a shift once more in central bank policy? a 'reverse Volcker' moment to tackle debt?
- not because central banks want, but as they are forced into a corner, even by their own actions that might make sense at first?

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Shifts in monetary policy

- **exogenous shift**

Taylor rule $i_t = \alpha(s_t)+\beta(s_t)\pi_t+\phi(s_t)y_t+\varepsilon_t$

state s_t is a discrete valued random variable that evolves stochastically and independently of the endogenous economic variables. State s shifts policy between different regimes

Evidence of changes from active monetary policy regimes, in which central banks combat inflation, to more lenient regimes, in which monetary policy gives in to inflationary pressures. Such a distinction lays at the root of characterizing the IT policy as the active policy that prevails since the mid-eighties in most industrialised economies (Davig and Leeper, 2006).

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Shifts in monetary policy

- **endogenous shift**

  Taylor rule $i_t = \alpha(\pi_{t-1})+\beta(\pi_{t-1})\pi_t+\phi(\pi_{t-1})y_t+\varepsilon_t$

  depend on all exogenous shocks that modify the inflation process, but also on any policy action itself that may modify the expectations of the inflation process

- Under strict IT, a central bank changes behaviour when inflation passes a certain threshold rate. Under flexible IT, the trigger for the change in policy regime depends on the rise in inflation as well as the measure of the output gap, and the policy rule shift will be reflected in both coefficients.

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Shifts in monetary policy

- monetary policy changes are not isolated events. A small literature with suggestions why monetary policy regimes shift
- choice of exchange rate regime
  "mirage view" + "fear of floating"
  - Rose (2006, 2007)
  - Klein and Shambaugh (2008)
- choice of monetary regime
  - academic: Carare and Stone (2006), Rose (2007)
  - policy: IMF policy paper (Schaechter et al., 2002)

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Shifts in monetary policy

- **reason 1: economic conditions (endogenous shift)**

  a) past inflation or output experience

  →evidence on the effect of IT on economic conditions (Ball and Sheridan, 2005)
  ← evidence? Davig and Leeper (2006), Melosi and Bianchi (2013)

  b) shifts can occur due to deep crises. Crises are an opportunity to reform, as veto barriers are eliminated

Shifts in monetary policy

- **reason 2: political conditions**

  preferences for certain types of policies

  different types of crises – even fiscal ones – may have triggered a reaction by politicians to reform part of the policy process

  ← sustaining and completing reform packages after the crisis passed may turn out to be more complicated. Even successful economic reforms have run into a political impasse (Rodrik, 2008)

  fizzling out of reform may shift expectations of the kind of policy that may be maintained in the longer term.

Shifts in monetary policy

- **reason 3: fiscal policy**

game of 'chicken' between central banks and governments

Unable to deal with the fundamental causes of debt, government asks the central bank to keep both banks and sovereign alive in order to buy time. Independence is gone and the incentive structure is wrong

reform: similar class of reforms of policymaking process, similarities in institutional settings (Kopits, 2001)

→ evidence on the effect of IT on fiscal policy (Combes et al. (2014; Minea and Tapsoba, 2014)

← evidence?

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Shifts in monetary policy

- **reason 4: capacity of monetary policy**

financial system
central bank instrument independence
mandate to achieve price stability
capacity for monetary policy action
build accountability and credibility

→ evidence on central bank building:
Carare and Stone (2006)

← exit of regimes? banking system collapse, loss of credibility, loss of accountability

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Shifts in monetary policy

- reason 1: economic conditions
- reason 2: political conditions
- reason 3: fiscal policy
- reason 4: capacity of monetary policy

not need to be in place before a country begins the transition towards (full-fledged) IT

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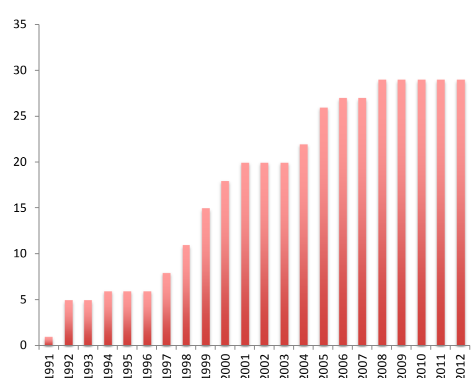
IT in practice

- classification of monetary regimes Rose (2007)

- increasing popularity of IT over time

  no country left IT, except for joining €



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IT in practice

country	year	country	year	country	year
New Zealand	1990	Brazil	1999	Philippines	2002
Canada	1991	Mexico	1999	Guatemala	2005
Chile	1991	Poland	1999	Slovak Republic	2005
Israel	1992	**Colombia**	**2000**	Armenia	2006
Australia	1993	South Africa	2000	Indonesia	2006
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Sweden	1993	Thailand	2000	Turkey	2006
United Kingdom	1993	Hungary	2001	Ghana	2007
Spain	1995	Iceland	2001	Albania	2009
Czech Republic	1998	Norway	2001		
Korea	1998	Peru	2002		

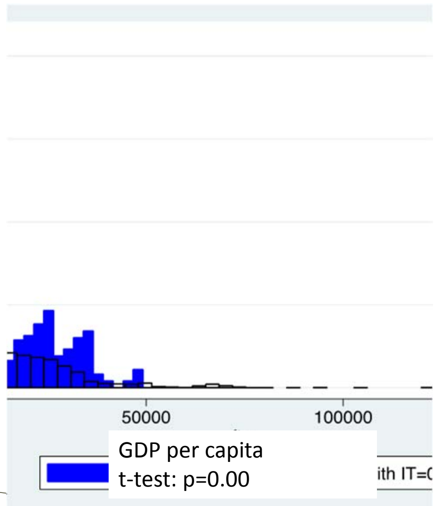
Some stats

Adopting IT: practical issues (Schaechter et al., 2002)

- a strong fiscal position
- macroeconomic stability
- a developed financial system
- central bank tools and operations

not need to be in place before a country begins the transition towards (full-fledged) inflation targeting

Some stats



Adopting IT: practical issues (Schaechter et al., 2002)

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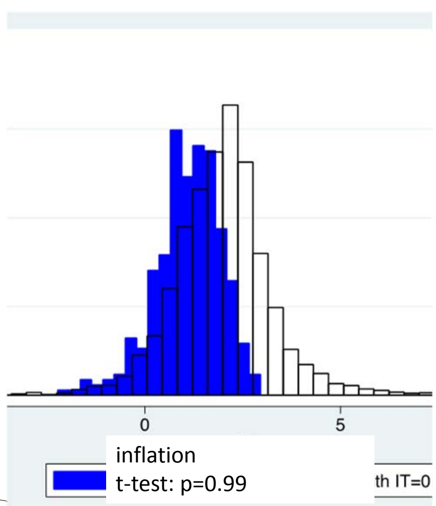

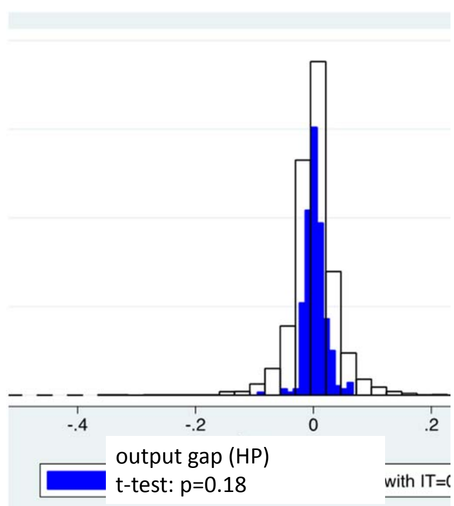

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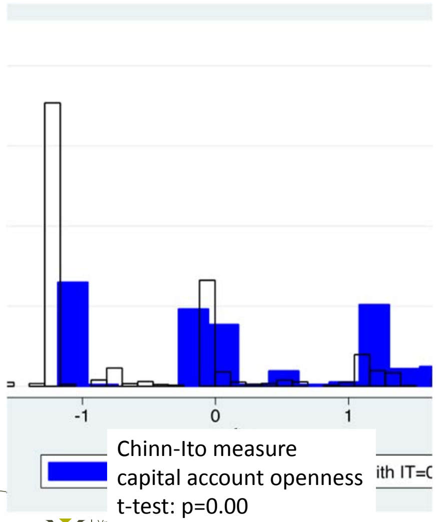
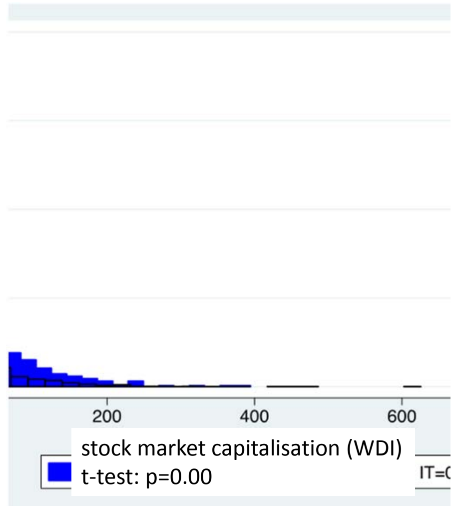
Some stats





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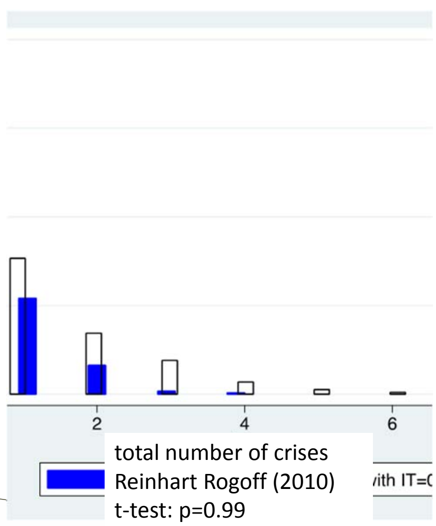

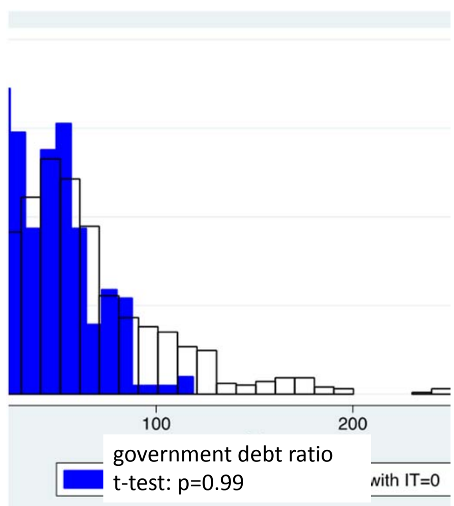

Some stats

- with IT, a significant lower number of crises
  - banking, currency, inflation,
  - no fiscal crisis (domestic or external)
- switch in monetary regime:
  usually, flexibilisation of exchange rate regime (IMF, Reinhart-Rogoff or Levy-Yeyati-Sturzenegger)

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Timing and duration of IT regime

examine switches in policy regime

- why timing of IT regime, why choice of this regime?
- duration of pre-IT regime
- we did not see a formal exit from IT,
  but what if it is window-dressing?
  look for regime switches in policy:
  classify monetary policy as active or passive

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Timing of IT regime

- discrete time duration data
- probit/logit model

$p_t=\alpha+\beta X_t+\varepsilon_t$

robust cluster
include duratic

- endogeneity: a
variables $X_{t,}$ bu
explanatory va
economic cycle

- output and inflation (Carare and Stone, 2006; Bianchi, 2013)
- fiscal policy (Minea and Tapsoba, 2014)
- financial development (Carare and Stone, 2006)
- financial instability (Borio and Lowe, 2012)
- policy capacity, credibility (IMF, 2002)

- IV
- duration

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Timing of IT regime

$p_{i,t}=\alpha+\beta X_{i,t}+\varepsilon_{i,t}$

variables X
- inflation, gap
- GDP per capita
- number of crises
- financial development (capital account openness, stock market capitalisation)

instruments

political variables (WB indicators)(Carare and Stone, 2006; Rose, 2014)

sample 206 countries, 1970-2012

economic data (WDI), Penn World Table,
WB, Reinhart-Rogoff, LYS, Chinn-Ito

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Results

timing IT

IV probit

inflation +
gap - and crisis -
debt -
financial
development +

variable	coeff	|z|	p-value
inflation*	2.39	1.57	0.12
gap*	-1.41	1.99	0.05
GDP per capita	0.00	1.66	0.10
crisis	-0.93	1.65	0.10
debt to GDP	-0.02	3.23	0.00
capital account openness	0.05	0.22	0.83
stock market capitalisation	0.01	1.88	0.06
constant	-3.71	1.38	0.17

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Alternative model

	coeff	|z|	p
inflation	2.44	2.24	0.03
gap	0.00	0.83	0.41
GDP per capita	1.00	0.85	0.40
crisis	0.49	1.79	0.07
debt to GDP	0.97	2.39	0.02
capital account openness	0.94	0.19	0.85
stock market capitalisation	1.00	0.27	0.79
constant	122.35	3.82	0.00
LL	-42.44		

- logit
  with robust standard error
  no endogeneity
  no time

- similar effect for inflation
  crisis makes adoption likely
- high debt makes adoption likely

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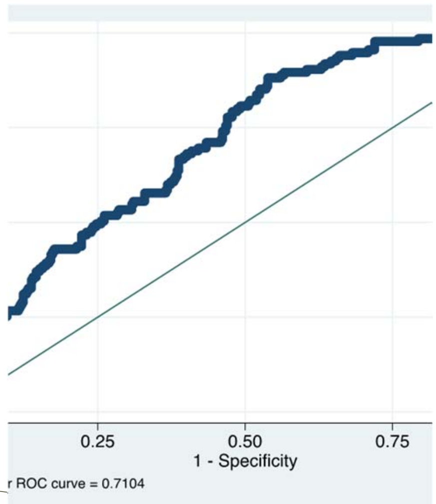
logit



- ROC curve
- plots a model's performance as one continuously changes the cut-off criterion for counting a given observation as a positive finding
- Y-axis: percent of true positives = test sensitivity
- X-axis: percent of false positives = 1-specificity
- the further the ROC curve diverges from the 45 degree line, predictions improve with fewer false positives and more true positives
- C stat = area under the ROC measure of in-sample performance

logit

	coeff	|z|	p
inflation	2.44	2.24	0.03
gap	0.00	0.83	0.41
GDP per capita	1.00	0.85	0.40
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LL	-42.44		

	coeff	|z|	p
inflation	1.31	0.76	0.44
gap	0.05	0.30	0.76
GDP per capita	1.00	2.34	0.02
crisis	0.65	1.74	0.08
debt to GDP	0.99	1.50	0.13
capital account openness	0.57	1.47	0.14
stock market capitalisation	0.99	1.80	0.07
constant	10.57	2.93	0.00
time	**0.80**	**9.48**	**0.00**
LL	-88.74		

add time

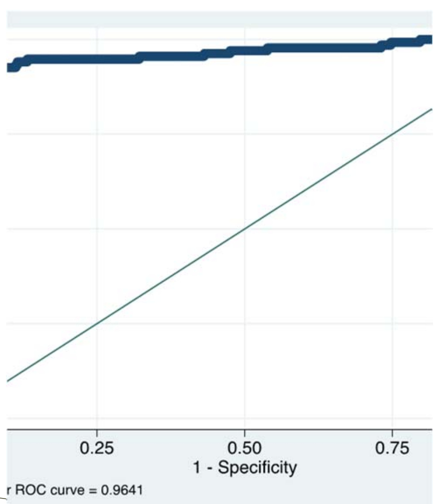
logit

	coeff	|z|	p
inflation	2.44	2.24	0.03
gap	0.00	0.83	0.41
GDP per capita	1.00	0.85	0.40
crisis	0.49	1.79	0.07
debt to GDP	0.97	2.39	0.02
capital account openness	0.94	0.19	0.85
stock market capitalisation	1.00	0.27	0.79
constant	122.35	3.82	0.00
LL	-42.44		

	coeff	|z|	p
inflation	2.33	2.21	0.03
gap	0.00	1.04	0.30
GDP per capita	1.00	1.77	0.08
crisis	0.53	1.88	0.06
debt to GDP	0.98	2.67	0.01
capital account openness	0.65	1.19	0.23
stock market capitalisation	0.99	0.98	0.33
constant	64.58	4.58	0.00
time	**0.15**	**2.66**	**0.01**
$spline_1$	**0.99**	**2.24**	**0.03**
$spline_2$	**1.01**	**2.18**	**0.03**
LL	-82.74		

time and spline estimation

logit



- ROC curve
- logit with time dependence

logit

	coeff	|z|	p
inflation	2.44	2.24	0.03
gap	0.00	0.83	0.41
GDP per capita	1.00	0.85	0.40
crisis	0.49	1.79	0.07
debt to GDP	0.97	2.39	0.02
capital account openness	0.94	0.19	0.85
stock market capitalisation	1.00	0.27	0.79
constant	122.35	3.82	0.00
LL	-42.44		

	coeff	|z|	p
inflation	2.32	2.10	0.04
gap	0.00	1.24	0.22
GDP per capita	1.00	1.96	0.05
crisis	0.53	1.68	0.09
debt to GDP	0.98	2.55	0.01
capital account openness	0.76	0.79	0.43
stock market capitalisation	1.00	0.65	0.52
constant	0.02	4.31	0.00
lag	**0.37**	**9.54**	**0.00**
LL	-54.33		

restricted transition model

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logit

	coeff	|z|	p
inflation	2.44	2.24	0.03
gap	0.00	0.83	0.41
GDP per capita	1.00	0.85	0.40
crisis	0.49	1.79	0.07
debt to GDP	0.97	2.39	0.02
capital account openness	0.94	0.19	0.85
stock market capitalisation	1.00	0.27	0.79
constant	122.35	3.82	0.00
LL	-42.44		

	coeff	|z|	p
inflation	2.84	1.99	0.05
gap	0.00	1.39	0.17
GDP per capita	1.00	1.56	0.12
crisis	0.42	1.60	0.11
debt to GDP	0.98	2.22	0.03
capital account openness	0.86	0.42	0.68
stock market capitalisation	1.00	0.26	0.79
constant	1.03	0.76	0.45
LL	-44.14		

regime switch only

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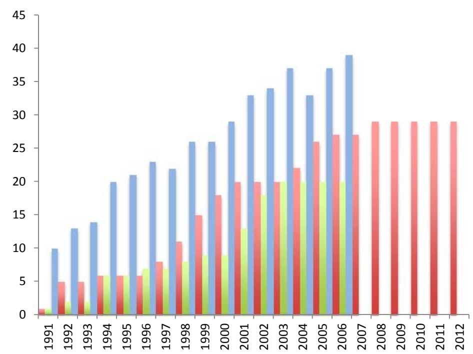
Alternative measures

definition of IT regimes

- Rose (2007)
- Stone Bhundia (2005)
- Stone Bhundia (2005)
- Carare and Stone (2006)



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Stone-Bhundia measure

timing IT

IV probit

similar findings

	coeff	|z|	p-value
inflation*	1.49	1.34	0.18
gap*	-1.69	1.99	0.05
GDP per capita	0.00	0.07	0.94
crisis	-1.30	1.68	0.09
debt to GDP	-0.03	2.43	0.02
capital account openness	-0.02	0.07	0.94
stock market capitalisation	0.01	0.85	0.39
constant	0.05	0.03	0.98

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Alternative measures

- definition of output gap and inflation
- subsamples
- subperiods
- …

IT since …

country	year	country	year	country	year
New Zealand	1990	Brazil	1999	Philippines	2002
Canada	1991	Mexico	1999	Guatemala	2005
Chile	1991	Poland	1999	Slovak Republic	2005
Israel	1992	**Colombia**	**2000**	Armenia	2006
Australia	1993	South Africa	2000	Indonesia	2006
Finland	1993	Switzerland	2000	Romania	2006
Sweden	1993	Thailand	2000	Turkey	2006
United Kingdom	1993	Hungary	2001	Ghana	2007
Spain	1995	Iceland	2001	Albania	2009
Czech Republic	1998	Norway	2001		
Korea, Rep.	1998	Peru	2002		

Duration of IT regimes

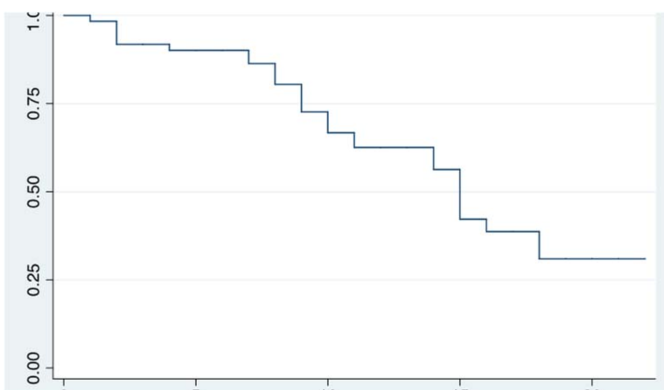
- duration data
  only IT switchers
  pre- and post-IT

- $duration_{i,t}=\alpha+\beta X_{i,t}+\varepsilon_{i,t}$

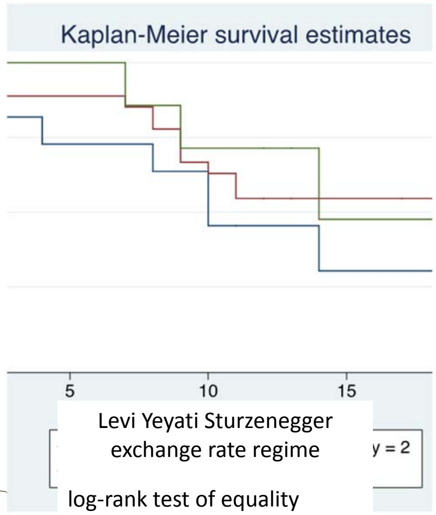
  with X_t variables an average over the subperiod

- standard Cox hazard model

Duration of IT regimes

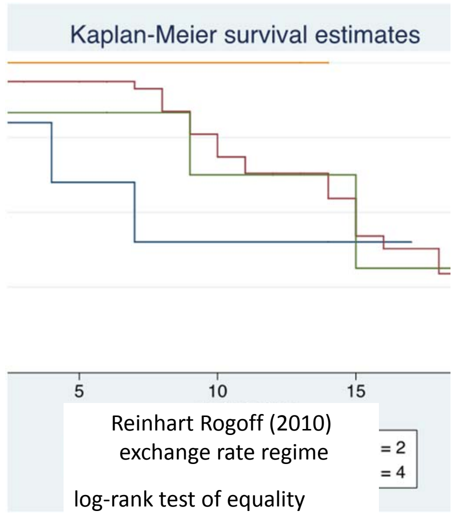


Duration of IT regimes



Levi Yeyati Sturzenegger
exchange rate regime

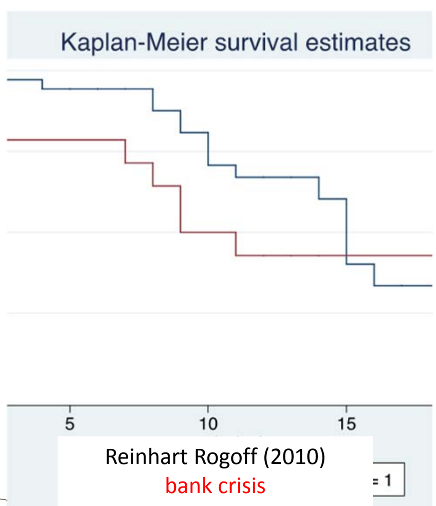
log-rank test of equality
$Chi^2(1)$ = 1.18, p-value=0.28



Reinhart Rogoff (2010)
exchange rate regime

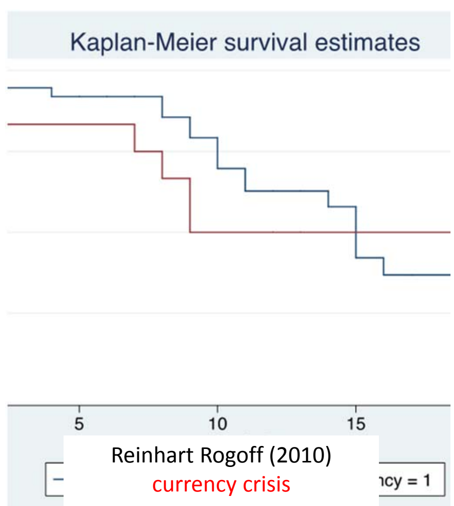
log-rank test of equality
$Chi^2(1)$ = 0.99, p-value=0.32

Duration of IT regimes



Reinhart Rogoff (2010)
bank crisis

log-rank test of equality
$Chi^2(3)$ = 0.90, p-value=0.34



Reinhart Rogoff (2010)
currency crisis

log-rank test of equality
$Chi^2(3)$ = 0.63, p-value=0.43

Results

duration model

Cox hazard

inflation +
debt +
fin development +

variable	hazard ratio	z	p-value
inflation	30.92	2.23	0.03
gap	0.03	0.26	0.79
GDP per capita	1.00	1.55	0.12
crisis	0.62	0.36	0.72
debt to GDP	0.95	2.76	0.01
capital account openness	0.68	0.85	0.40
stock market capitalisation	1.02	1.75	0.08
log(spell)	0.07	0.73	0.47

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Results

country	year	country	year	country	year
New Zealand	1990	Brazil	1999	Philippines	2002
Canada	1991	Mexico	1999	Guatemala	2005
Chile	1991	Poland	1999	Slovak Republic	2005
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Czech Republic	1998	Norway	2001		
Korea, Rep.	1998	Peru	2002		

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Timing of IT regime

- only 0 to 1
  - why timing or duration of pre-IT regime
  - why previous regime was abandoned
- if exit from 1 to 0
  - why IT regime lasts
  - why exit from regime

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Timing of IT regime

- we did not observe a formal exit from IT
  but is this really so?
- we observed a lot of changes in monetary policy over time, and evidence of switches in regimes
  - Davig and Leeper (2006) characterize the regimes by change in policy coefficients of a Taylor rule
  - simpler approach: are real interest rates positive or negative?

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Monetary regime: active to passive

- discrete time duration data
  endogeneity: IV probit
  instruments: political institutions (WB indicators)

  include duration of spell
  + previous regime

- duration model
  length of staying in active regime

  standard Cox hazard model

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Monetary regime: passive to active

	coeff	|z|	p-value
inflation*	0.19	3.98	0.00
gap*	0.48	0.03	0.98
GDP per capita	1.00	0.49	0.62
crisis	1.16	0.27	0.79
debt to GDP	1.00	0.23	0.82
capital account openness	0.59	1.50	0.13
stock market capitalisation	1.00	0.53	0.60
time	0.75	1.04	0.30
previous failure	0.95	0.80	0.42
constant	56.77	2.49	0.01

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Monetary regime: active to passive

	coeff	|z|	p-value
inflation*	0.19	3.98	0.00
gap*	0.48	0.03	0.98
GDP per capita	1.00	0.49	0.62
crisis	1.16	0.27	0.79
debt to GDP	1.00	0.23	0.82
capital account openness	0.59	1.50	0.13
stock market capitalisation	1.00	0.53	0.60
time	0.75	1.04	0.30
previous failure	0.95	0.80	0.42
constant	56.77	2.49	0.01

	coeff	|z|	p-value
inflation*	0.25	3.38	0.00
gap*	10.39	0.23	0.82
GDP per capita	1.00	1.02	0.31
crisis	1.04	0.30	0.76
debt to GDP	0.99	2.06	0.04
capital account openness	1.00	0.01	0.99
stock market capitalisation	0.99	3.64	0.00
time	0.56	1.21	0.28
previous failure	0.94	1.43	0.15
constant	684.68	4.11	0.00

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Results

duration model

Cox hazard

variable	hazard ratio	|z|	p-value
inflation	0.34	2.31	0.76
gap	-1.49	1.83	0.07
GDP per capita	0.01	0.84	0.40
crisis	-0.44	0.90	0.37
debt to GDP	-0.01	1.56	0.12
capital account openness	-0.52	1.10	0.27
stock market capitalisation	0.01	0.82	0.41
log(spell)	0.74	0.36	0.72

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Key findings

- shift to IT given in by
  - high inflation
  - crises
  - in particular fiscal crises (high debt)…
- shift to active monetary policy as
  - high inflation
- but shift to passive monetary policy because of
  - worsening fiscal performance (higher debt)

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Conclusions

- easy transition for central banks in crisis, or a forced march into inflationary policies?
- Is the current period of central bank practice an anomaly, soon to be followed by a return to normal service, or does the Crisis point towards the need to consider wholesale changes to how central banks conduct their business? (Whelan, 2013)
- "Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is past the ocean is flat again." J.M. Keynes

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Conclusions

- spell of rules-based time consistent monetary policy that started in the mid-80s and in many industrialised economies became known as IT

- end with the Financial Crisis?
  policy switches become more likely after a crisis that makes policy tradeoffs more complicated
  central bankers may be forced in the corner
  or make choices that paint them in the corner

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Policy implications

- active monetary regimes, like IT, require support from fiscal discipline, and economic stability.
  IT could have contributed to the development of a financial crisis (CEPR, 2013), so wider policy mandate for central banks?
  But is this sufficient? High debt and rising inflation is a problem

- for emerging economies, IT did support economic stability (Rose, 2007) so there is no reason to switch policy. Avoiding the economic volatility of the past or any political backdrop seems sufficient to maintain in place IT regimes, and enjoy the beneficial impact on macroeconomic performance (which may help to support IT)

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Timing and duration of IT regimes

Peter Claeys (Vrije Universiteit Brussel)

ESPE Conference, Banco de la Republica
Bogota, October 23-24th, 2014

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Muchas gracias!
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Any comments or suggestions?

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