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26 – 28 August 2015

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'Downturn' Estimates for Basel Credit Risk Metrics

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Experian

Agenda

- Review approaches and methods for:
  - Defining ‘downturn’ conditions
  - Estimating downturn values for LGD
- Focus on:
  - Retail credit
  - Workout data
  - Economics
- Illustrate related to ‘timestamps’ for economic data and LGD outcomes
- Discuss lessons from recent projects in this area across UK and Europe.

Regulations

Basel II (BCBS 2006)

468: A bank must estimate an LGD for each facility that aims to reflect economic downturn conditions where necessary to capture the relevant risks … Averages of loss severities observed during periods of high credit losses, forecasts based on appropriately conservative assumptions, or other similar methods.

475: Also for EAD where appropriate.

Basel II: Guidance note on para 468

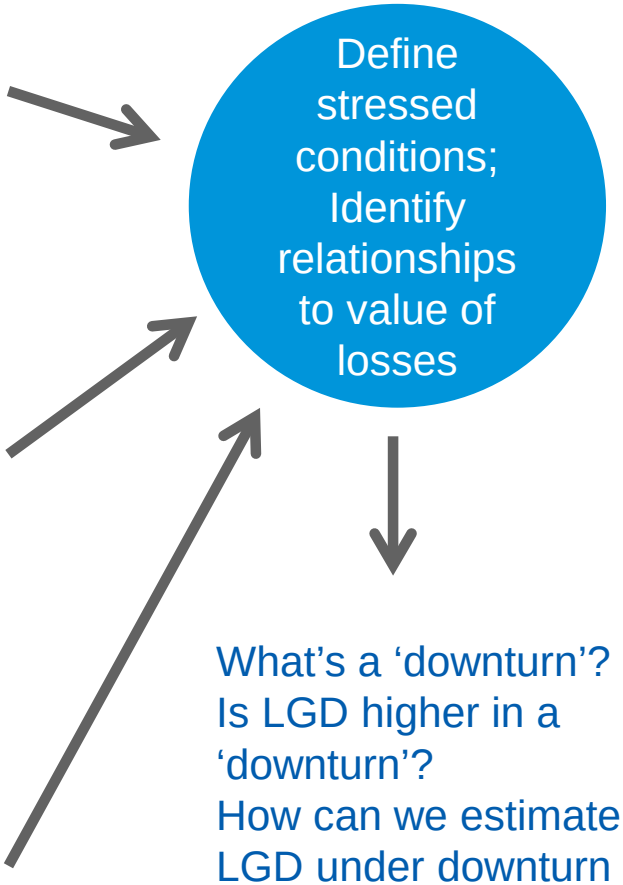
'Principles-based approach'

Principle 1: Rigorous and well-documented process for assessing the effects of economic downturn conditions on recovery rates, including: (1) Identification of appropriate downturn conditions; (2) Identification of any adverse dependencies between default rates and recovery rates; (3) Incorporation of dependencies to produce downturn LGD. May be related to stress tests.

Basel III (BCBS 2011)

28: Central aim to increase sector resilience going into a downturn and provide rebuilding capital during economic recovery.

Also reference to 'downturns' in para 29 (capital adequacy; excess credit growth); and 128 (earnings retention).



What's a 'downturn'?
Is LGD higher in a 'downturn'?
How can we estimate LGD under downturn conditions?

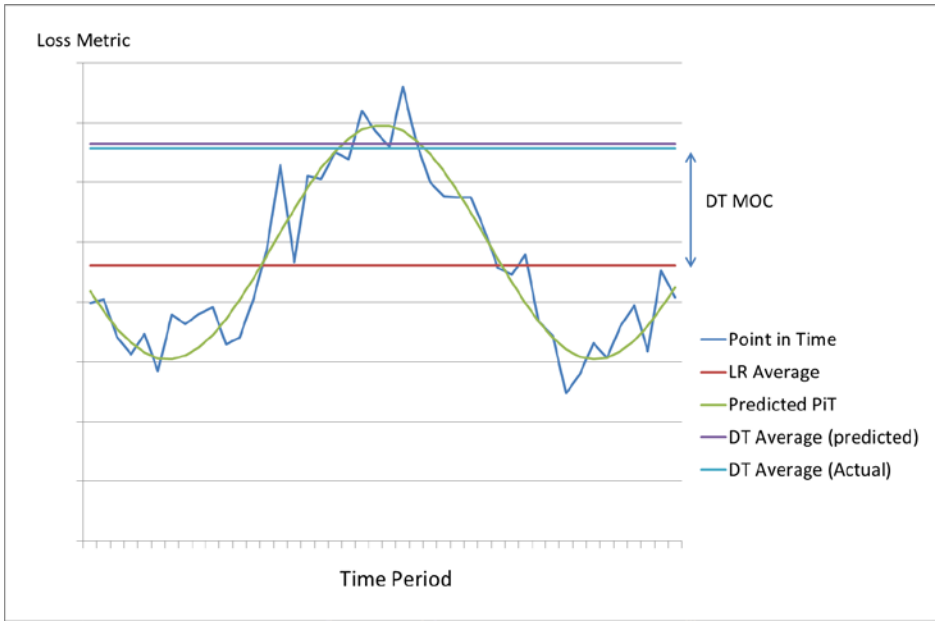
Defining ‘Downturn’

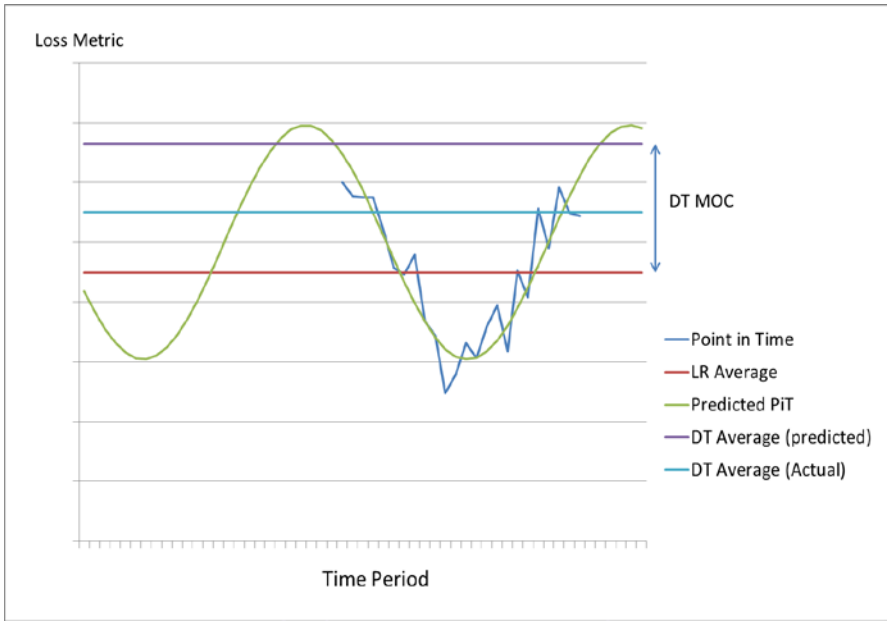
	Approach	Pros	Cons
1	2 consecutive quarters of GDP decline.	Simple, clear, definite. Limited data required.	Which recession? Is GDP right for retail credit? Some countries don’t have recent data.
2	Multiple macroeconomic time series	More comprehensive assessment of economic conditions relevant to retail risks.	How to weight series? Judgment? Formal models to credit risk outcomes (LGD). Factor analysis?
3	Credit cycle – peak PD	More directly relevant to stressed credit losses.	Data availability? Interpretation of PD trends (is observed PD peak related to economic downturn?)
4	Conservative interpretation of LGD outcomes – peak LGD; higher quantiles	Directly relevant to LGD outcomes	Data availability and interpretation; data may not span an economic downturn; or might be dominated by an extreme stress event (too conservative)

Estimating ‘Downturn’ LGD

	Approach	Pros	Cons
1	Direct estimation for restricted sample reflecting downturn conditions	Simple, transparent, directly relevant. No requirement for predictive modelling (?).	Data availability. Interpretation of trends in LGD data (particularly timing).
2	Conservative quantiles of observed LGD outcomes	Simple. Only requires data on observed losses.	What is ‘conservative’? Available data may not reference sufficiently stressed periods (or may be dominated by excess stress).
3	Correlations to PD	Directly addresses concerns in Basel II. Models may have other uses (stress testing).	Data availability? Interpretation of PD trends and correlations to LGD (particularly timing).
4	Model relationships of LGD outcomes to economic conditions and simulate downturn LGD for defined economic downturn.	Directly links to economic conditions inherent in ‘downturn’ definition. Actual loss data need not cover downturn conditions (although it helps!). Models may have other uses (stress testing).	May be difficult to establish robust models. Requires precise definition of an economic downturn to simulate LGD.

Data Constraints and Downturn Estimation



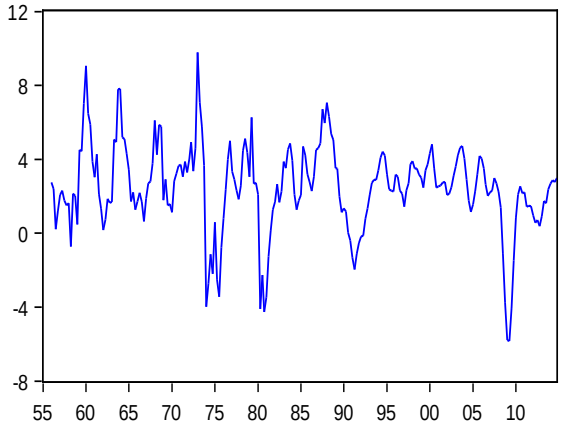


Method 1

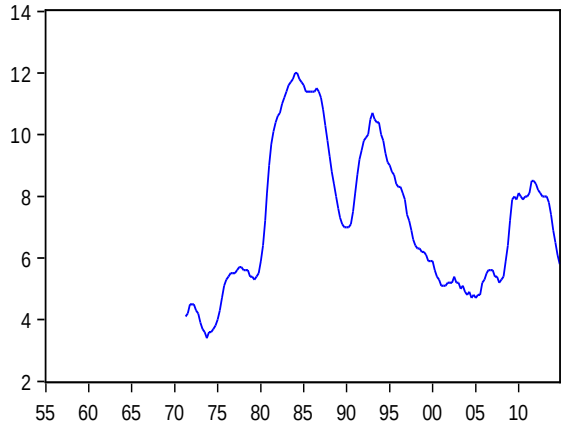
Methods 3 / 4

Defining ‘Downturn’
UK Macroeconomics

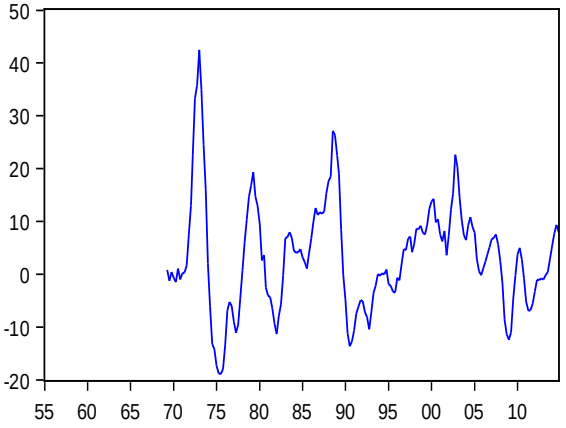
GDP Annual % Growth Rate



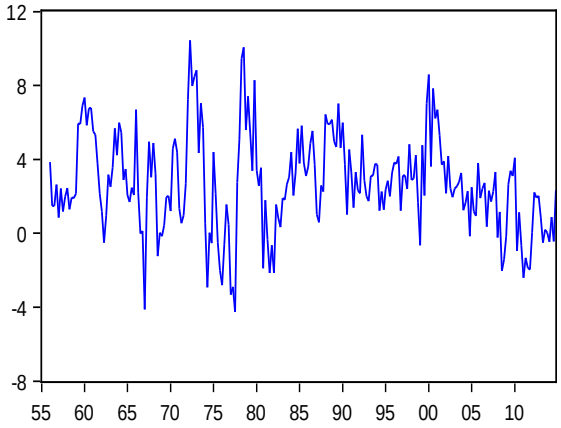
ILO Unemployent % Rate



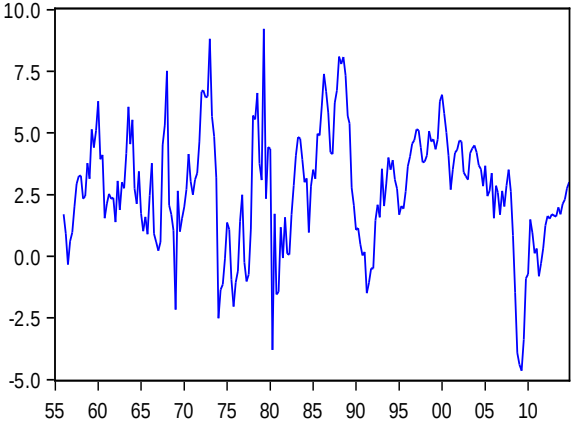
HPI Annual % Increase (Deflated by RPI)



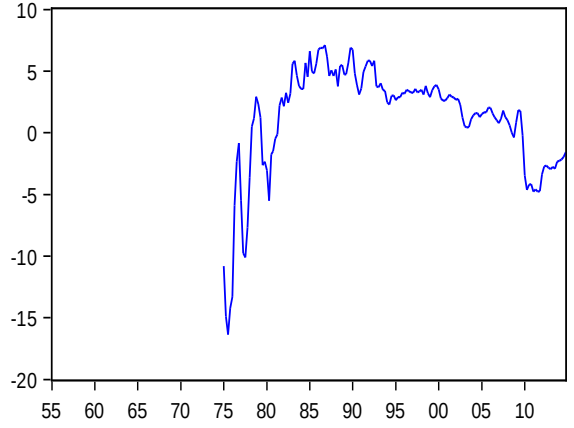
HHLD Income (RPDI) Annual % Growth Rate



Consumer Expenditure Annual % Growth Rate

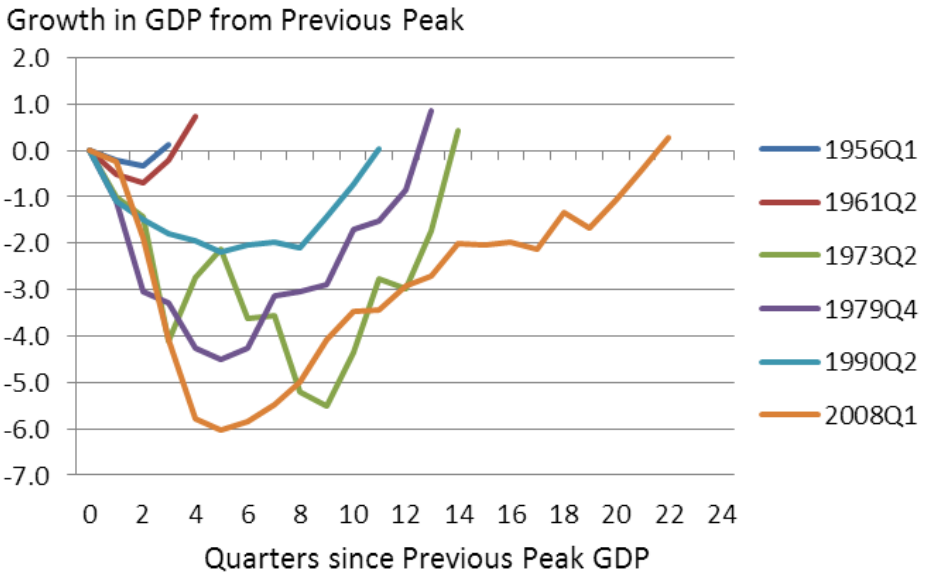


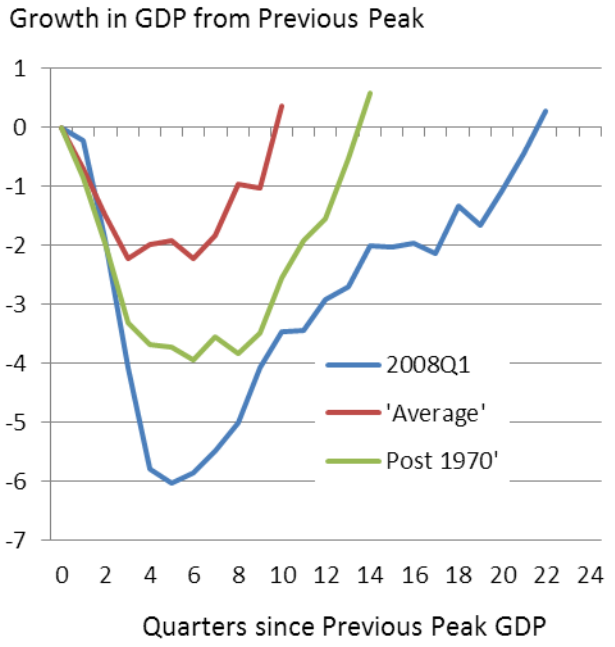
3 month Interest Rate, Deflated by RPI



Defining 'Downturn'
UK Recessions (GDP based)

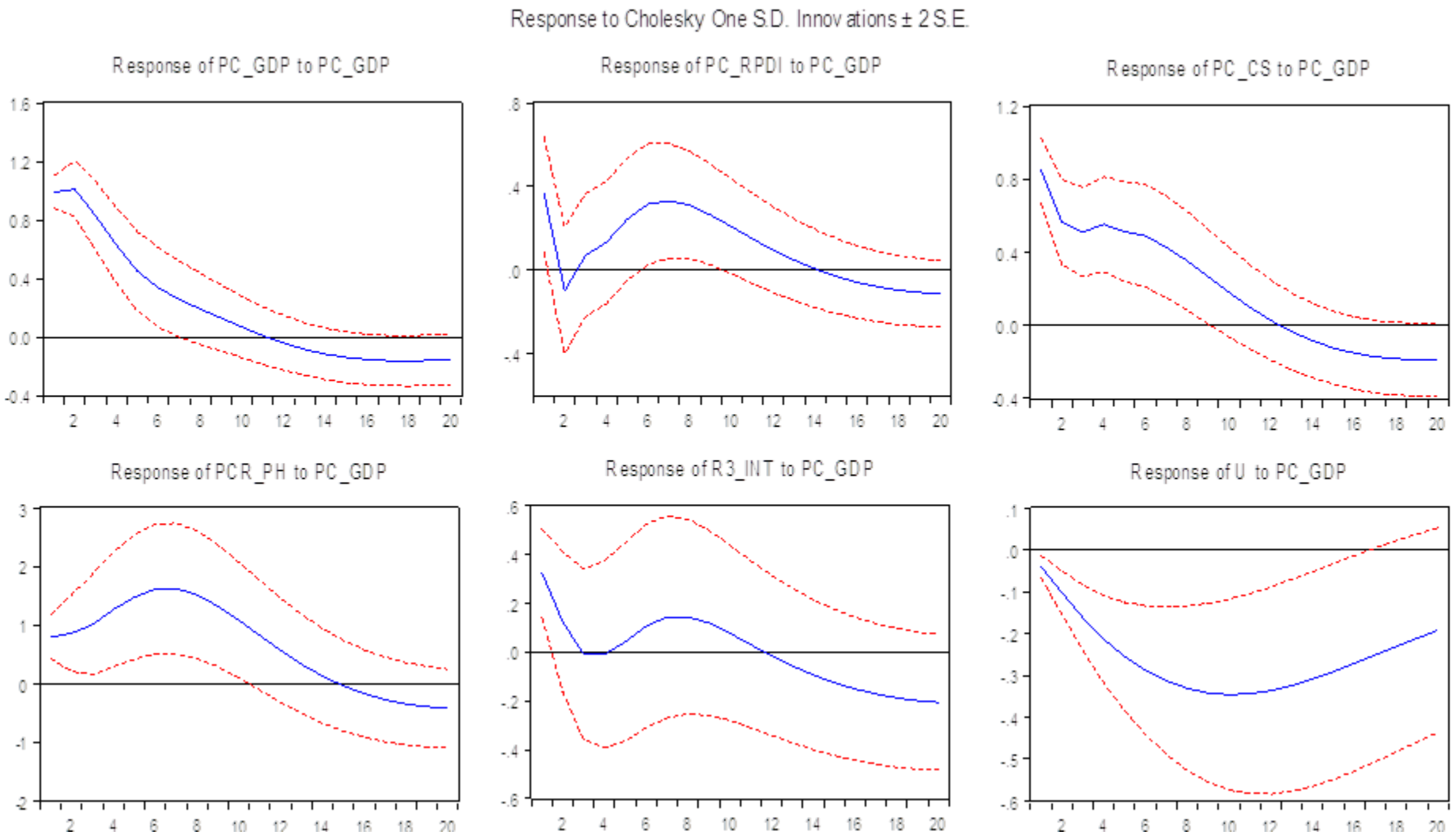
Peak Quarter	Peak GDP	Trough Quarter	Trough GDP	Duration	Peak to Trough
1956Q1	104811	1956Q3	104476	2	-0.3%
1961Q2	123267	1961Q4	122412	2	-0.7%
1973Q2	187241	1974Q1	179528	3	-4.1%
1975Q1	180603	1975Q3	176931	2	-2.0%
1979Q4	205300	1981Q1	196026	5	-4.5%
1990Q2	266644	1991Q3	260779	5	-2.2%
2008Q1	414424	2009Q2	389388	5	-6.0%





What is a UK (typical) downturn?
Was the 2008-9 recession typical / appropriate?
Equivalent analysis on alternative variables (unemployment; house prices; etc.) would give different results
How to combine in absence of long-term loss data?

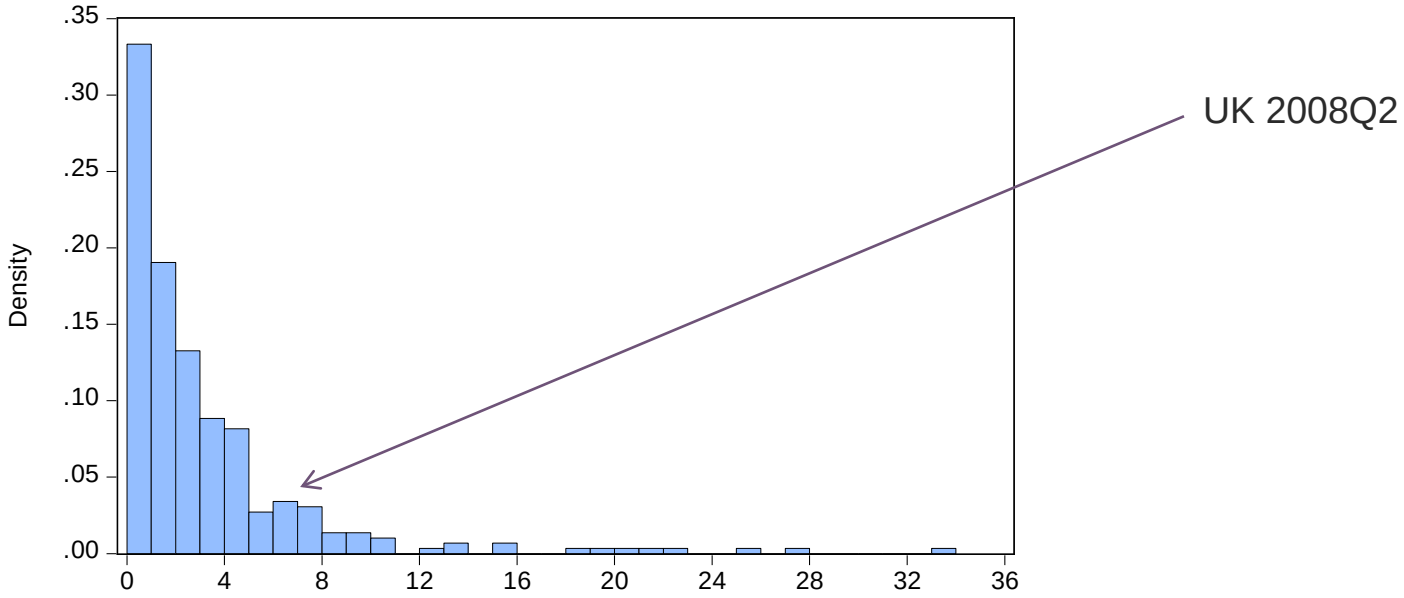
Defining ‘Downturn’
UK VAR Impulse Responses for GDP Shock



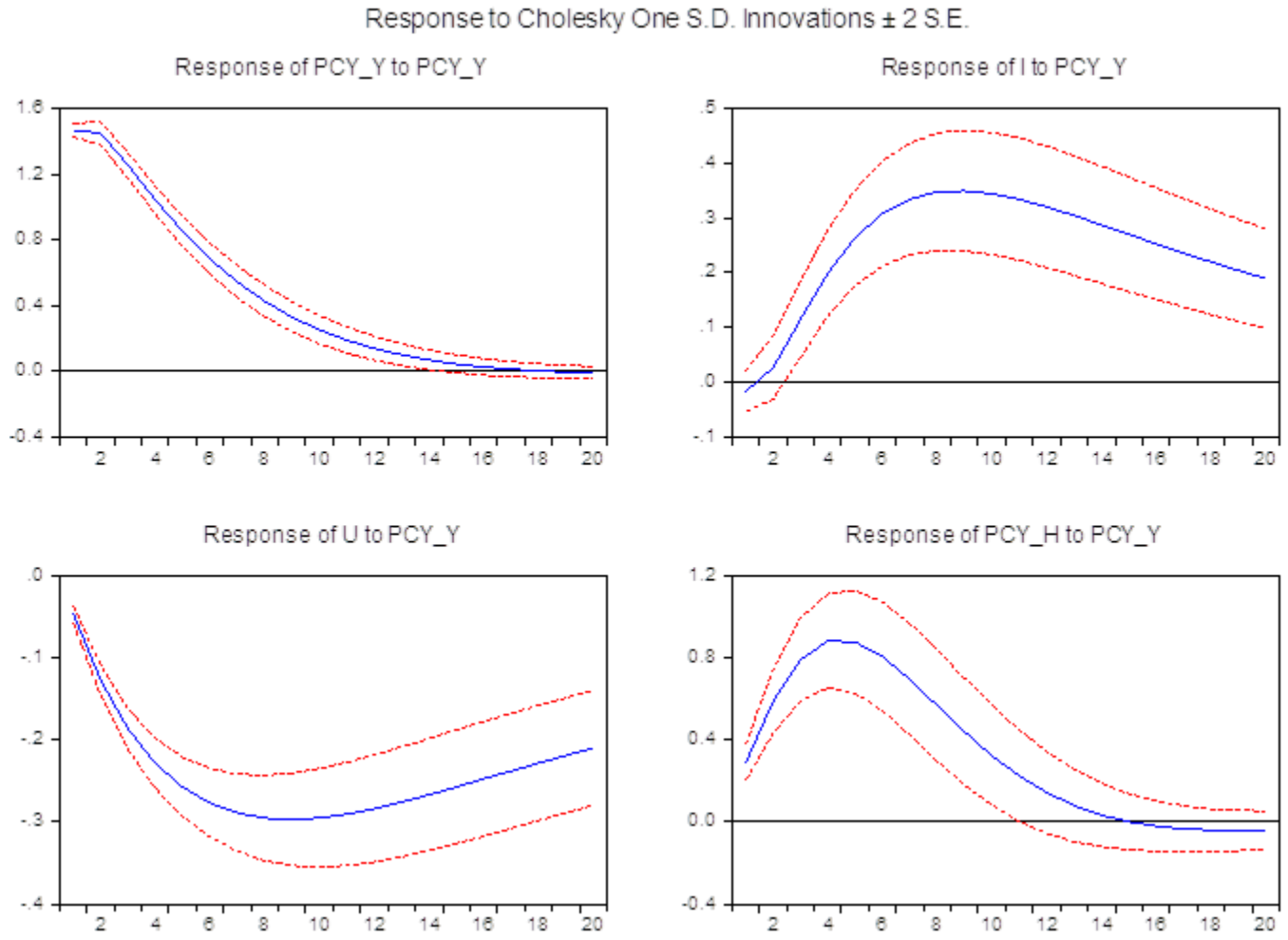
Defining 'Downturn'
European Recessions (GDP based)

Peak to trough declines in Real GDP during Recessions, European Economies

				Quantile			
DECADE (end)	Mean	Median	Max	Min.	0.25	0.75	Obs.
1970	3.18	2.57	13.22	0.06	1.00	3.71	31
1980	2.40	1.90	7.06	0.23	0.76	3.83	40
1990	5.66	2.73	33.55	0.15	1.37	6.77	54
2000	5.02	4.03	21.55	0.30	1.07	7.19	41
2010	3.32	2.74	15.74	0.13	0.47	4.28	19
All	4.16	2.74	33.55	0.06	1.02	5.17	185



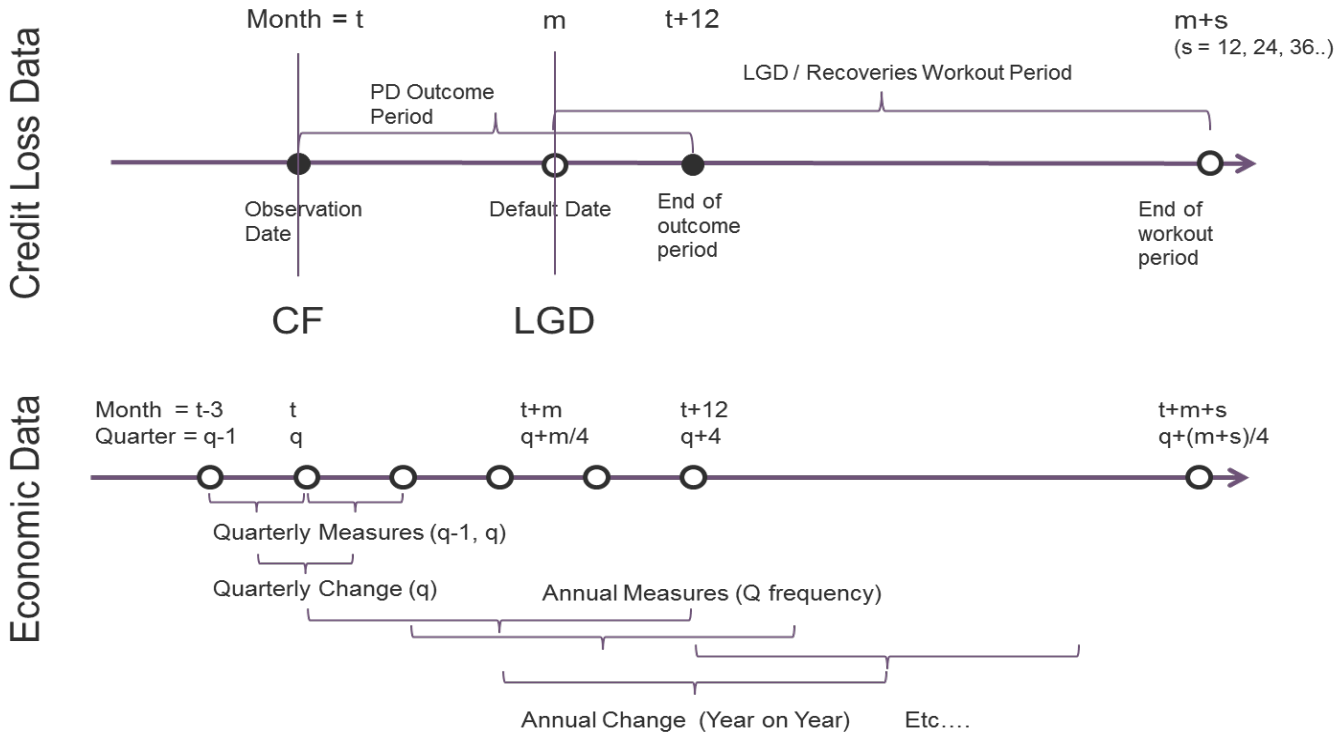
Defining ‘Downturn’
European Panel VAR Impulse Responses to GDP Shock



Estimating Downturn LGD using econometric models

Authors	Date	Market	Methods	Results
Belotti & Crook	2012	UK	Various regression specifications including macroeconomic variables for 12m recoveries rates	OLS gave best results. Economic effects significant. Interaction effects did not improve models.
Zhan & Thomas	2012	UK	Linear regression & survival models within & without segmentations	Linear regressions give best fit (although assessed only on full workout cases). Insignificant effects from year of default in linear regressions suggest limited value from macroeconomic variables. No benefit from mixture distributions.
Witzany et al	2012	Czech Rep.	Linear regression & survival models	Survival models including incomplete recoveries provide improved fit.
Calabrese	2012	Italy	Generalized Additive models and various regression models including economic variables	GAM models perform best. Significant effects from economic variables.
Balyaev et al	2012	Czech Rep.	Survival and regression models for account level data. Time series models for aggregated data. Both with economic variables.	Several significant macroeconomic effects in the account level analysis. More restricted effects in aggregate models.

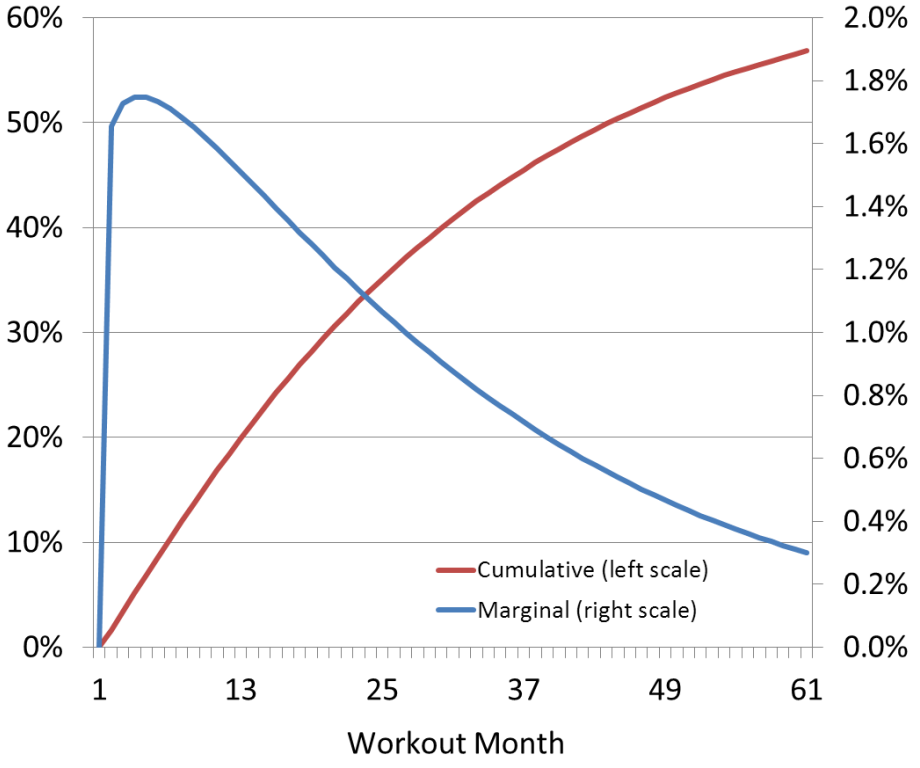
Timestamps

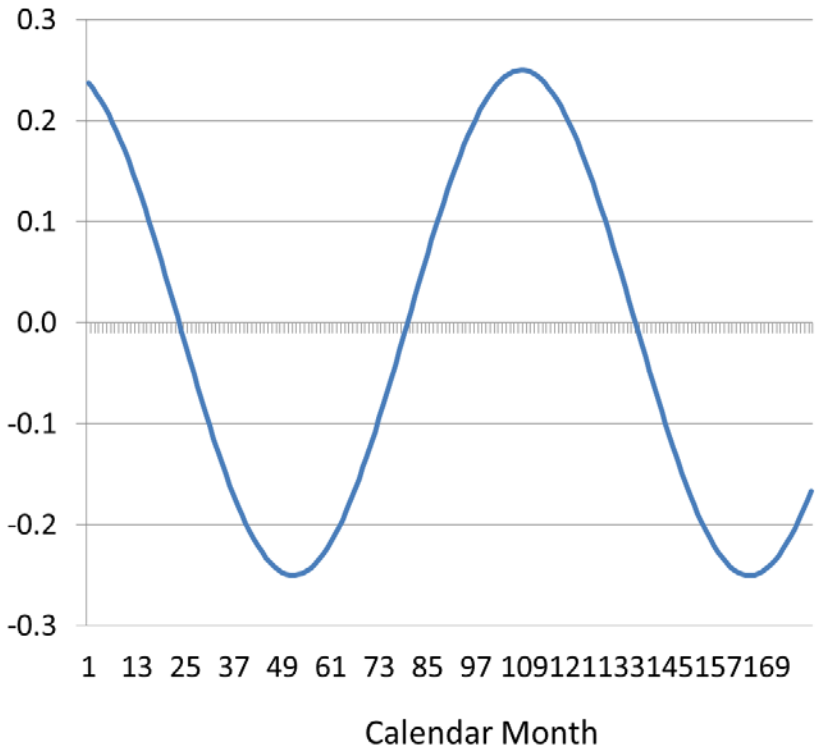


Alignment of LGD outcomes to macroeconomic conditions (or to PD) complicated by dispersion of recoveries accumulation over extended workout period – if economic conditions during the workout period are relevant to recoveries. The distribution of recoveries across the workout period may itself be influenced by economic conditions.

Cumulative RR for fixed workout periods (12m, 24m, etc.) may be very difficult to model against economic (or PD) trends.

Timestamps
Simple illustrative simulations



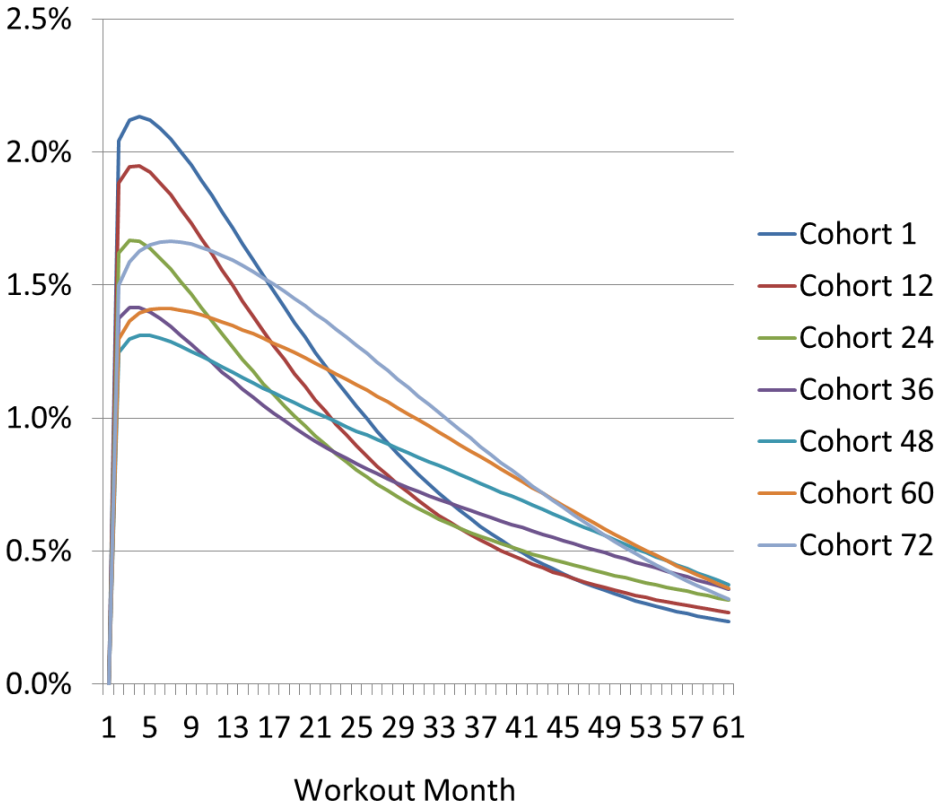


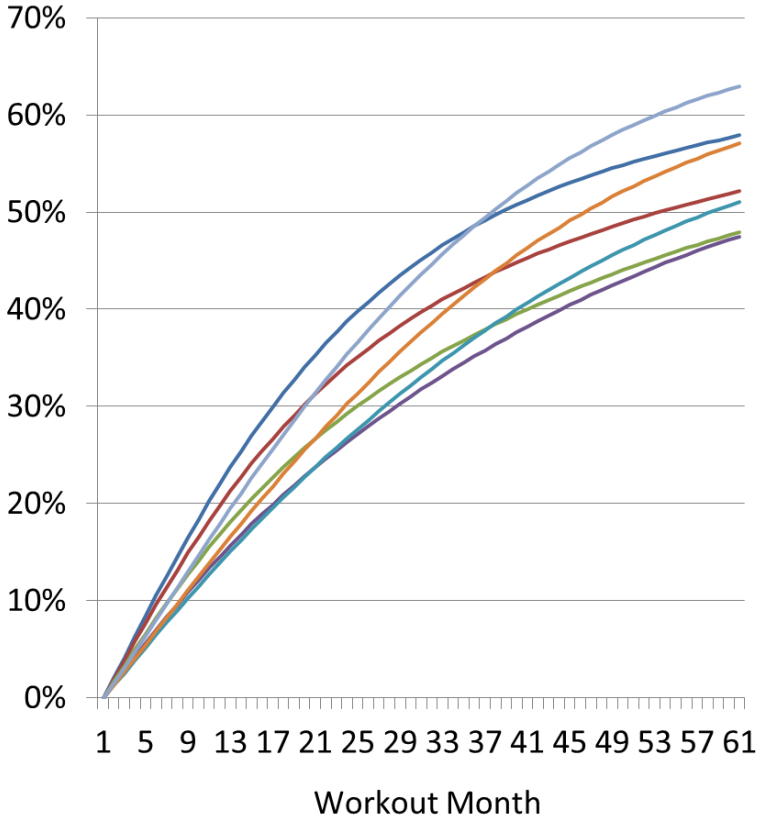
Marginal (in month) Recovery Rate for each cohort follows the same scaled Weibull distribution; Single cyclical macroeconomic factor impacts multiplicatively on in-month recovery rates for that calendar month without lag

Case 1: Recoveries concentrated early in the workout period

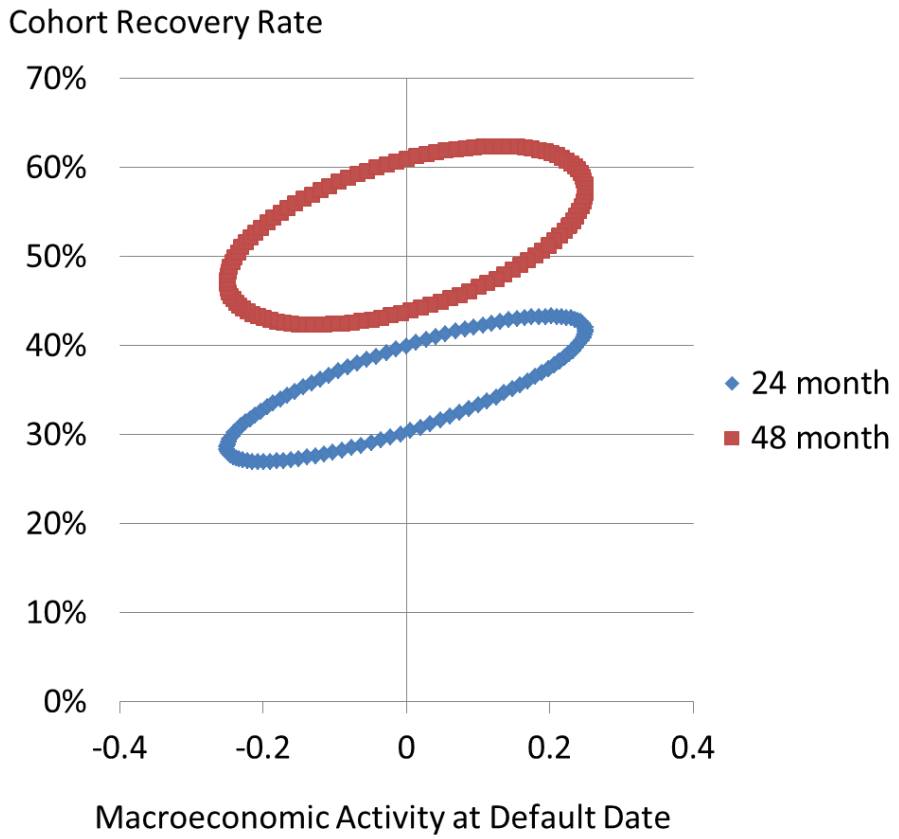
Timestamps:
Simple illustrative simulations

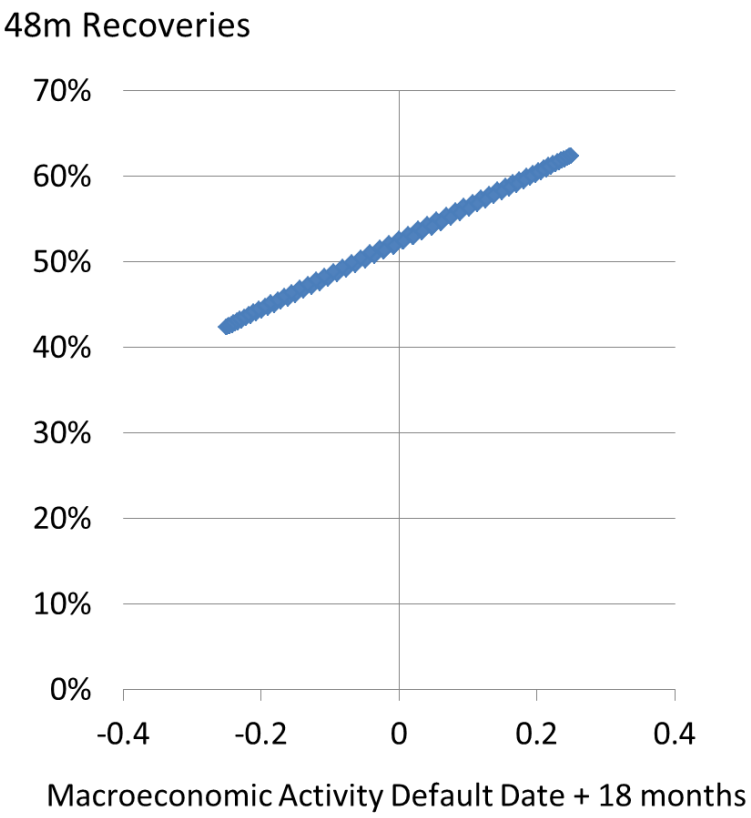
Simulated marginal and cumulative recovery rates for default rate cohorts





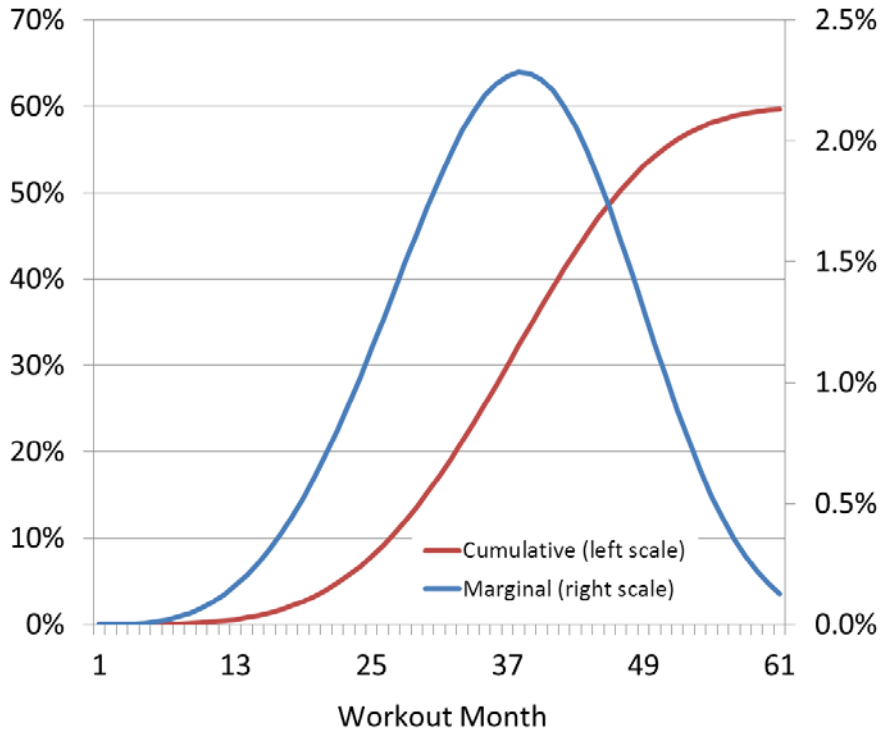
Timestamps:
Simple illustrative simulations

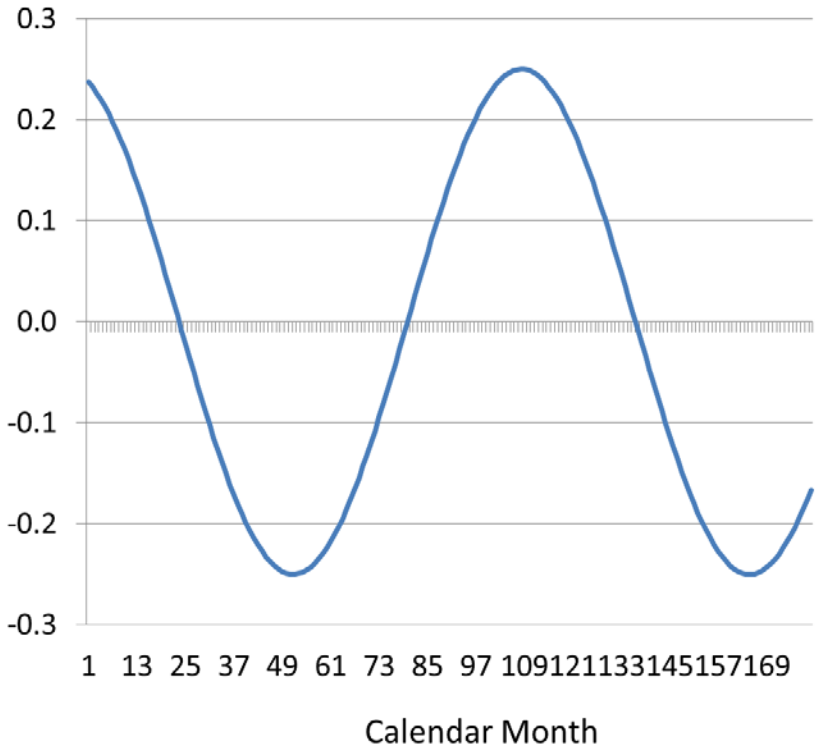




Simulated 24 and 48 month recovery rates vs macroeconomic conditions at time of default

Timestamps:
Simple illustrative simulations



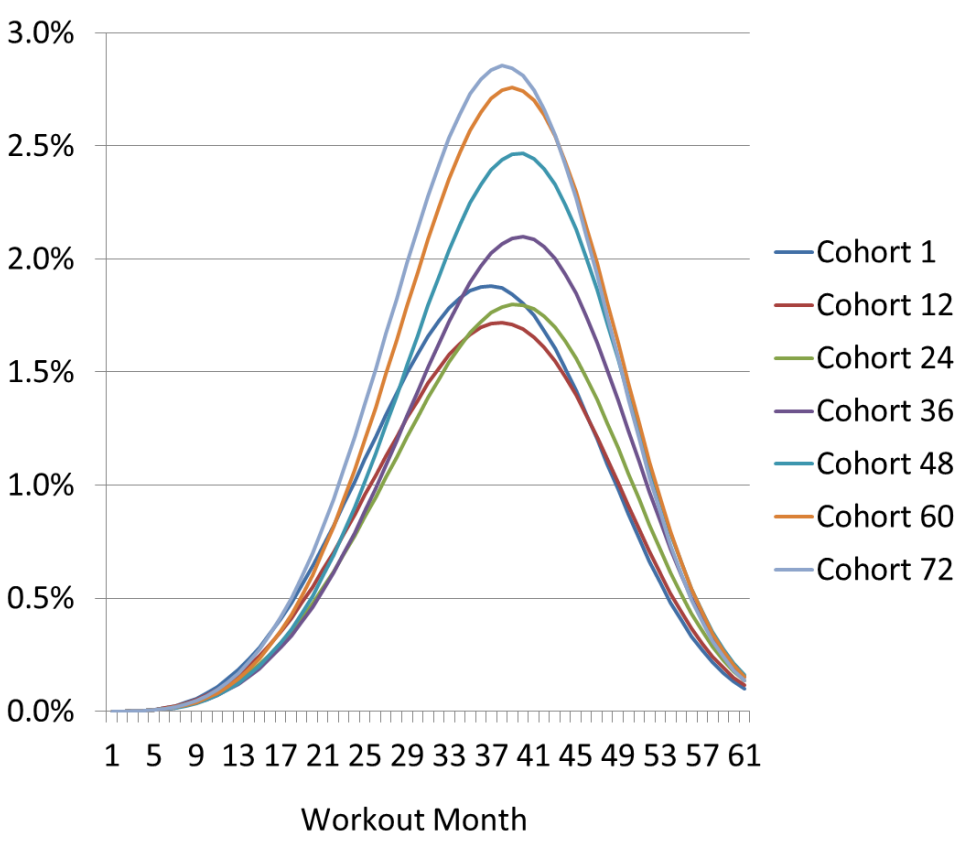


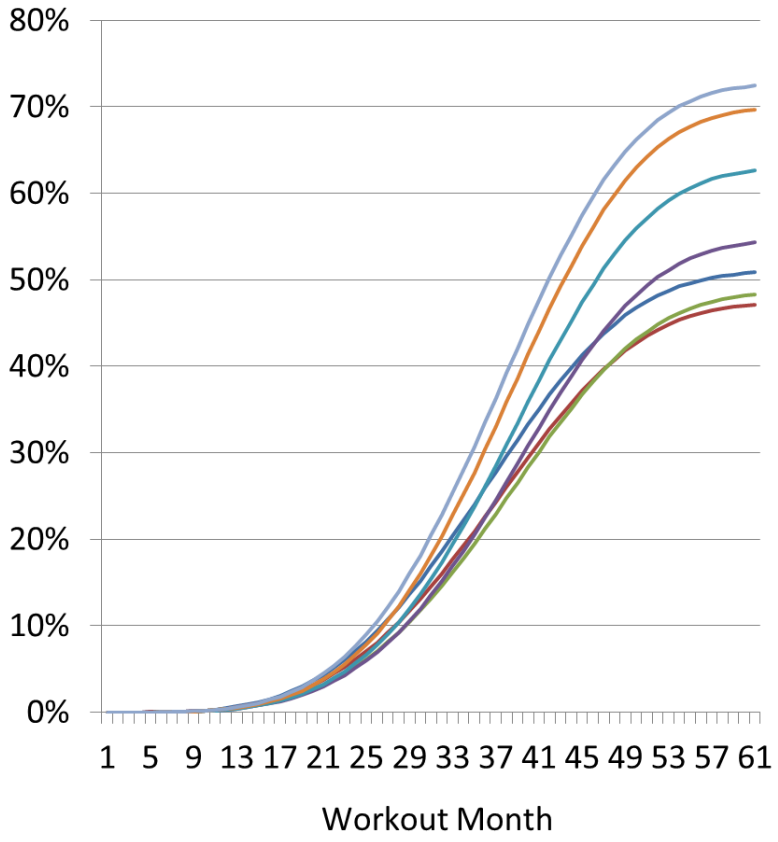
Marginal (in month) Recovery Rate for each cohort follows the same scaled Weibull distribution; Single cyclical macroeconomic factor impacts multiplicatively on in-month recovery rates for that calendar month without lag

Case 2: Recoveries concentrated later in the workout period

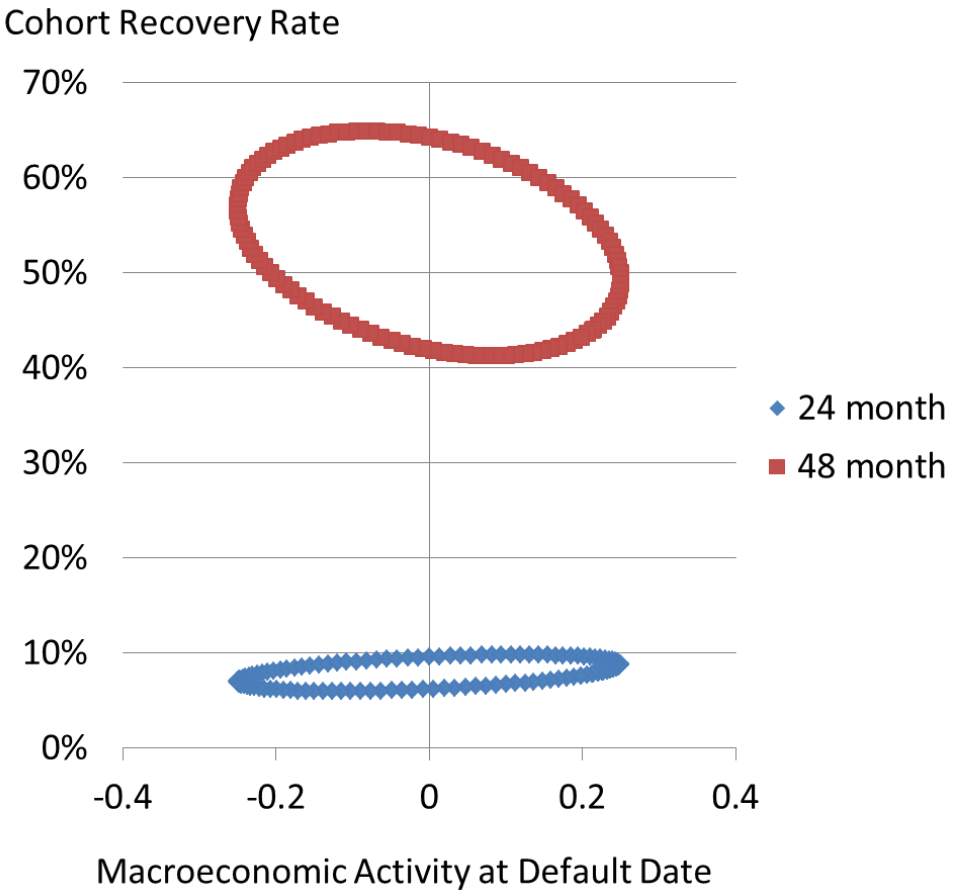
Timestamps:
Simple illustrative simulations

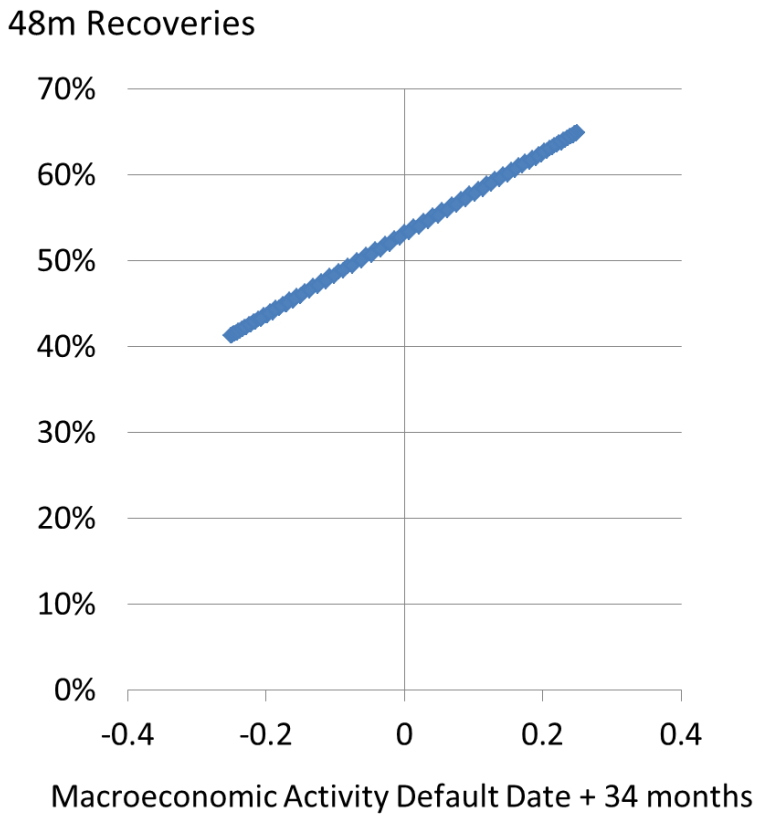
Simulated marginal and cumulative recovery rates for default rate cohorts





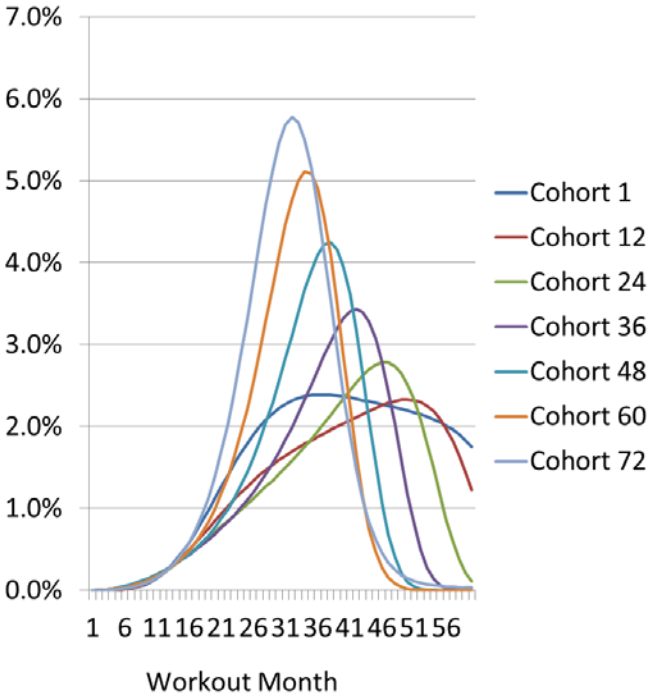
Timestamps:
Simple illustrative simulations

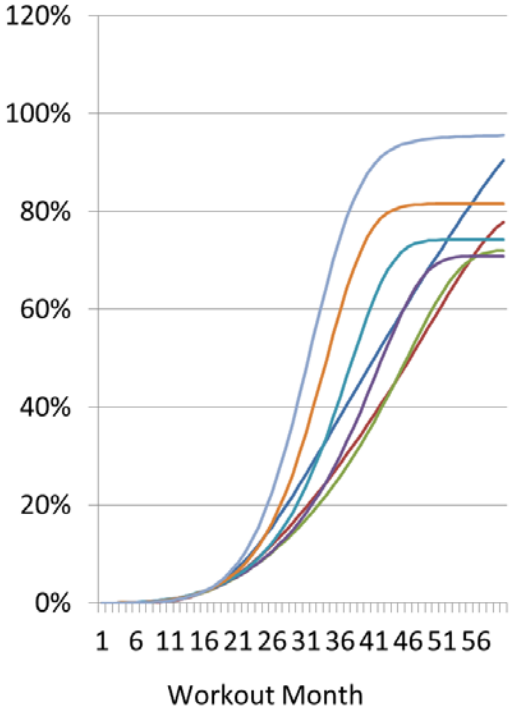


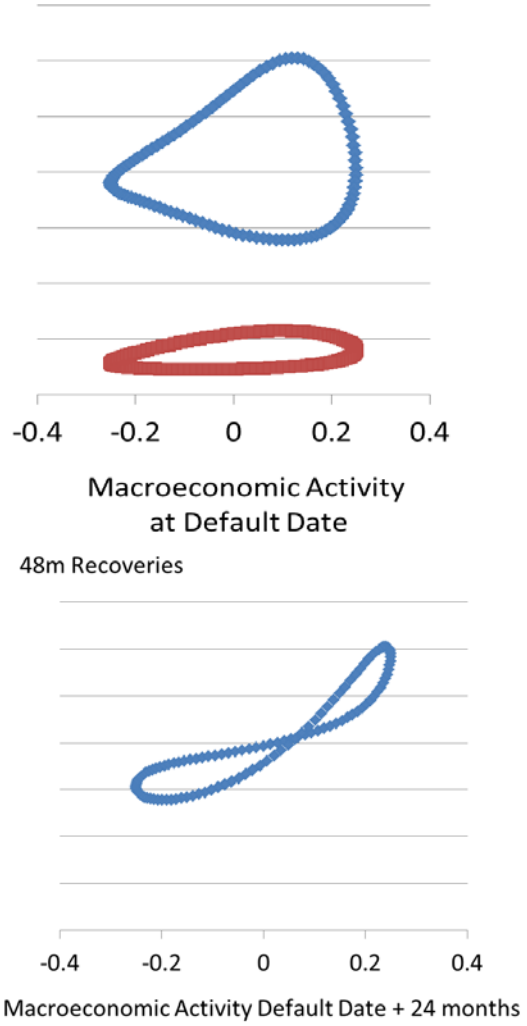


Simulated 24 and 48 month recovery rates vs macroeconomic conditions at time of default

Timestamps:
Simple illustrative simulations



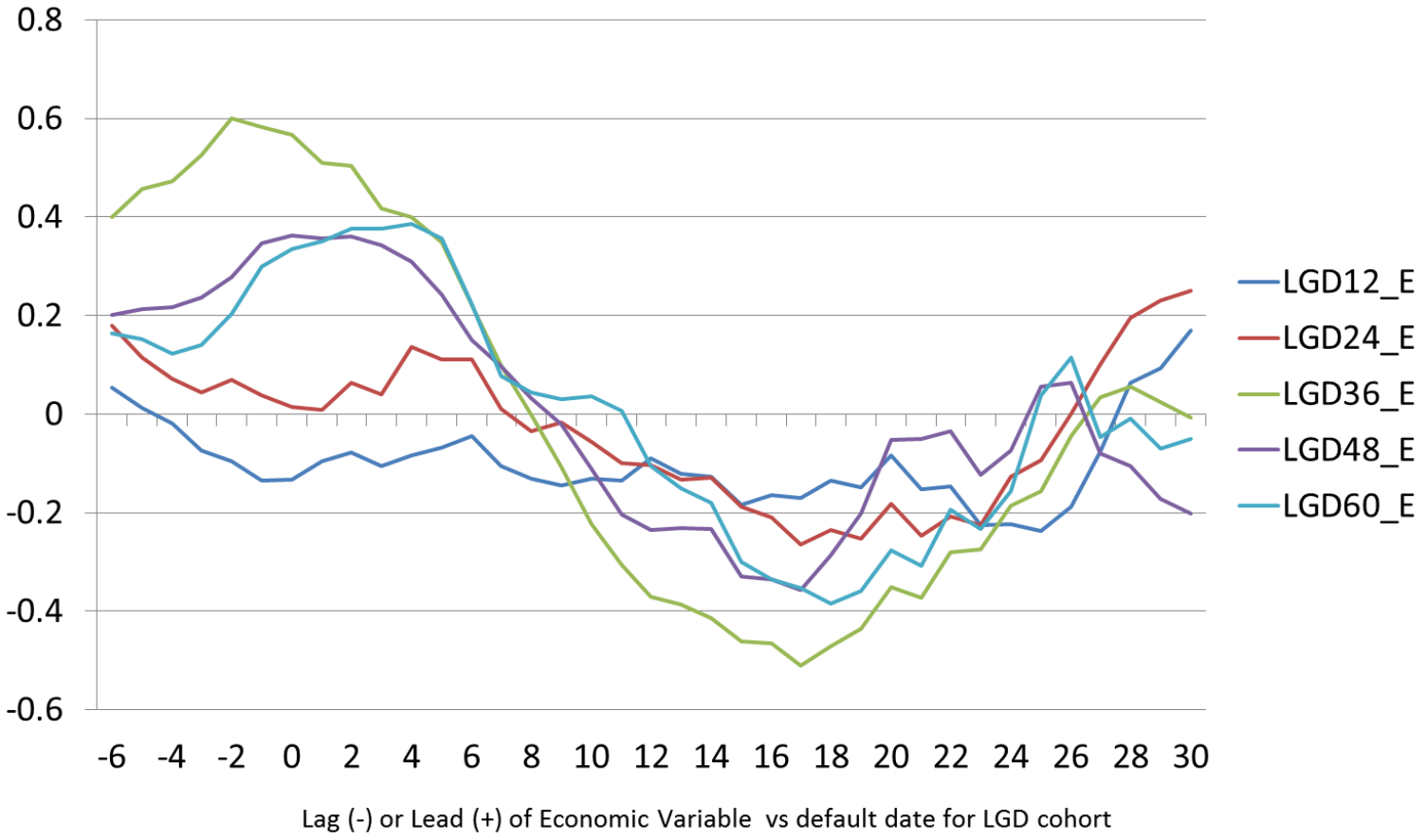




Marginal (in month) Single cyclical macroeconomic factor flexes parameters of Weibull function for that calendar month without lag

LGD vs GDP correlations for different workout periods and lag/lead structures – central European cards portfolio

Ordinary Correlations: LGD by default date cohort to Annual Growth of GDP



Downturn LGD: Our recent experience

- Eastern European unsecured:
  - Weakly significant effects from macroeconomic variables in aggregated and account level recovery rate regressions for (range of) fixed outcome periods
  - Panel methods for aggregated cohort recovery rates give better results in terms of identification of economic effects and model fit – likely due to better matching of timing of recoveries outcomes to economic variables
- Eastern European secured:
  - Econometric methods (for various alternative specifications) delivered poor results: insignificant or wrongly signed economic effects with no improvement in fit.
- Western European (various retail):
  - Panel methods for aggregated recovery rates generally outperform account-level models and aggregated time series approaches
  - Models generally replicate peak loss rates for post-2008 recession periods and provide sensible simulations for 'downturn' conditions.
  - Methods useful in (at least) supporting direct estimates from stress period and results from PD correlations.

Conclusions

- Economic models have a valuable role for downturn estimation:
  - Identifying downturn periods (or validating selection based on PD peaks)
  - Establishing lag structures
  - Predicting LGD when direct estimation is not possible
  - Verifying that presumed downturn periods have ‘right’ level of conservatism
- Growing evidence of significant effects from economic conditions on LGD for retail loans:
  - Various sample countries, products and time periods
  - Variety of model specifications and estimation methods
  - Model specification complicated by extended workout period for LGD
  - We have found panel methods including incomplete workout data can often improve fit
  - Viable approaches must consider process generating recoveries data and links between economic conditions and recoveries
- Characterizing ‘downturn’ economic conditions is not uncontroversial. What is a typical ‘downturn’ or a ‘mild recession’. What are the relevant measures for consumer credit? Is the 2008 recent too severe (or not severe enough).
- Cross verification across several approaches appears prudent even where direct ‘downturn’ estimation is feasible.

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