

Financial Assets, Debt and Liquidity Crises

The macroeconomic development of most major industrial economies is characterised by boom-bust cycles. Normally such boom-bust cycles are driven by specific sectors of the economy. In the financial meltdown of the years 2007–9 it was the credit sector and the real-estate sector that were the main driving forces. This book takes on the challenge of interpreting and modelling this meltdown. In doing so it revives the traditional Keynesian approach to the financial–real economy interaction and the business cycle, extending it in several important ways. In particular, it adopts the Keynesian view of a hierarchy of markets and introduces a detailed financial sector into the traditional Keynesian framework. The approach of the book goes beyond the currently dominant paradigm based on the representative agent, market clearing and rational economic agents. Instead it proposes an economy populated with heterogeneous, rationally bounded agents attempting to cope with disequilibria in various markets.

MATTHIEU CHARPE works as an economist for the International Institute for Labour Studies at the International Labour Organization in Geneva.

CARL CHIARELLA is Emeritus Professor and Professor of Quantitative Finance in the School of Finance and Economics at the University of Technology, Sydney.

PETER FLASCHEL is Emeritus Professor in the Faculty of Economics at Bielefeld University.

WILLI SEMMLER is Professor of Economics at The New School for Social Research, New York.

Financial Assets, Debt and Liquidity Crises: A Keynesian Approach

Matthieu Charpe

Carl Chiarella

Peter Flaschel

Willi Semmler



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press
 978-1-107-00493-1 — Financial Assets, Debt and Liquidity Crises
 Matthieu Charpe , Carl Chiarella , Peter Flaschel , Willi Semmler
 Frontmatter
[More Information](#)

CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom
 One Liberty Plaza, 20th Floor, New York, NY 10006, USA
 477 Williamstown Road, Port Melbourne, VIC 3207, Australia
 314-321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi - 110025, India
 79 Anson Road, #06-04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781107004931

© Cambridge University Press 2011

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2011

First paperback edition 2015

3rd printing 2012

A catalogue record for this publication is available from the British Library

Library of Congress Cataloging in Publication data

Financial assets, debt, and liquidity crises : a Keynesian approach / Matthieu Charpe... [et al.].
 p. cm.

Includes bibliographical references and index.

ISBN 978-1-107-00493-1

1. Macroeconomics. 2. Business cycles. 3. Financial crises.

4. Keynesian economics. I. Charpe, Matthieu.

HB172.5.F516 2011

330.9'0511—dc22 2011011256

ISBN 978-1-107-00493-1 Hardback

ISBN 978-1-107-54666-0 Paperback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

Contents

<i>List of figures</i>	<i>page</i> x
<i>List of tables</i>	xiv
<i>Notation</i>	xvi
<i>Preface</i>	xxi
1 Financial crises and the macroeconomy	1
1.1 <i>Open economies, foreign debt and currency crises</i>	2
1.2 <i>Household borrowing, debt default and banking crises</i>	5
1.3 <i>Overleveraging, debt and debt deflation</i>	8
1.4 <i>Plan of the book</i>	10
Part I The non-linear dynamics of credit and debt default	13
2 Currency crisis, credit crunches and large output loss	15
2.1 <i>The emergence of currency crises</i>	15
2.2 <i>Some stylised facts</i>	16
2.3 <i>The Krugman model: an MFT representation</i>	17
2.4 <i>Sectoral budget equations and national accounts</i>	23
2.5 <i>Flexible exchange rates: output and exchange rate dynamics</i>	29
2.6 <i>Fixed exchange rates and the emergence of currency crises</i>	36
2.7 <i>International capital flows: adding capital account dynamics</i>	42
2.8 <i>Conclusions</i>	48
3 Mortgage loans, debt default and the emergence of banking crises	50
3.1 <i>Mortgage and banking crises</i>	50
3.2 <i>A Keynes–Goodwin model with mortgage loans and debt default</i>	52
3.3 <i>Excessive overconsumption and an attracting steady state</i>	55
3.4 <i>Weakly excessive overconsumption and a repelling steady state</i>	62
3.5 <i>Credit rationing, reduced consumption and the emergence of mortgage crises</i>	65
	v

3.6	<i>Monetary policy in a mortgage crisis</i>	67
3.7	<i>Adding commercial banking</i>	71
3.8	<i>Conclusions and outlook</i>	77
3.9	<i>Appendix: some simulation studies of the baseline model</i>	78
4	Debt deflation and the descent into economic depression	85
4.1	<i>The debt deflation debate</i>	85
4.2	<i>3D debt accumulation</i>	88
4.3	<i>4D debt deflation</i>	100
4.4	<i>Keynes–Metzler–Goodwin real business fluctuations: the point of departure</i>	111
4.4.1	The basic framework	112
4.4.2	The 3D Rose type wage-price dynamics	113
4.4.3	The 2D Metzlerian quantity dynamics and capital stock growth	116
4.4.4	Putting things together: the KMG growth dynamics	117
4.5	<i>Feedback-motivated stability analysis</i>	119
4.6	<i>Debt deflation in the KMG framework</i>	124
4.6.1	Integrating debt financing of firms	125
4.6.2	Enterprise debt dynamics in the KMG framework	127
4.6.3	Analysis of the model	128
4.7	<i>Conclusions and outlook</i>	132
	Part II Theoretical foundations for structural macroeconomic model building	133
5	Keynesian macroeconomic model building: a point of departure	135
5.1	<i>Introduction</i>	135
5.2	<i>The real and the financial part of the economy</i>	139
5.2.1	The structure of the real part	139
5.2.2	The structure of the financial part	140
5.3	<i>The structure of the economy from the viewpoint of national accounting</i>	142
5.3.1	The four sectors of the economy	142
5.3.2	Gross domestic product, savings, investment and further aggregates	148
5.4	<i>The model</i>	151
5.4.1	Preliminaries	152
5.4.2	Households	155
5.4.3	Firms	161
5.4.4	The government	164
5.4.5	Quantity and price adjustment processes	168

	Contents	vii
5.4.6	The dynamics of asset market prices and expectations	171
5.4.7	External accounts and foreign country data	176
5.5	<i>The next steps</i>	178
6	Intensive form and steady state calculations	180
6.1	<i>Introduction</i>	180
6.2	<i>The real and the financial structure on the intensive form level</i>	181
6.2.1	The real part of the economy	181
6.2.2	The financial part of the economy	182
6.3	<i>The implied 34D dynamics</i>	183
6.3.1	The laws of motion	184
6.3.2	Static relationships	190
6.4	<i>Steady state analysis</i>	192
6.5	<i>The 18D core dynamics of the model</i>	197
6.5.1	The laws of motion	198
6.5.2	Static relationships	200
6.6	<i>Outlook: feedback structures and stability issues</i>	201
7	Partial feedback structures and stability issues	206
7.1	<i>Introduction</i>	206
7.2	<i>National accounting (in intensive form)</i>	207
7.2.1	Firms	207
7.2.2	Asset holders	209
7.2.3	Workers	209
7.2.4	Fiscal and monetary authorities	209
7.2.5	International relationships	210
7.3	<i>The core 18D dynamical system: a recapitulation</i>	211
7.4	<i>A Goodwin wage income/insider-outsider labour market dynamics</i>	216
7.5	<i>Adding the Rose real wage feedback chain</i>	219
7.6	<i>The Metzlerian expected sales/inventory dynamics</i>	224
7.7	<i>The dynamics of housing supply</i>	228
7.8	<i>The Keynes effect</i>	230
7.9	<i>The Mundell–Tobin effect</i>	232
7.10	<i>The Blanchard bond and stock market dynamics</i>	234
7.11	<i>The dynamics of the government budget constraint</i>	240
7.12	<i>Import taxation</i>	242
7.13	<i>The Dornbusch exchange rate dynamics mechanism</i>	243
7.14	<i>Conclusions</i>	248
	Part III Debt crises: firms, banks and the housing markets	251
8	Debt deflation: from low to high order macrosystems	253
8.1	<i>Introduction</i>	253

8.2	<i>Reformulating the structure of the economy</i>	260
8.2.1	Changes in the financial sector of the economy	261
8.2.2	Changes from the viewpoint of national accounting	261
8.3	<i>The augmented 18+2D system: investment, debt and price level dynamics</i>	266
8.4	<i>Intensive form representation of the 20D dynamics</i>	273
8.5	<i>Debt effects and debt deflation</i>	282
8.5.1	3D debt accumulation	283
8.5.2	4D debt deflation	287
8.6	<i>Numerical simulations: from low to high order dynamics</i>	294
8.6.1	The 3D dynamics	294
8.6.2	The 4D dynamics	296
8.6.3	The 20D dynamics	300
8.7	<i>Summary and outlook</i>	304
9	Bankruptcy of firms, debt default and the performance of banks	307
9.1	<i>Debt targeting, debt default and bankruptcy</i>	309
9.2	<i>Tabular representations of stocks and flows</i>	311
9.3	<i>Commercial banks and pro-cyclical credit supply</i>	313
9.3.1	Firms	313
9.3.2	Commercial banks: credit rationing and money creation	317
9.3.3	Asset holders: Blanchard asset market dynamics	320
9.3.4	Public sector	321
9.3.5	Workers	323
9.4	<i>Reduced form equations and steady state</i>	325
9.5	<i>Debt default without and with bankruptcy</i>	327
9.5.1	Debt default without bankruptcy	328
9.5.1.1	The case of a wage-led aggregate demand	330
9.5.1.2	The case of a profit-led aggregate demand	332
9.5.2	Debt default with bankruptcy	333
9.5.2.1	The case of a wage-led aggregate demand	335
9.5.2.2	The case of a profit-led aggregate demand	336
9.6	<i>Simulations: baseline scenarios</i>	338
9.6.1	Debt default and bankruptcy	338
9.6.2	Banks' budget constraint	339
9.6.3	Pro-cyclical profits and credit supply	340
9.6.4	Debt default and credit crunch	341
9.6.5	Bank bailouts and loss socialisation	342
9.7	<i>Simulations: extended studies</i>	343
9.7.1	Wage-led aggregate demand	343
9.7.2	Profit-led aggregate demand	346
9.7.3	Debt deflation	347

	Contents	ix
9.7.4 Interest rate policy rules		349
9.7.5 Fiscal policy		351
9.8 Conclusions		352
10 Japan's institutional configuration and its financial crisis		354
10.1 A stable profit-led real sector		356
10.2 Pro-cyclical financial markets		360
10.3 Less than optimal fiscal and monetary policies		362
10.4 Debt default without bankruptcy		365
10.5 Bad debt and banking crises		367
10.6 Delayed and weak government response		368
10.6.1 The early response: buy-in of failing banks		370
10.6.2 The ineluctable buy-out of failing banks		372
10.7 Conclusions		378
10.8 Appendix: data sources		379
11 Housing investment cycles, workers' debt and debt default		380
11.1 Introduction		380
11.2 Debt relationships in the household sector		382
11.2.1 Worker households		382
11.2.2 Pure asset holder households		385
11.2.3 Wage, price and interest rate adjustment processes		388
11.3 Intensive form derivation of a simplified 9D dynamics		389
11.4 2D, 3D and 5D subcases of integrated 6D real subdynamics		397
11.5 Numerical investigation of housing cycles and debt deflation		410
11.6 Debt default and bankruptcy in the private housing market		414
11.7 Conclusions		419
References		420
Index		427

Figures

2.1	A Krugman (2000) type of investment function	<i>page</i> 20
2.2	IS equilibrium and output adjustment along the AA curve in the case of an output and asset market determined exchange rate	22
2.3	Dynamic multiplier analysis under perfectly flexible exchange rates.	31
2.4	The market for foreign bonds and exchange rate adjustments	34
2.5	The Krugman dynamics extended to the whole Y, s phase space	34
2.6	The extended dynamics in the Y, s phase space with three equilibria.	35
2.7	Balanced trade line and a normal equilibrium in a fixed exchange rate regime, with ‘excess demand’ for the foreign asset	37
2.8	The normal real equilibrium, limited intervention range and the shadow dynamics in a fixed exchange rate regime	38
2.9	The breakdown of the fixed exchange rate regime: currency crisis, investment collapse and large output loss	39
2.10	No currency crisis and output expansion in the case of a quick return to a flexible exchange rate regime	41
2.11	Overshooting exchange rate crisis and output improvements due to net export dominance	42
2.12	Equilibrium on the international market for domestic bonds	44
2.13	Fixed exchange rate regime and a speculative attack on the domestic currency	46
2.14	Flexible exchange rate and the endogenous change from booms to busts	47
3.1	A summary of the stability scenarios for a varying parameter C_w	64
3.2	Loan rate adjustment dynamics	68
3.3	A alternative summary of the stability scenarios for a varying parameter c_w	70
3.4	The dynamics of the economy following a 1 per cent debt shock – the profit-led case	79
3.5	The dynamics of wage share and debt. The case of weak wage adjustment	80
3.6	Eigenvalues and debt in the wage-led case	81

3.7	Stabilising the investment climate in the case when $i_f > 1$ and $c_w < 1$	82
3.8	Stabilising the investment climate in the case $i_f > 1$ and $c_w > 1$	83
4.1	Debt dynamics around the steady state share of wages	96
4.2	Convergence for small shocks and divergence for large shocks to λ	98
4.3	Eigenvalue diagrams for important parameters of the 4D dynamics	110
4.4	The feedback channels of the KMG modelling approach and their stabilising/destabilising tendencies	121
6.1	Advanced traditional disequilibrium growth dynamics	204
7.1	A limit cycle of the dynamics (7.37), (7.38), (7.39) showing the full employment ceiling	219
7.2	A non-linear law of demand in the labour market	223
7.3	The viability domain of the Rose dynamics for $y'(\omega^e) < 0$	224
7.4	A numerical representation of the limiting relaxation oscillations in the Metzlerian 2D dynamics	228
7.5	Variable speed of adjustment of expected bond price inflation	236
7.6	The phase diagram of the bond price dynamics with the assumed threshold behaviour in Figure 7.5	237
7.7	A variable speed of bond price adjustment	238
7.8	The phase diagram for variable speed of bond price adjustment	239
8.1	The Fisher debt deflation effect	256
8.2	Normal Rose effects	257
8.3	Adverse Rose effects	258
8.4	Debt and profit curves around the steady state share of wages	286
8.5	Debt convergence and shock-dependent persistent cyclical growth	295
8.6	Slow convergence through debt-financed investment	295
8.7	Faster convergence through a stabilising Rose effect	296
8.8	Less convergence through more sluggish wages	297
8.9	Deflation and converging debt	298
8.10	Debt deflation in the case of a sluggishly adjusting wage share	299
8.11	Positive price shocks (temporarily) stop debt deflation	300
8.12	Asymptotic stability in the 20D case	301
8.13	Destabilising price flexibility	302
8.14	Pure debt deflation	303
8.15	Positive price shocks in order to stop debt deflation	304
9.1	Bankruptcy – heterogenous firms	315
9.2	Stabilising debt default – intensive form	316
9.3	Credit rationing	319
9.4	Banks' profitability and credit supply	319
9.5	Debt default and banks' profits	319
9.6	Taylor rule	323
9.7	Rose effect	324

xii	List of figures	
9.8	The intensive form dynamics – a stabilising channel of debt default via the effect of real wages on profits	332
9.9	The intensive form dynamics – a stabilising channel of debt default via the effect of goods market-led real wage	337
9.10	Destabilising channels bankruptcy with a profit-led AD	338
9.11	Debt default and bankruptcy – the 3D model	339
9.12	The balance sheet of banks – loans and bank bonds	340
9.13	The balance sheet of banks – net deposits and net wealth	340
9.14	Banks' pro-cyclical profitability and credit supply	341
9.15	Debt default and credit crunch	342
9.16	Bank bailout	344
9.17	Business cycle – wage-led – stability	345
9.18	Business cycle – wage-led – stabilising higher price flexibility	346
9.19	Maximum real parts of eigenvalues – wage-led – Rose effect	347
9.20	Business cycle – profit-led – stability	348
9.21	Debt deflation – wage-led AD	349
9.22	Debt deflation – profit-led AD	350
9.23	Taylor rule	351
9.24	Fiscal policy	352
10.1	Japan – the main economic indicators	358
10.2	Japan – an indicator of firms' wealth (assets minus liabilities divided by final assets)	361
10.3	The call rate in Japan: 1980–2004	363
10.4	Firms' bankruptcy, reproduced from Kageyama and Harada (2007)	366
10.5	Loss related to default	367
10.6	Banks' self-assessment of NPLs	369
10.7	Bad assets of the Jusen companies in June 1995	371
10.8	Financial assistance and capital injections – billion yen	374
10.9	Assets purchase – Japan	376
10.10	Transfers to the financial system – Japan	377
11.1	Damped fluctuations in the supply of housing services and rental prices	411
11.2	More volatile fluctuations through flexible goods-price level adjustments	412
11.3	Implosive fluctuations and debt deflation	412
11.4	Damped fluctuations based on absolute downward wage rigidity	413
11.5	Monotonic debt deflation instead of cyclical recovery due to downward wage adjustment	414
11.6	Increasing amplitude due to increasing interest rate effect on the default rate of worker households	416
11.7	Increasing instability due to price level dependency on the default rate of worker households	417

	List of figures	xiii
11.8	Economic breakdown through default dependent price deflation	417
11.9	Increasing instability due to additional investment in the supply of housing services due to increases in the housing default rate of workers	418
11.10	Economic breakdown through default dependent price deflation	418

Tables

2.1	The balance sheet of firms (current values)	<i>page</i> 26
2.2	The production, change of wealth and flow of funds accounts of firms, households and the government	28
2.3	The income, change of wealth and flow of funds accounts of the central bank	28
2.4	The balance of payments account	29
2.5	Balance of payments (in foreign currency)	43
4.1	The parameters of the simulation of the 3D dynamics	98
4.2	The parameters of the simulated 4D dynamics	109
4.3	Sectors and markets of the economy	113
5.1	The real part of the economy (foreign country data: $\gamma, p_x^*, p_m^*, \tau_c^* = \tau_c$)	140
5.2	The financial part of the economy (foreign country data: i^*)	141
5.3	The production, income, accumulation and financial accounts of firms	143
5.4	The production, income, accumulation and financial accounts of asset holders	144
5.5	The production, income, accumulation and financial accounts of worker households	145
5.6	The production, income, accumulation and financial accounts of the monetary and fiscal authorities	146
5.7	The external account	148
6.1	The real part of the economy	182
6.2	The financial part of the economy	183
7.1	The accounts of firms	208
7.2	Accounts of households (asset owners)	210
7.3	Accounts of households (workers)	210
7.4	Accounts of the fiscal and monetary authorities	211
7.5	International relationships	211
8.1	The financial part of the economy (foreign country data: i_l^*)	262
8.2	Production account of firms	262
8.3	Income account of firms	263

List of tables xv

8.4	Accumulation account of firms	263
8.5	Financial account of firms	264
8.6	Production account of households (asset holders)	264
8.7	Income account of households (asset holders)	264
8.8	Accumulation account of households (asset holders)	265
8.9	Financial account of households (asset holders)	265
8.10	Parameter values underlying the simulations of Figure 8.8	296
8.11	The parameter set for Figure 8.10	298
8.12	The simulation of the 20D dynamics – parameter values for Figures 8.12–8.15 with the exceptions noted in the text	302
9.1	Balance sheets	312
9.2	Flows of funds	312
9.3	The balance sheet of banks: assets adjustments	317
9.4	Banks' balance sheets: CB advances	318
10.1	Phillips–Perron unit test results for labour share data	359
10.2	Estimations results: the real model	360
10.3	Phillips–Perron unit test results for interest rate data	362
10.4	Estimations results: with credit rationing	362
10.5	Phillips–Perron unit root test results on the interest rate	363
10.6	Estimations results: with government policy	364
10.7	Jusen Resolution Corporation in December 1995 in billion yen	372
10.8	Data sources for Japan	379

Notation

Steady state or trend values are indicated by a sub- or superscript ‘*o*’. When no confusion arises, letters *F*, *G*, *H* may also define certain functional expressions in a specific context. A dot over a variable $x = x(t)$ denotes the time derivative, a caret its growth rate; $\dot{x} = dx/dt$, $\hat{x} = \dot{x}/x$. In the numerical simulations, flow variables are measured at annual rates.

As far as possible, the notation tries to follow the logic of using capital letters for level variables and lower case letters for variables in intensive form, or for constant (steady state) ratios. Greek letters are most often constant coefficients in behavioural equations (with, however, the notable exceptions being π , ω).

The following list of symbols corresponds to the notation used in Parts I and II and Chs. 8 and 11 of the book and it contains only domestic variables and parameters (Chs. 9 and 10 contain some notation that is specific to them). Foreign magnitudes are defined analogously and are indicated by an asterisk (*). To ease verbal descriptions we shall consider in the following the ‘Australian dollar’ (or the Norwegian Krona, in Ch. 2) as the domestic currency (A\$) and the ‘US dollar’ (\$) as a representation of the foreign currency (currencies).

A. Statically or dynamically endogenous variables

Y	Output of the domestic good
Y^d	Aggregate demand for the domestic good
Y^p	Potential output of the domestic good
Y^e	Expected sales for the domestic good
Y_w^{Dn}, Y_c^{Dn}	Nominal disposable income of workers and asset holders
$u = Y/Y^p$	Rate of capacity utilisation of firms
Y_f	Income of firms
L_1	Population aged 16–65
L_2	Population aged over 65
L_0	Population aged 0–15
L^d	Total employment of the employed
L_f^d	Total employment of the workforce of firms

$L_g^d = L_g^w$	Total government employment (= public workforce)
L_f^w	Workforce of firms
L^w	Total active workforce
$u_f^w (\bar{u}_f^w)$	(Normal) Employment rate of those employed in the private sector
α_l	Participation rate of the potential workforce
$e = L^d / L$	Rate of employment (\bar{e} the employment complement of the Non-Accelerating Inflation Rate of Unemployment or NAIRU)
$C_w(C_w^o)$	Real (equilibrium) goods consumption of workers
$C_c(C_c^o)$	Real (equilibrium) goods consumption of asset owners
$C = C_w + C_c$	Total goods consumption
C_h^s	Supply of dwelling services
C_h^d	Demand for dwelling services
I	Gross business fixed investment
I_h	Gross fixed housing investment
$\Lambda_f, \Lambda_w, \Lambda_g$	Debt of firms, workers, government
$I^a(I^{na})$	Gross (net) actual total investment
\mathcal{I}	Planned inventory investment
N	Actual inventories
N^d	Desired inventories
i	Nominal short-term rate of interest (price of bonds $p_b = 1$)
i_l	Nominal long-term rate of interest (price of bonds $p_b = 1/i^l$)
$\pi_b = \hat{p}_b^e$	Expected appreciation in the price of long-term domestic bonds
i^r	Required rate of interest
p_e	Price of equities
$\pi_e = \hat{p}_e^e$	Expected appreciation in the price of equities
$S^n = S_p^n + S_f^n + S_g^n$	Total nominal savings
$S_p^n = S_w^n + S_c^n$	Nominal savings of households
S_f^n	Nominal savings of firms (= $p_y Y_f$, the income of firms)
S_g^n	Government nominal savings
$T^n(T)$	Nominal (real) taxes
G	Real government expenditure
r^e	Expected short-run rate of profit of firms
r^a	Actual short-run rate of profit of firms
r^l	Expected long-run rate of profit of firms
r_h	Actual rate of return for housing services
r_h^l	Expected rate of return for housing services
K	Capital stock
K_h	Capital stock in the housing sector

xviii	Notation
w^b	Nominal wages including payroll tax
w	Nominal wages before taxes
$\omega = w/p$	Real wages
w^u	Unemployment benefit per unemployed
w^r	Pension rate
w^e, l^e	Wage and labour intensity in efficiency units
p_v	Price level of domestic goods including value-added tax
p_y	Price level of domestic goods net of value-added tax
p_x	Price level of export goods in domestic currency
p_m	Price level of import goods in domestic currency including taxation
p_h	Rent per unit of dwelling
p	Price level (in the one good case)
$\pi^c = \hat{p}_v^e$	Expected rate of inflation or inflation climate
s	Exchange rate (units of domestic currency per unit of foreign currency: A\$/\\$)
$\epsilon_s = \hat{s}^e$	Expected rate of change of the exchange rate
$\sigma = sp^*/p$	Real exchange rate
L	Labour supply
l^e	Labour supply in efficiency units per unit of capital
B	Stock of domestic short-term bonds (index d: stock demand)
B_w	Short-term debt held by workers
B_c	Short-term debt held by asset owners
B^l	Stock of domestic long-term bonds, of which B_1^l are held by domestic asset holders (index d: demand) and B_1^{l*} by foreigners (index d: demand)
B_2^l	Foreign bonds held by domestic asset holders (index d: demand)
E	Equities (index d: demand)
W^n, W	Nominal and real domestic wealth
n	Natural growth rate of the labour force (adjustment towards \tilde{n})
$z = Y/L^d$	Labour productivity
\hat{z}	Rate of Harrod neutral technical change
X	Exports
J^d	Imports
$NX^n = p_x X - sp_m^* J^d$	Net exports in terms of the domestic currency
NFX^n	Net nominal factor export payments (in A\\$)
$N CX^n$	Net nominal capital exports (in A\\$)
τ_w	Tax rate on wages, pensions and unemployment benefits
τ_m	Tax rates on imported commodities

t^n	Total taxes per value unit of capital
g_k^d, g_k	Desired and actual rate of growth of the capital stock K
g_h^d, g_h	Desired and actual rate of growth of the housing capital stock K_h
$\lambda_f, \lambda_w, \lambda_g$	Actual debt to capital ratios of times, workers and government respectively

B. Parameters of the model

The parameters of the non-linear extensions of the model are described when such functions are introduced in the text.

δ_k	Depreciation rate of the capital stock of firms
δ_h	Depreciation rate in the housing sector
α_i^j	All α -expressions (behavioural or other parameters)
β_x	All β -expressions (adjustment speeds)
γ	Steady growth rate in the rest of the world
\bar{e}	NAIRU employment rate (NAIRE)
\bar{u}	Normal rate of capacity utilisation of firms
\bar{u}_h	Normal rate of capacity utilisation in housing
κ_w, κ_p	Weights of short- and long-run inflation ($\kappa_w \kappa_p \neq 1$)
κ	$= (1 - \kappa_w \kappa_p)^{-1}$
y^p	Output-capital ratio
x_y	Export-output ratio
l_y	Labour-output ratio
j_y	Import-output ratio
p_m^*	World market price of import commodities
p_x^*	World market price of export commodities
\bar{d}	Desired public or firm debt/output ratio
ξ	Risk and liquidity premium of long-term over short-term debt
ξ_e	Risk premium of long-term foreign debt over long-term domestic debt
τ_c	Tax rates on profit, rent and interest
τ_v	Value-added tax rate
τ_p	Payroll tax
c_y	Propensity to consume goods (out of wages)
c_h	Propensity to consume housing services (out of wages)

C. Further notation

\dot{x}	Time derivative of a variable x
\hat{x}	Growth rate of x

xx **Notation**

$r_o, etc.$	Steady state values
$y = Y/K, etc.$	Real variables in intensive form
$m = M/(p_v K), etc.$	Nominal variables in intensive form
GBR	Government Budget Restraint

D. Commonly used abbreviations

AD	Aggregate Demand
ADF	Augmented Dickey-Fuller
AS	Aggregate Supply
BOJ	Bank of Japan
CAO	Central Application Office
CB	Central Bank
CDO	Collateralised Debt Obligation
CES	Constant Elasticity of Substitution
DSGE	Dynamic Stochastic General Equilibrium
ECB	European Central Bank
FED	Federal Reserve Board
GBR	Government Budget Restraint
GDP	Gross Domestic Product
GMM	Generalised Method of Moments
GNP	Gross National Product
IMF	International Monetary Fund
KMG	Keynes–Metzler–Goodwin
MBS	Mortgage Backed Security
METI	Ministry of Economy, Trade and Industry
MFT	Mundell–Fleming–Tobin
NAIRE	Non-Accelerating Inflation Rate of Employment
NAIRU	Non-Accelerating Inflation Rate of Unemployment
MOF	Ministry Of Finance
NDP	Net Domestic Product
NDP-F	Net Domestic Product at Factor costs
NNP	Net National Product
ODE	Ordinary Differential Equation
OECD	Organisation for Economic Co-operation and Development
OLG	OverLapping Generations
PC	Phillips Curve
PPP	Purchasing Power Parity
RBC	Real Business Cycle
RMBS	Residential Mortgage Backed Security
WB	World Bank

Preface

When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done.

(John Maynard Keynes, *The General Theory of Employment, Interest and Money*, 1936, p.159)

Deflation is also harder to fight than inflation. Over the past two decades central bankers have gained plenty of experience in how to conquer excessive price increases. Japan's ongoing inability to prevent prices falling suggests the opposite task is rather less well understood. Although it is true that heavily indebted governments might be tempted to erode their debts through higher inflation, there are few signs that political support for low inflation is waning.

(*The Economist*, 'The deflation dilemma', 3 June 2010)

The current macroeconomic development of the USA as well as of most major industrial economies is characterised by boom-bust cycles. Such boom-bust cycles start with overconfidence, expectations of high returns and overleveraging. Often an asset price boom goes hand in hand with a credit boom and rising prices. When a downturn is triggered, often initiated by a sudden bankruptcy or similar event, frequently entailing long-term protracted periods of low growth and low employment, prices may fall and periods of debt deflation are experienced. Normally such boom-bust cycles are driven by specific sectors in the economy. In the most recent boom-bust cycle, the credit sector and the real estate sector were the main driving forces.

To study such phenomena, this book takes a macroeconomic perspective. It uses a dynamic framework that builds on the theoretical tradition of non-clearing markets. The modelling philosophy behind most of the chapters of this book is of a Keynesian nature, representing an attempt to revive this theoretical approach on the working of the interaction of the financial market and macroeconomy from a fundamental perspective that also takes account of very recent developments. In its empirical application it refers to the various financial crisis episodes that the new century has already experienced.

The macroeconomic research approach that we employ differs in significant ways from the mainstream literature that uses the Dynamic Stochastic General Equilibrium (DSGE) approach as the basic modelling device. The key difference is that our approach represents an out-of-equilibrium approach which assumes that macrofoundations have to precede microfoundations. Most importantly, we dispense with the well-informed agents that are a key assumption of the rational expectations school. The main features

of the DSGE approach are – by contrast – the assumptions of intertemporally optimising agents, rational expectations, competitive markets and price mediated market clearing through sufficiently flexible prices and wages. Credit markets and financial markets have no particular role in this framework since all shocks are real shocks, coming from the real side of the economy. The New Keynesian approach to macroeconomics has, in the last decade or so, to a large extent, also adopted the DSGE framework, building on the intertemporally optimising agents and market clearing paradigm, but favouring more the concept of monopolistic competition, sticky wages and prices and nominal as well as real rigidities. An excellent description of this line of research is Eggertsson and Woodford (2003).

The focus of our approach in this book is to revive the Keynesian business cycle perspective on macrodynamics by giving a central role to the financial sector, as it was already formulated by Keynes (1936). It is well known that the intertemporal approach of smoothly optimising agents and fast adjustments in order to establish temporal or intertemporal marginal conditions in the product, labour and capital markets has not been very successful in matching certain stylised facts on those markets. A further deficiency of the intertemporal decision models is that macroeconomic feedback effects, in particular the ones that come from the financial sector – as well as their stabilising or destabilising impact on the macroeconomy – are rarely considered. Yet such feedback mechanisms, which are indeed relevant for the interaction of all three markets, have been central to the theoretical and empirical explorations by Keynesian authors since the 1930s. The emphasis of the topics here lies in the study of the relative strength and interaction of these feedback mechanisms as well as the transmission channels with respect to all three markets, those for labour, goods and financial assets. We are, in particular, interested in their impact on the stability of the economy once their working is considered in the context of a fully developed dynamical system approach.

We do not deny that forward-looking behaviour and (the attempt at) intertemporal optimisation by economic agents might be relevant for the dynamics of the economy, but in our view the exclusive focus on these issues in the present academic literature leaves completely to one side too many interesting, important and relevant issues. In particular, in the interaction of all three markets there may be non-linear feedback mechanisms at work which do not necessarily give rise to market clearing, nor necessarily to convergence towards a (unique) steady state growth path. Also, as recent research has shown, there is heterogeneity of agents and beliefs present in modern economies, as well as a large variety of informational, structural and financial frictions in the real world. We believe that this leaves many questions open so that the true understanding of the economy might better be pursued by a variety of frameworks. Often it is said with respect to the DSGE models that one needs to use an intertemporal optimising and rational expectations framework, otherwise one would leave ‘too much money on the sidewalk’. But one might also add, that by doing so, there is a danger that one might also leave too many problems in macroeconomics on the sidewalk.

Central points in our book on Keynesian macrodynamic theory, and its application to the study of the financial market and boom-bust cycles, are the mechanisms generating non-cleared markets and the phenomenon of disequilibrium recurrently present in certain markets such as the labour or goods markets. In contrast to the tradition that stresses the clearing of all markets at each instant of time,¹ in our modelling approach, as it will be stressed at several occasions throughout this book, disequilibrium situations are the main driving forces of wage and price inflation dynamics. Moreover, disequilibrium in financial markets is often generated by overleveraging in the real sector, the household sector as well as the financial sector of the economy. Some of the markets may act as either stabilising or destabilising forces through a variety of different macroeconomic channels such as the real wage feedback channel, product market, financial market as well as debt devaluation channels, showing that there are indeed different (and also valid) possibilities to specify and analyse the dynamics of the macroeconomy in a different way from that of the DSGE framework.

Due to the fact that in our modelling approach the stability of the analysed dynamical system is not imposed *ab initio* by the assumption of rational expectations (which requires that the economy always ‘jumps’ to some stable path and therefore always converges to the steady state after any type of shock), its stability properties (and its analysis) are based on the relative strength of the interacting macroeconomic and financial feedback channels. Such stability analysis, despite its importance for the understanding of the dynamics of an economy, does not seem to be relevant for the literature based on the rational expectations market clearing tradition and divergent paths (apart from anomalies) do not appear to be an issue there. However, the ongoing occurrence of ‘bubbles’ and ‘herding’ in financial markets worldwide, as well as the large macroeconomic imbalances present nowadays in the global economy through overleveraging indicate that such divergent paths can indeed take place in significant and sometimes long-lasting ways.

In our framework we finally dispense with another prominent assumption of mainstream economics, namely the assumption of a single representative household. In a capitalist economy there are – almost by definition – always at least two representative households to be considered, workers and asset holders. Of course, there exist more household types in actual economies and also hybrid configurations of them, but certainly not a single type as far as utility formation and budget constraints are concerned, as the current subprime and credit crises make obvious. Macroeconomic theory with only ‘Robinson Crusoe’, and not also ‘Man Friday’, not only ignores the conflict over income distribution and labour and employment issues, but also neglects the impact of financial and real boom-bust cycles on the labour market and job creation and destruction. The labour market will thus play an important part in our modelling strategy.

A number of professional colleagues, too numerous to name here, have contributed to the present project through stimulating discussions on various aspects of the subject

¹ This is really an heroic assumption in a continuous-time modelling framework.

xxiv **Preface**

matter of this book as well as on related research projects. We are also grateful for comments and criticisms we have received from numerous participants at presentations of aspects of the material of this book at numerous international conferences and research seminars. Of course, we alone are responsible for the remaining errors in this work. We are indebted to two anonymous referees who read the original version of the manuscript and offered many, even detailed, suggestions for its improvement. We also wish to thank Stephanie Ji-Won Ough of the University of Technology, Sydney ‘UTS’ for her excellent editorial work. Finally we would like to thank Chris Harrison of Cambridge University Press for all he has done to make the publication process go as smoothly as it has.