

Macroeconomic crises and Macroeconomic Models

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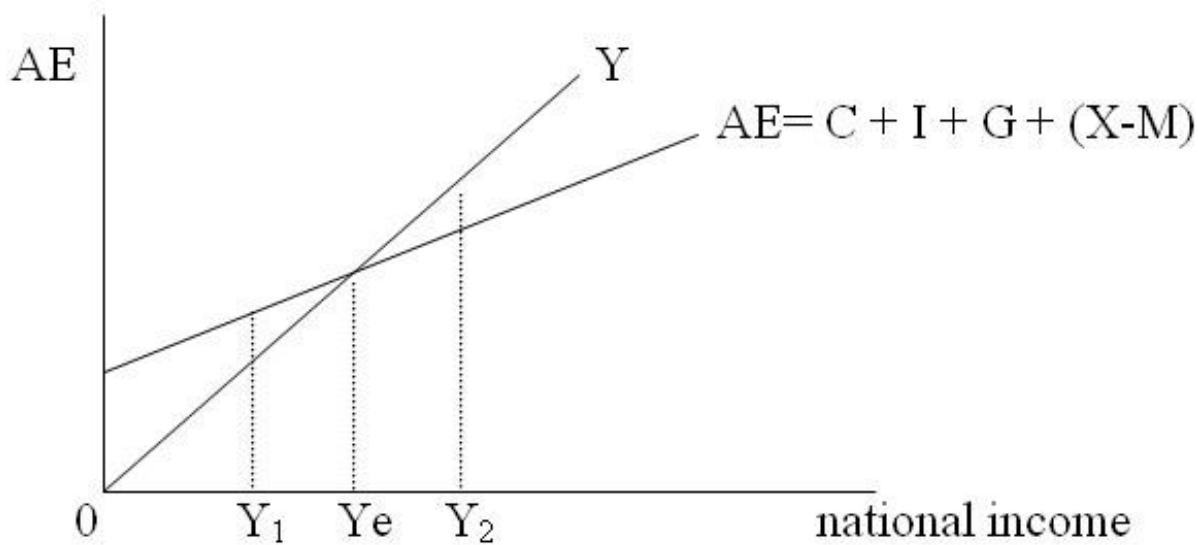
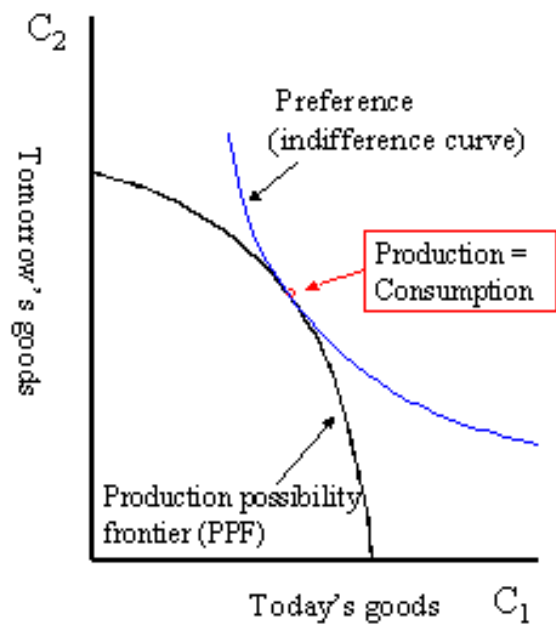
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Introduction

- Events under consideration: “memorable” episodes, marked by widespread difficulties in debt repayment and lower real activity. Deserve analysis of connections with other kinds of extreme disturbances like hyperinflations.
- Features of crises: high perceived social costs, large changes in plans and expectations in origin and aftermath, occasion for “search for lessons”

Introduction

- Processes at different time scales, coupled:
 - At some moments: relevance of day-by-day news, especially in financial markets. Perceptions of system near “bifurcation”; actions decided “on the spot” with potentially lasting effects.
 - Movements in aggregate real activity, employment: large fluctuations over months, quarters.
 - Longer-run effects: changes in balance sheets: wealth levels, distribution: attitudes and behaviors regarding spending and asset demands; shifts in policies and institutions. Changes in beliefs: possible reversals in “burden of proof” arguments; return of old debates.



Introduction

- Specificities of various episodes: more or less necessary condition that “no two crises alike”. But common features: wealth losses, unfulfilled contracts, “broken promises”, large falls in productivity without obvious “extra- economic” shock.
- Macro policies, configuration of financial system, incentive problems, relevant in their ways but general operative factor is different: wealth misperceptions, and financial implications.
- Consequences for policy: planning for the event of next crisis, would differ (in not easily predictable forms) from past ones.

Introduction

- Interactions between growth trends and large macro fluctuations. Problems of intertemporal coordination induced by difficulties in predicting real incomes over relatively long horizons. Implicit: RE of growth performance hard to determine, especially if “innovation” (technology, institutions) believed to be driving force.

Introduction

- Topics:
 - Variable trends, expectational disturbances and debt cycles. Other effects as complementary mechanisms.
 - Sustainability. Issues in determining precise notion; evaluations as forward-looking exercises in evolving systems (relevant “fundamentals” are in future).

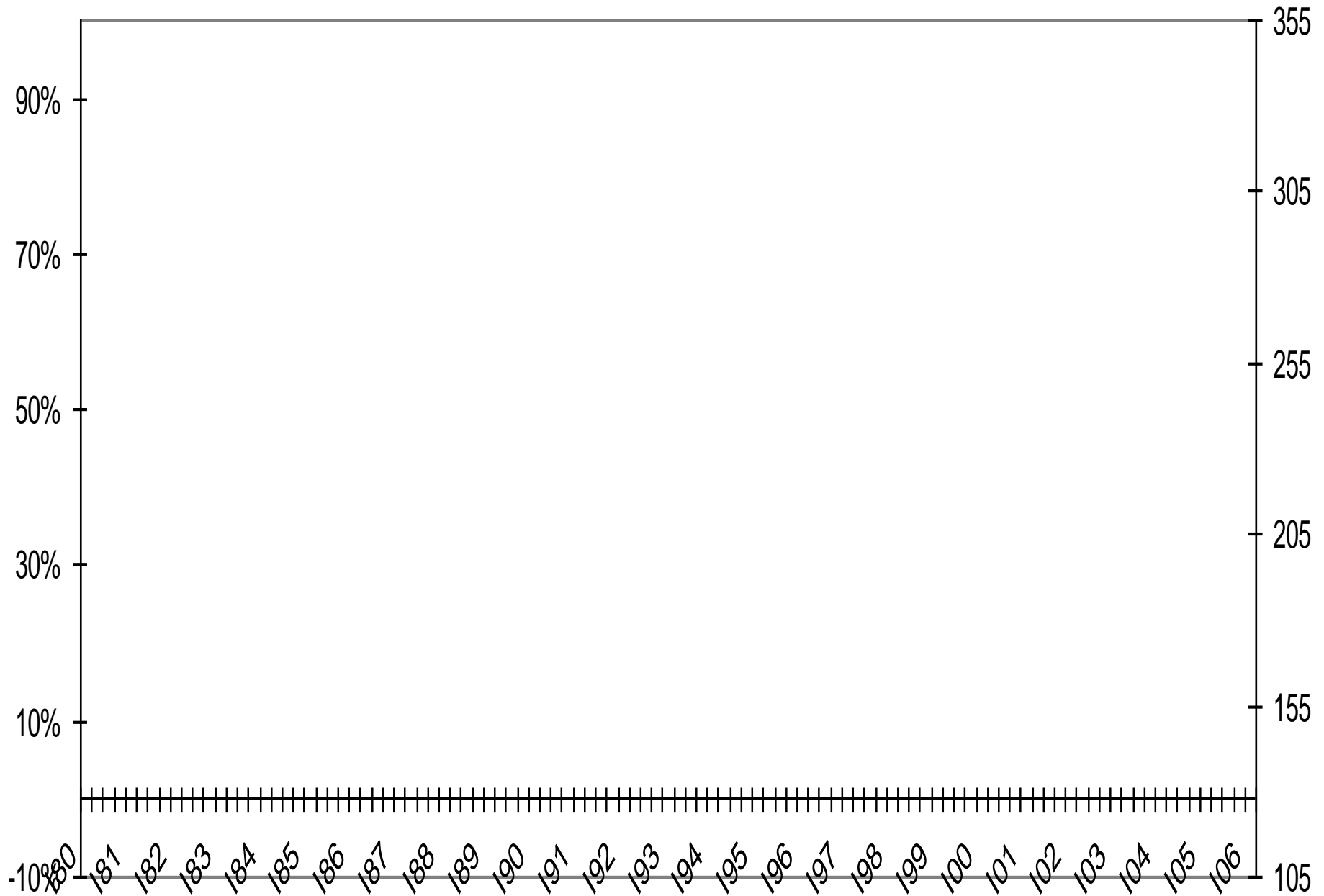
Introduction

- Topics
 - Types of crisis according to nature, strength of disturbances. Potential policy implications in dealing with crises: “lender, spender, debtor of last resort”.
 - Crucial to model intertemporal choices and expectations, and propagation effects between agents/markets. The DSGE framework aims for that, but in ways that are intrinsically limited to analyze crises. Much room for exploration.

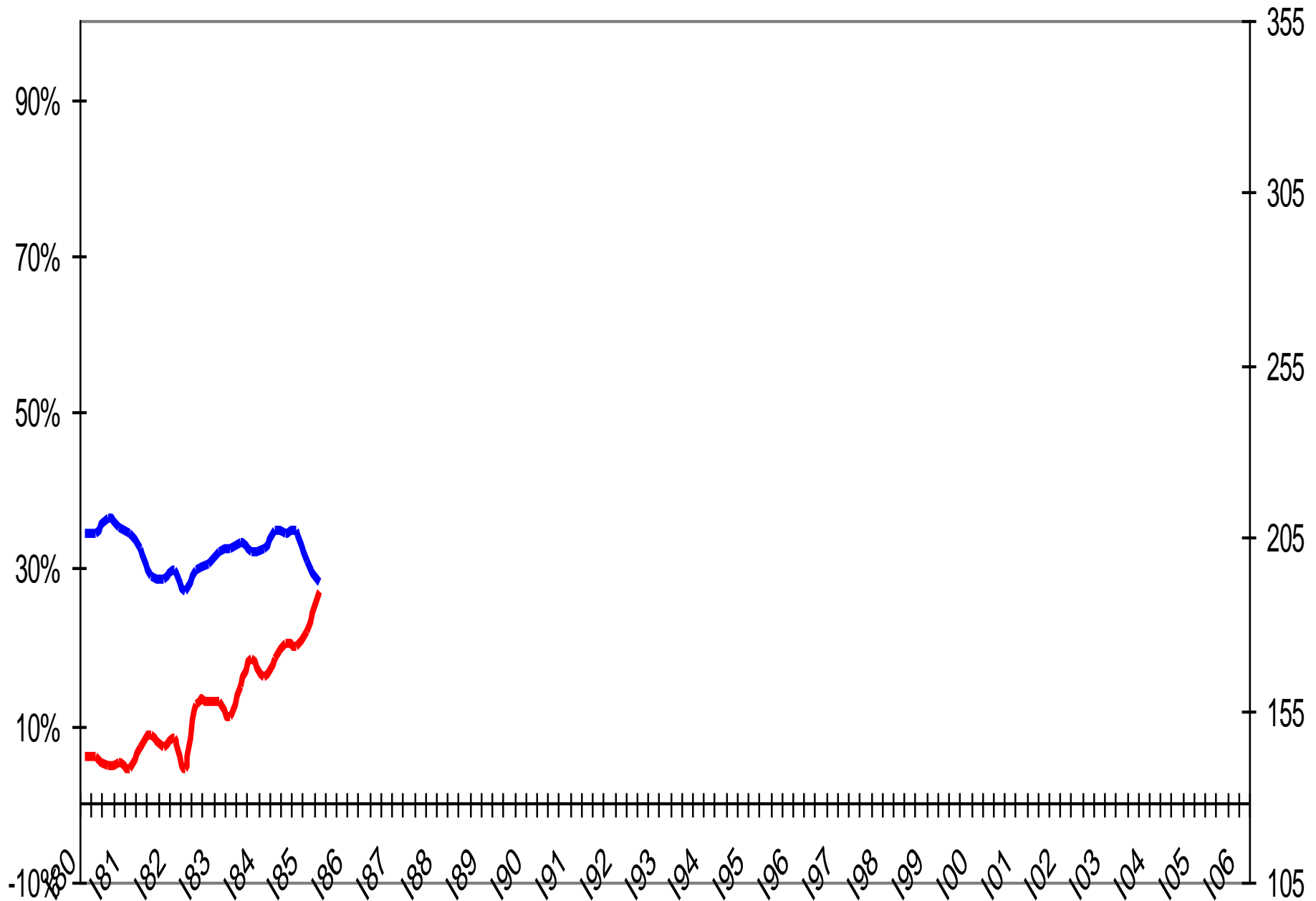
Trends, cycles, crises

- Not arguing that “in the aggregate”, agents make obvious mistakes: growth trends in real activity and incomes are “really” difficult to forecast. In some economies, the problem has been historically very complicated, with macro evolution marked by changes in growth rates and crises of different kinds.

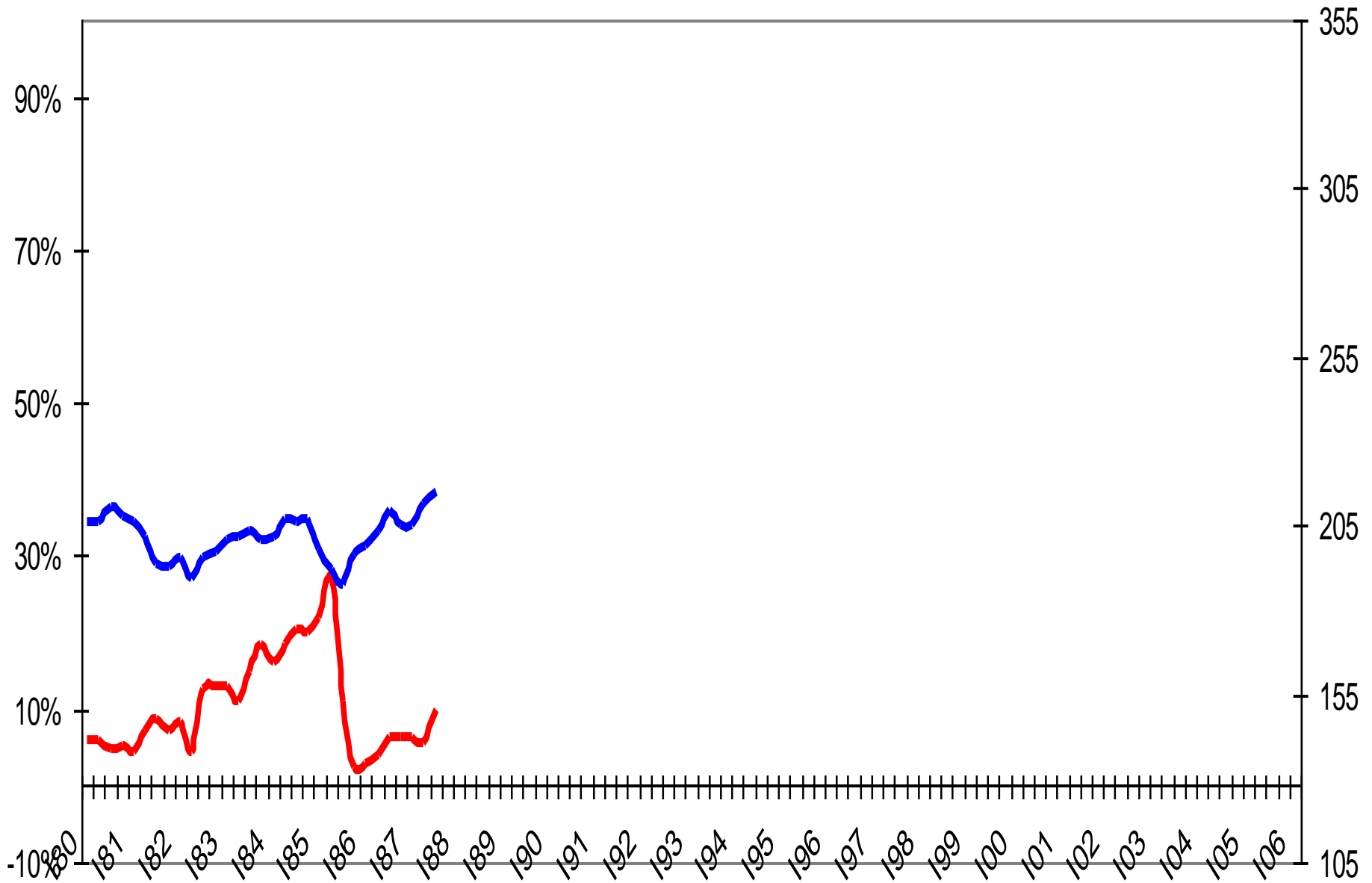
GDP at constant prices and CPI inflation rates



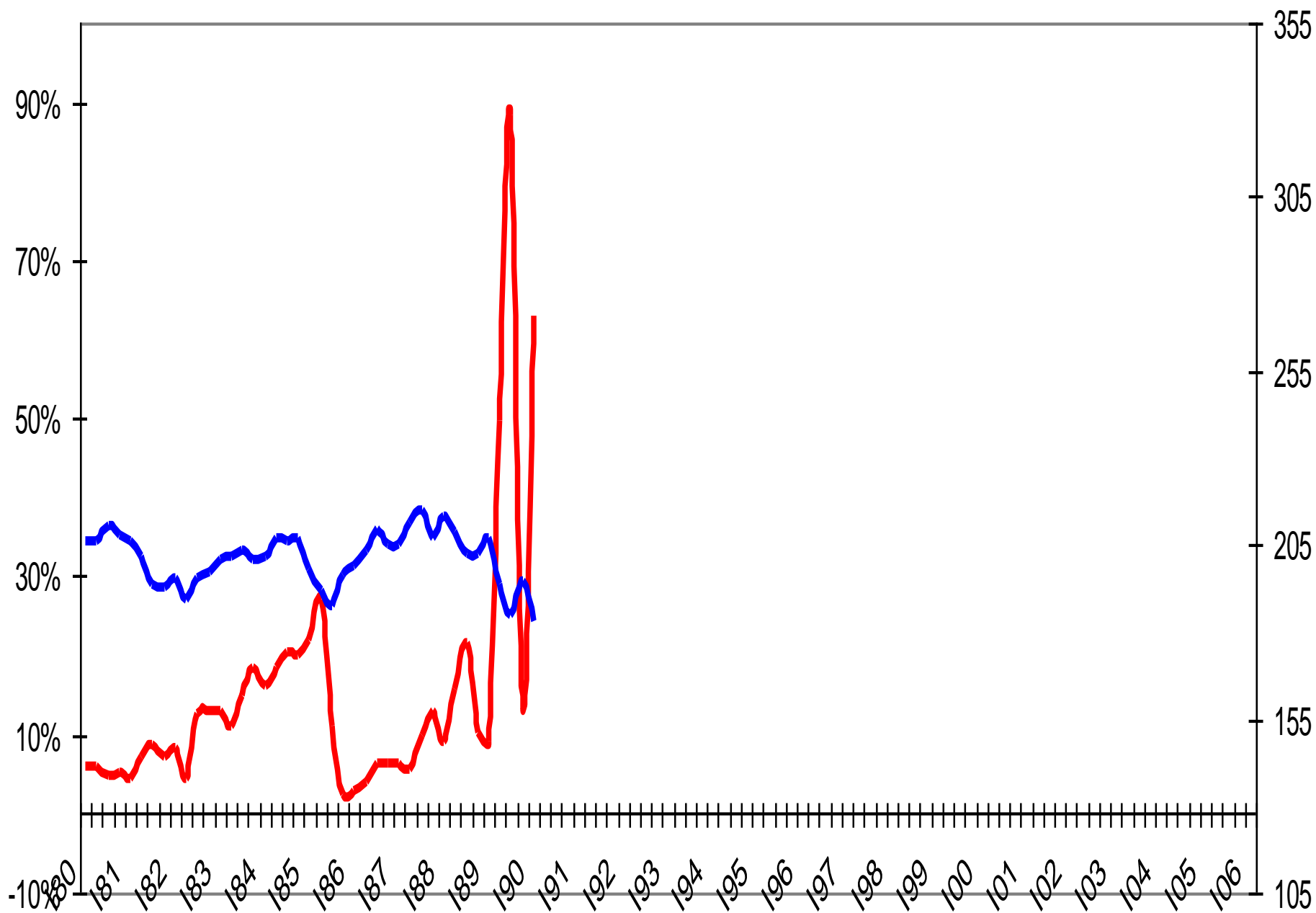
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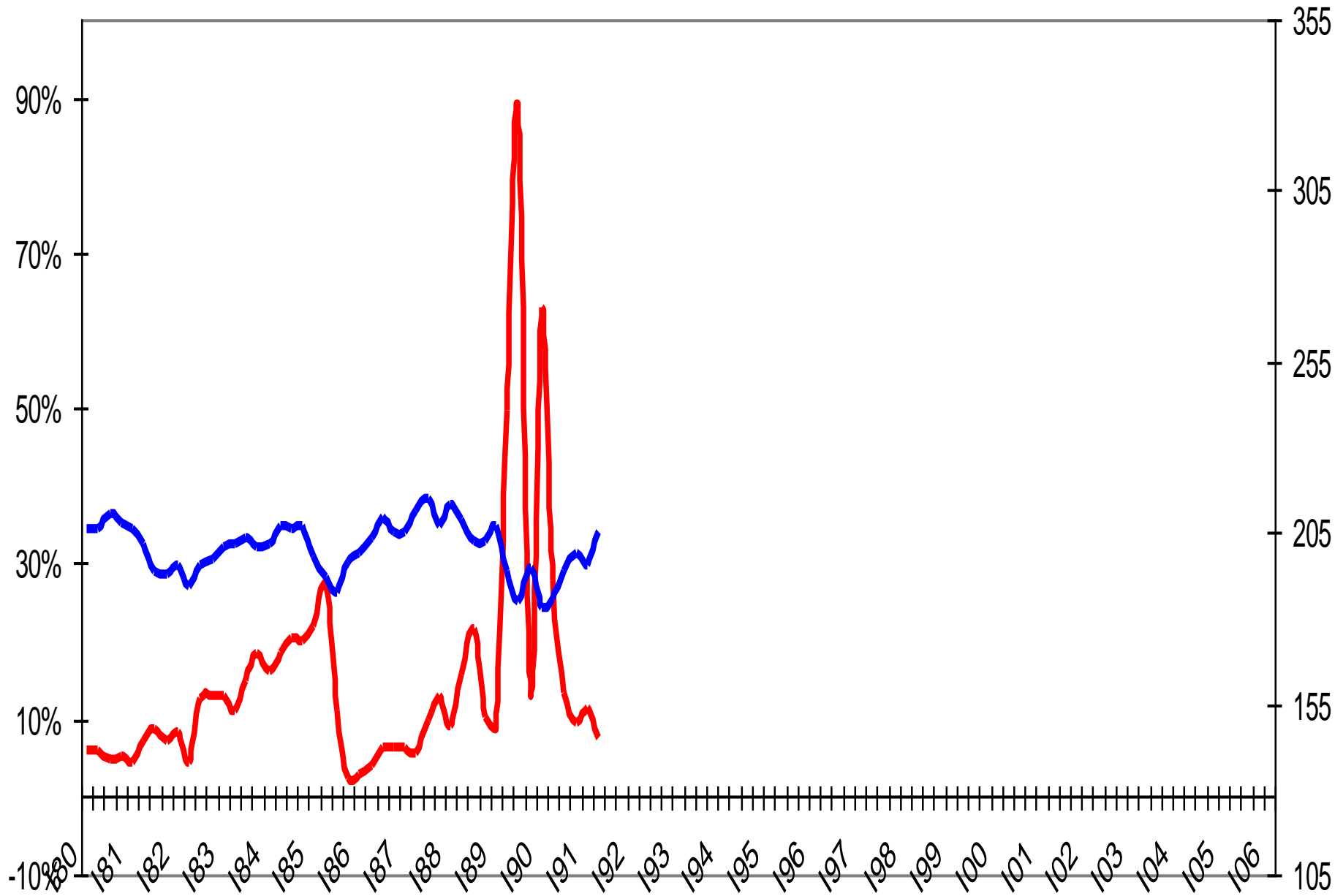
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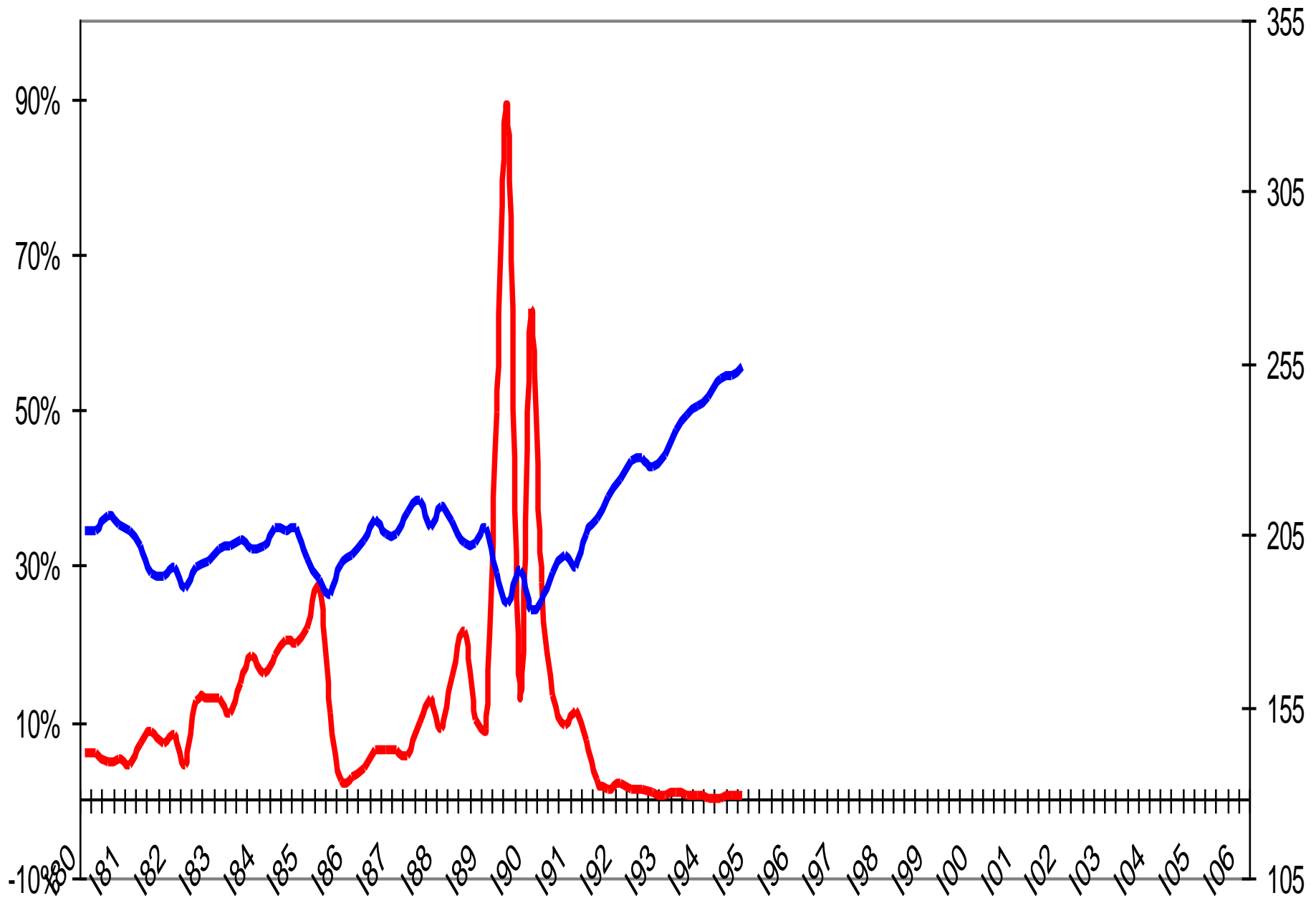
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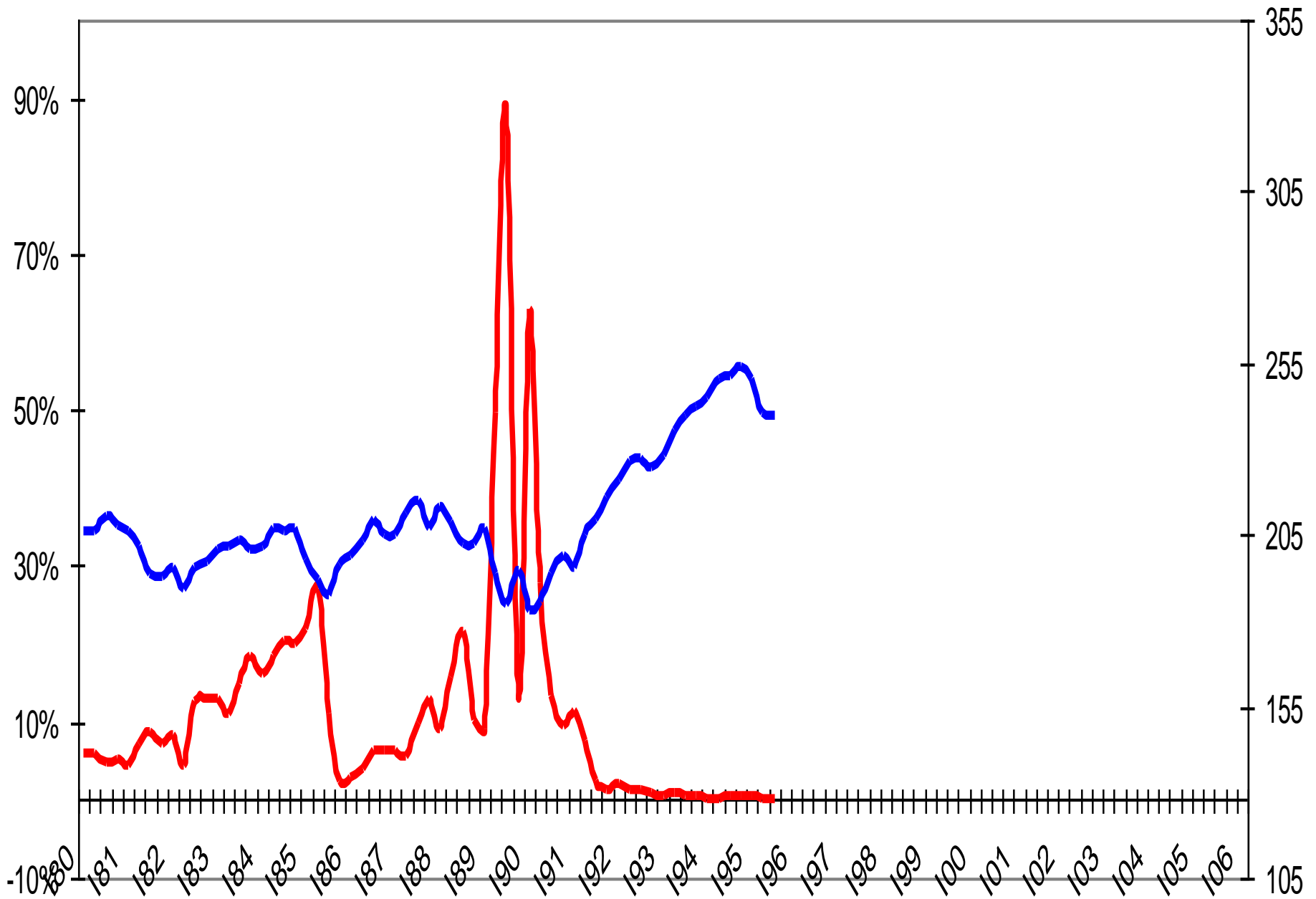
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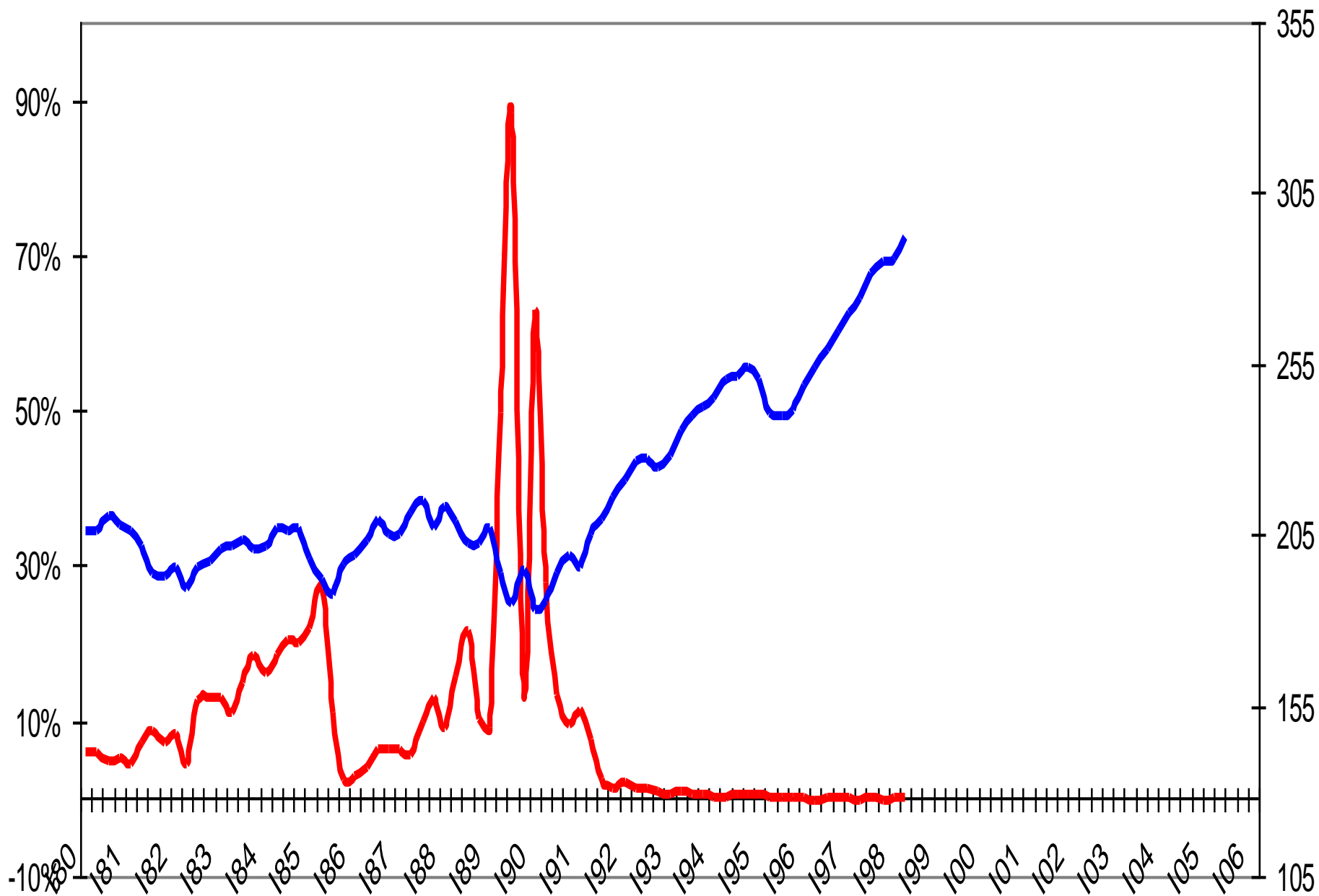
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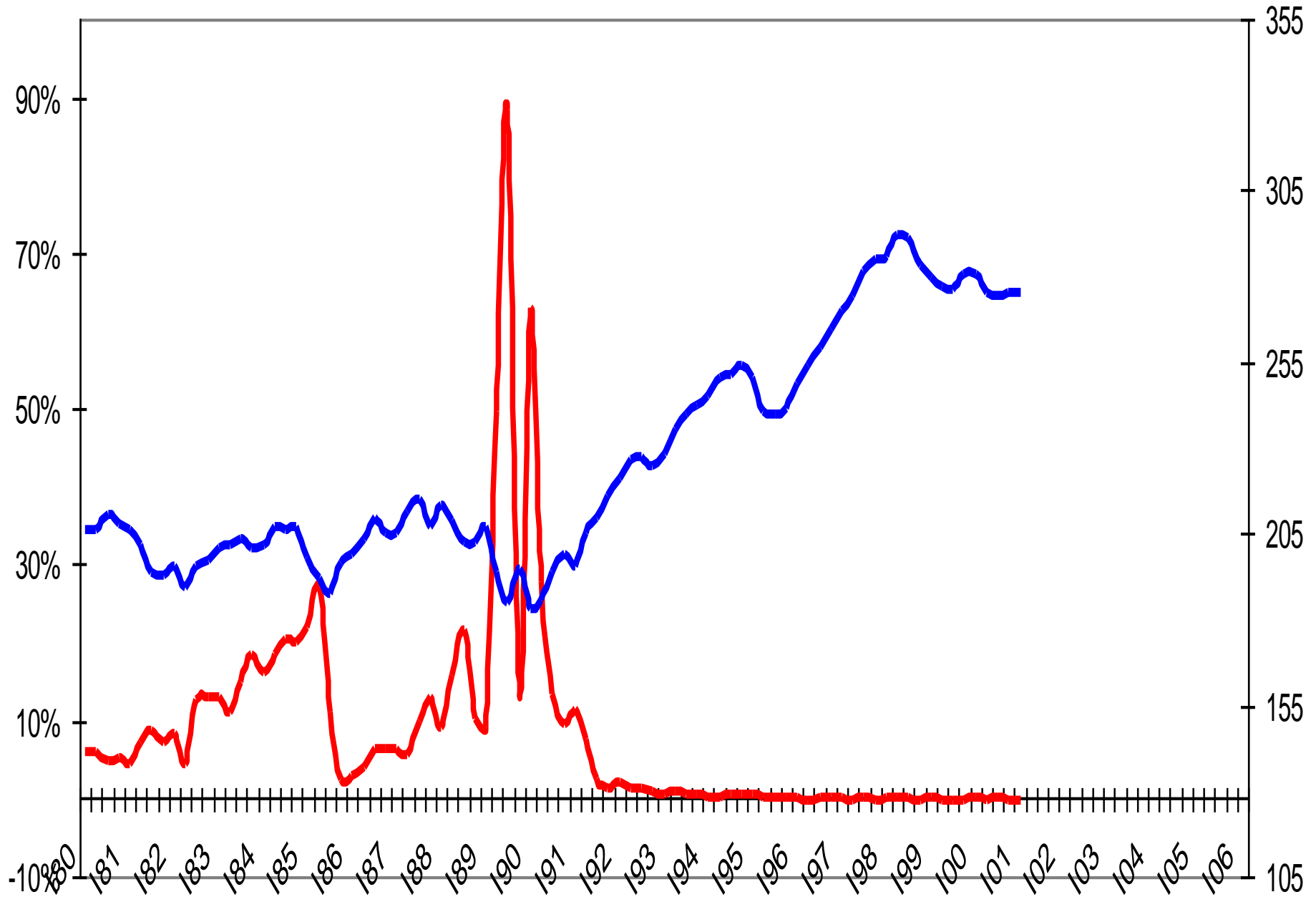
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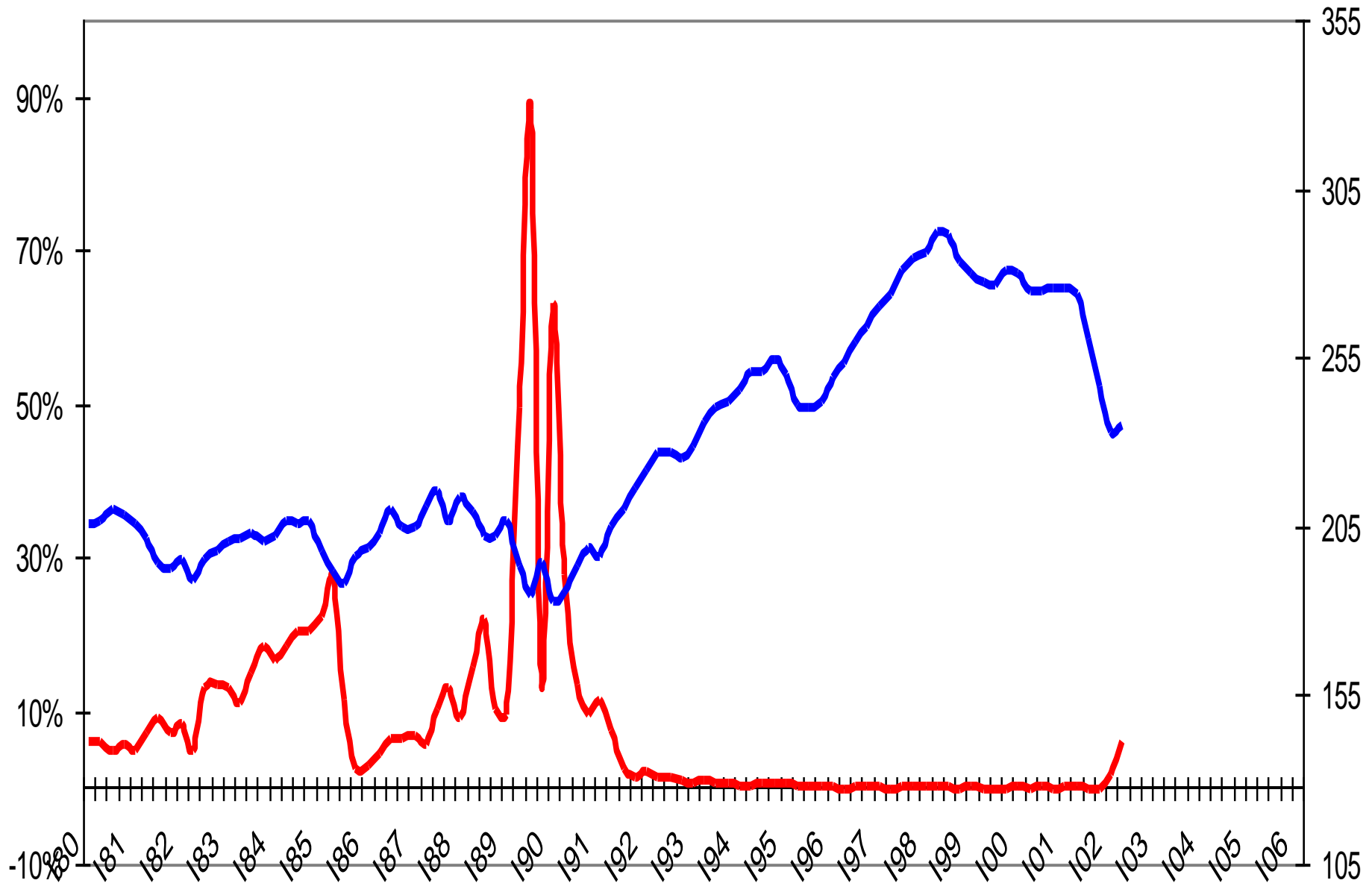
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GDP at constant prices and CPI inflation rates

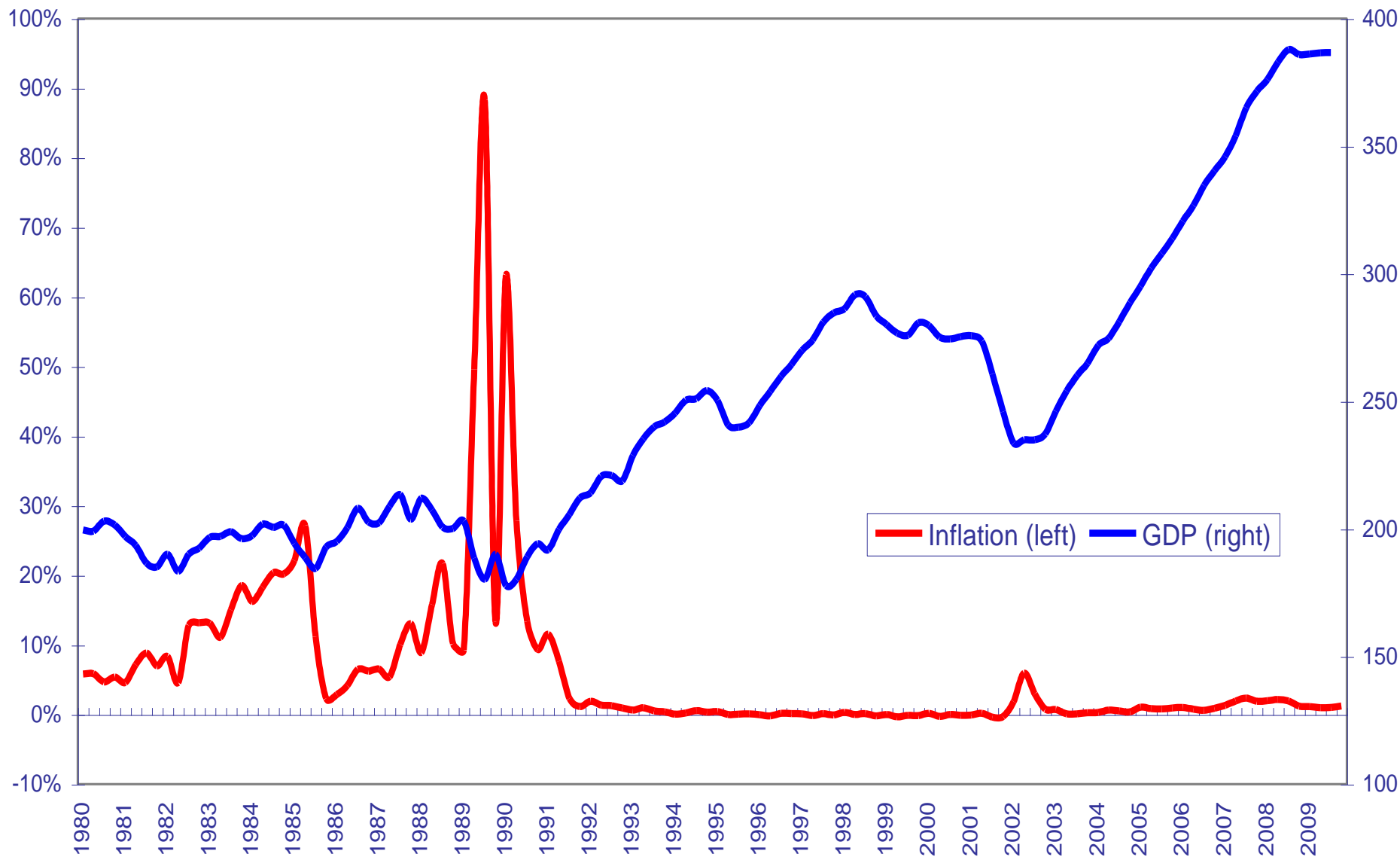


GDP at constant prices and CPI inflation rates



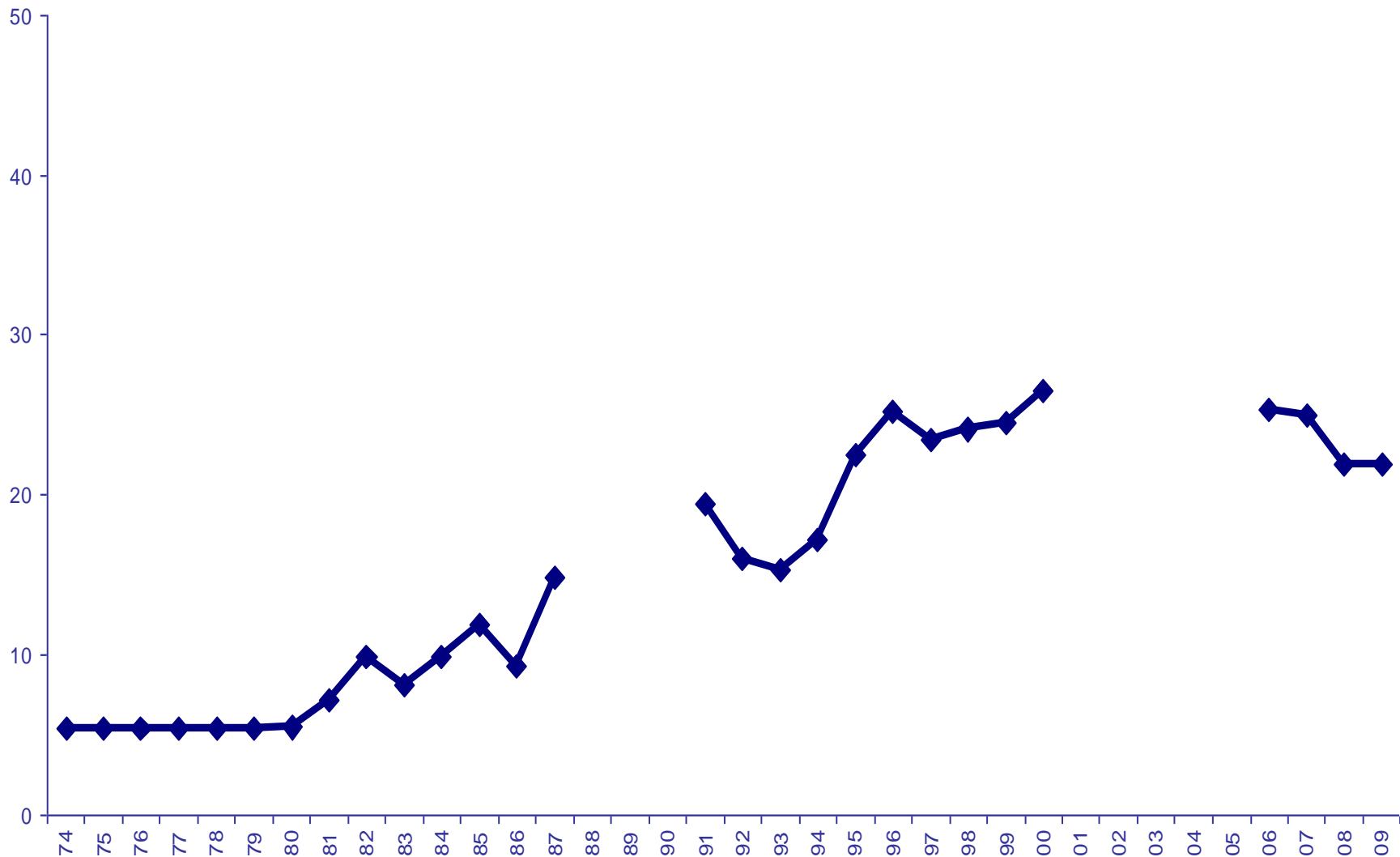
GDP at constant prices and CPI inflation rates

(billions of pesos of 1993 and monthly rates of change)



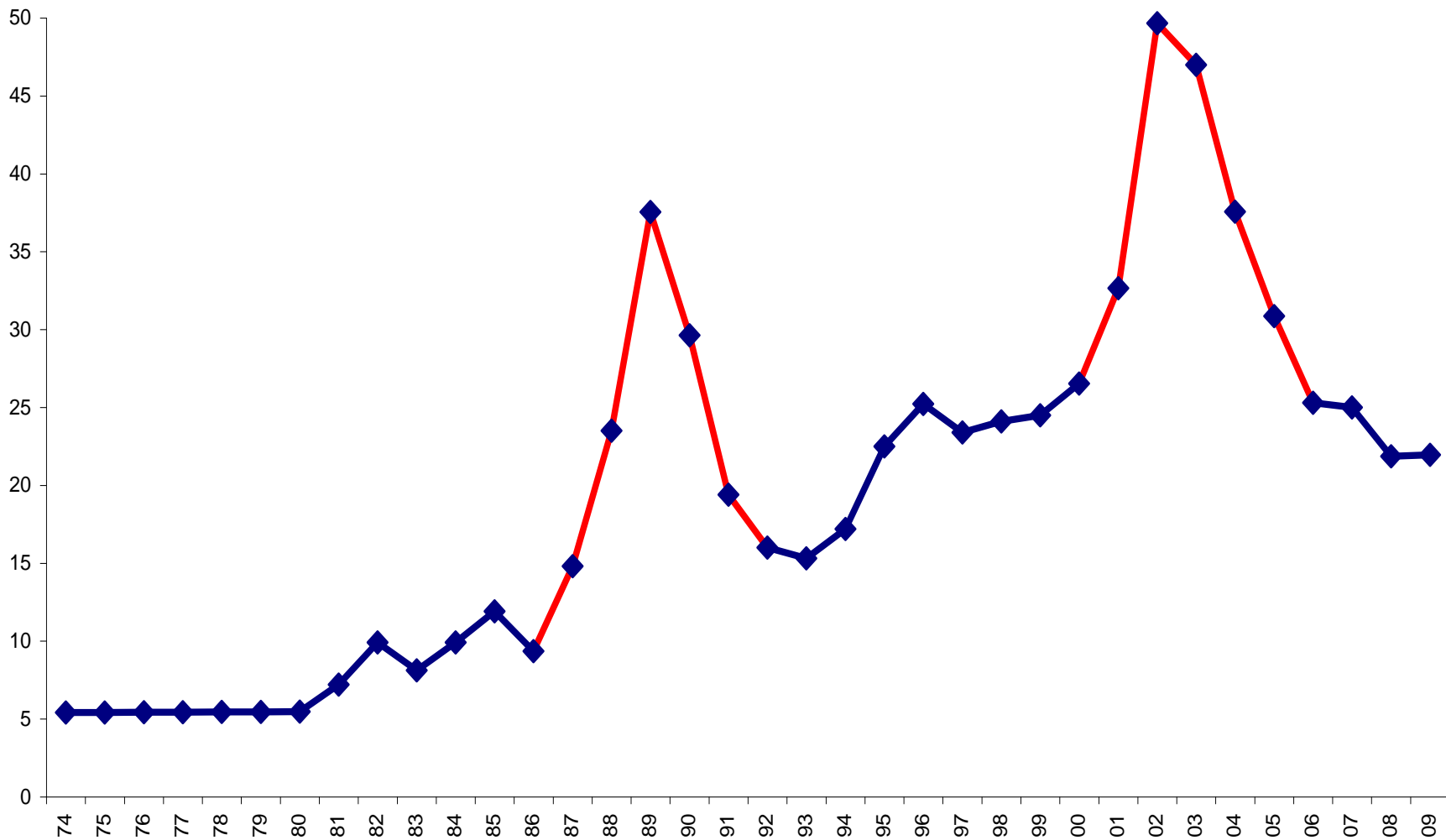
Incidence of Poverty

(Source: CEDLAS)



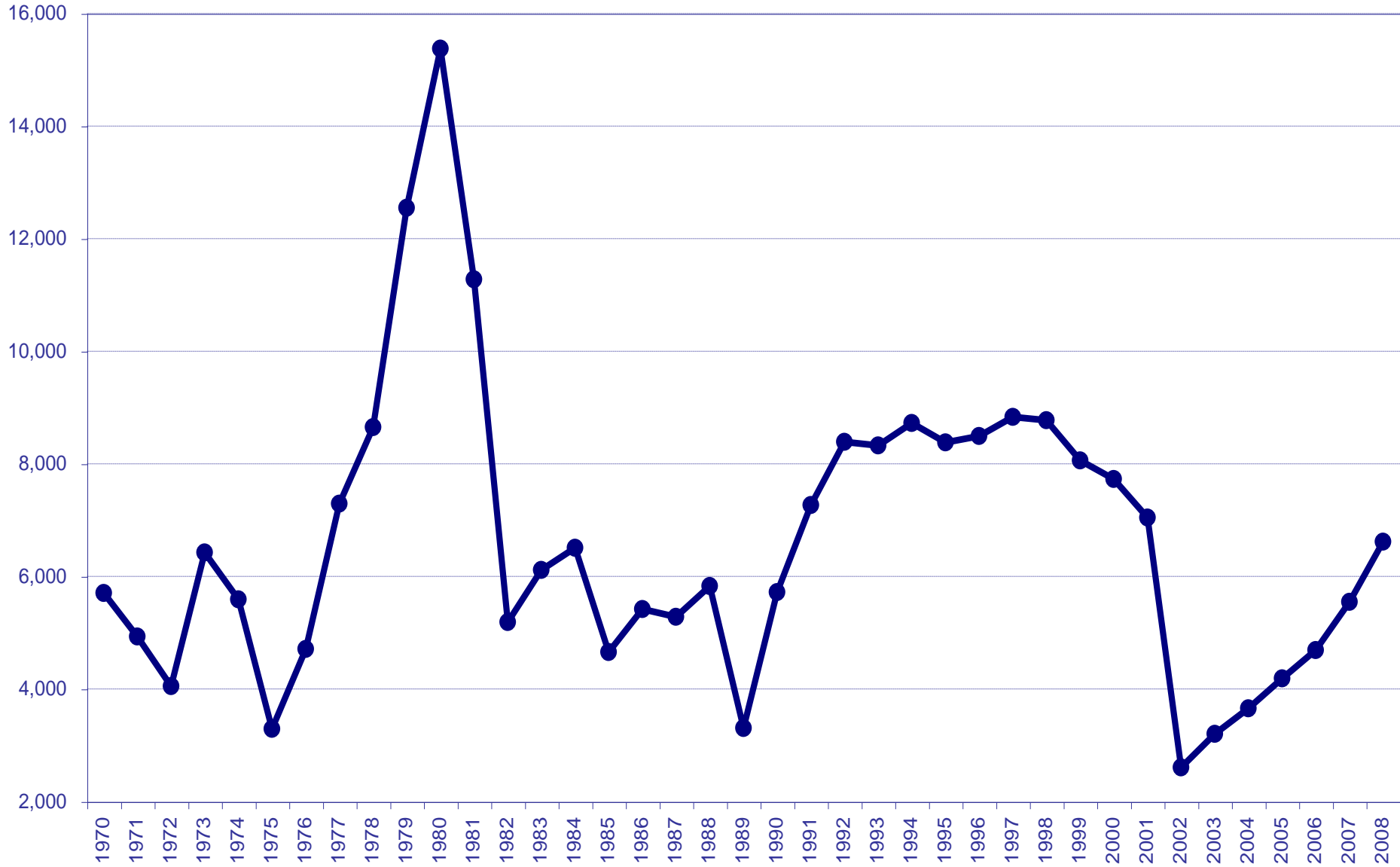
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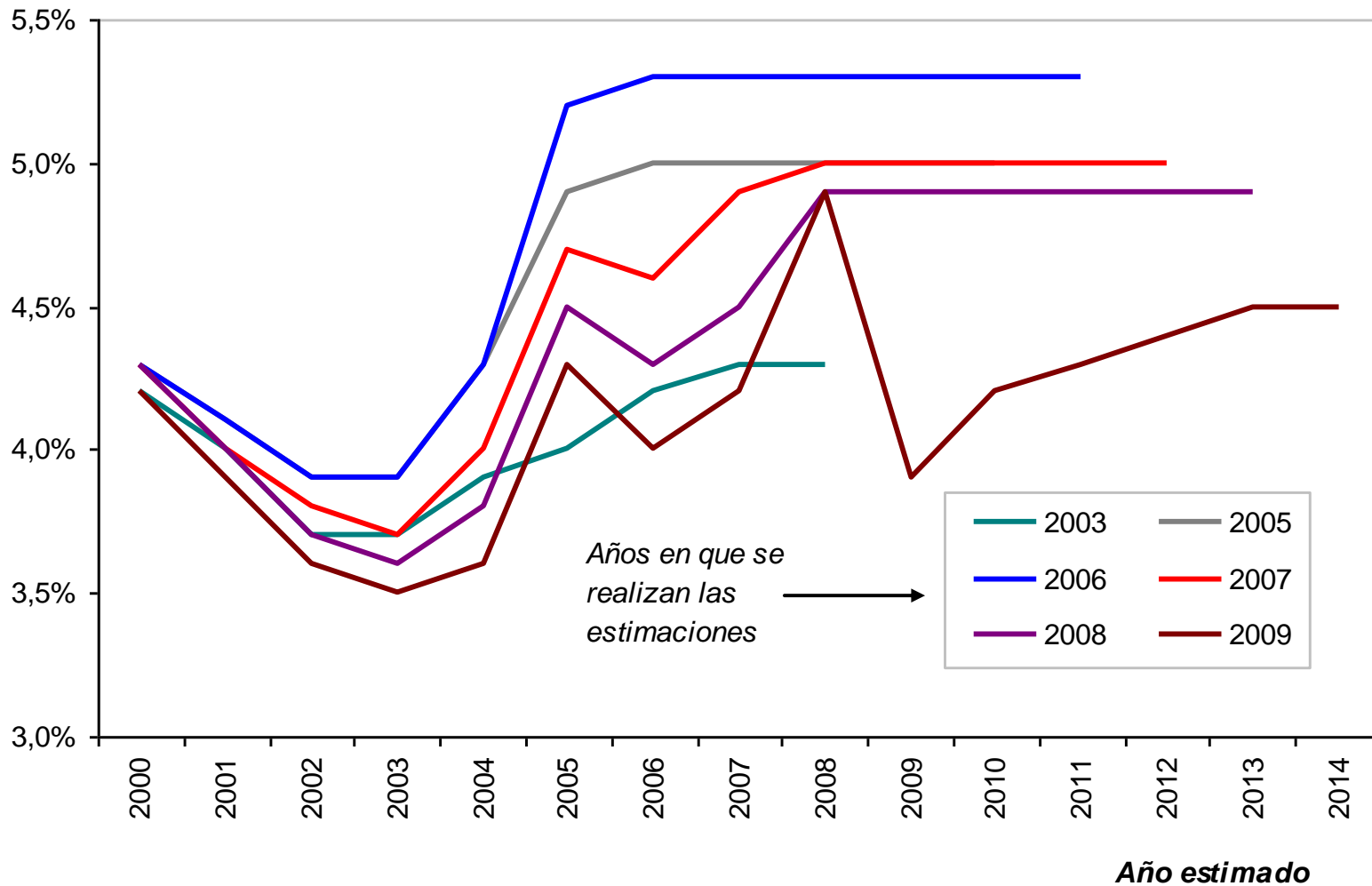


GDP per capita at constant prices

(dollars of 2000)



PBI Tendencial Chile *-variación interanual estimada-*



Fuente: Dipres Chile.

Trends, cycles, crises

- Crises in economies with very different financial systems: based on bank intermediation or capital markets, sophisticated and diversified or simple and narrow asset structure, domestic or foreign unit of denomination (although contract “dollarization” can be important source of vulnerability: in connection with history of monetary instability).
- Monetary policy potentially among main actors in generation of crises. But crashes in economies without (or very limited) independent monetary policies. Also: necessary interaction with wrong expectations (always a “well adapted” response to any interest rate path; possible misallocations, but no perfect foresight debt crisis).

Trends, cycles, crises

- Incentive problems typically visible in crises: fraud, moral hazard from expected bailouts, biased advice. But crisis requires error somewhere, and probably, of a non-trivial kind. “ When it is too late, the dupes discover scandals...But probably these frauds could never have become so great without the original starters of real opportunities to invest lucratively. There is always a very real basis for the ‘new era’ psychology before it runs away with all its victims” (I. Fisher, 1933).

Trend, cycles, crises

- Sketch of an argument (DH, 1993, DH-PS, 1998, DH-MK-PS, 2001): learning about trends following “structural change”. No attempt to represent whole process, but exploring potential generators of “aggregate mistakes” in simple, standard general equilibrium model.
- Open economy producing two goods, traded (T) non-traded (N). In first approximation, perfectly competitive goods markets and access to international credit with fixed, constant interest rate; risk-free contracts. Capital, traded good, only variable input in sector T; sector N produces with inputs (perishable) of goods T.

Trends, cycles, crises

- Note: while demand for produced traded goods independent of behavior of other agents in the economy, presence of non-tradables makes individual real incomes of residents function of economy's aggregates.
- Consumption modelled as function of perceived wealth (note: agents may be engaged in learning, but “act as if” had perfect foresight. Issue: representation of uncertainty when agents “should know that they don't know” relevant distributions). Investment derived from maximization given expected individual productivity, with “adjustment costs”.

Trends, cycles, crises

- Agents assumed to estimate wealth as function of expected output (in T , function of planned capital stocks) and prices. Expectations of prices of N , as if convergence to perfect foresight solutions given individual's estimates of aggregate wealth and output generated on the basis of those estimates Question: to what extent is learning by agents "model consistent"? In any case, non-trivial problem of representation of the beliefs of other agents, even with very simplified setup.

Trends, cycles, crises

- Disturbance (in system where agents were assumed to have peacefully settled in a presumably permanent steady state...): permanent shock to productivity in T . Agents know that this has occurred; they don't know size of shift and length of period of convergence to new steady state (capital stock does not adjust immediately).

Trends, cycles, crises

- Assumption: after receiving aggregate info, agents extrapolate the economy-wide production of T through a learning algorithm that updates the parameters of a simple auto-regressive process converging to a steady state. Parameters indicate permanent level of output, and speed of adjustment (note: there may be more sophisticated procedures, but also others much less so).

Trends, cycles, crises

- In a “new scenario”, the initial parameters are considered as a guess (see later, on the “persistence of priors” in systems subject to structural change).
- Results obviously depend on agents’ priors. Possibility of non-monotonic evolution of wealth perceptions driven by learning. If agents initially overpredict the steady state output of T , but underestimate the rate of convergence, there may be “positive surprises” in observed output, leading to increases in already too high estimates of consumption capacity.

Trends, cycles, crises

- This basic model can generate cycles in spending, output (of N) based on errors about future incomes. No need for “outside event” for reversal of boom. No news can be bad news.
- However, revisions of expectations during the learning process (after the initial shock) are slow and gradual, and with perfectly elastic credit supply/demand and bankruptcy ruled out by assumption, macro variables also change without large movements. No crises or breakdowns there, but misperceptions can be propagated and amplified by financial mechanisms (see later) and stronger expectational reactions.

Trends, cycles crises

- Issue: where do priors come from. General problem, both analytical and practical: “making statistics out of history”. Question should probably not be: “why agents make errors”, but how and when and with what likelihood large aggregate biases (ex-post) may arise. Practical matter: what “insurance” to buy and at what price for what event...

Trends, cycles, crises

- Related to recent discussions on “paradoxes” in asset prices: equity premium, too low risk-free rates (question, also with practical relevance: how does one actually, and “rationally” identify absence of risk?).
- Standard representative agent “tree models” of asset prices. Risk free bonds offer given stream of consumption goods, equity represented as claim on economy’s output

Trends, cycles, crises

- For the orders of magnitude of observed performance of developed economies “between crises” (say, 2% average per capita growth with a standard deviation of 2%), and a standard risk aversion factor (in the order of 2): calculated risk free rate much larger than observed: there is not enough “risk in the data” to compensate for the incentive to smooth consumption given expected growth.

Trends, cycles, crises

- Various proposed arguments to account for puzzles. One of them (Rietz, 1988, retaken by Barro, 2005 and others): behavior influenced by perception of some likelihood of “rare events” on negative end of distribution (assumes that “bad draw” implies losses on equity but maintains risk-free property of bonds). Portfolio choices in “normal times” more prudent than implied by corresponding distributions.

Trends, cycles, crises

- Question: how to “rationally” anticipate likelihood of rare events. What is relevant sample?
- Issue addressed by Weitzman (2007).
Argument: structural parameters time-varying. Learning does not converge to “true parameters”: when add more observations, old data become obsolete. The size of the “useful” sample does not tend to infinity; priors “never go away”.

Trends, cycles, crises

- Implication: with uncertainty about underlying parameters and Bayesian updating, thickened tail of distribution for projected consumption growth, should create “fear factor effect” on asset returns.
- Result depends on recognition by the agent of the fat tails generated by learning about the distribution of growth rates (W. stresses changes over time of variance).

Trends, cycles, crises

- What may be “right distribution” to project growth, what are the procedures actually used by agents to forecast incomes, in what conditions behavior tends to prudence in case of good news, in which to overreaction, how agents evaluate the precision of their own forecasts, how expectations of different variables interrelated....Much left to be explored in order to account for origins of booms and crises with more precision. Experiments?

Sustainability

- Intuitive concept: ability to repay debts of agent or set of agents implies condition on the present value of primary surpluses, adequately defined (in the case of public sector, for analytical purposes may have alternative evaluations with and without seigniorage revenues). But difficult to give precise definition.
- In macro terms: “precedence” of external sustainability (trade surpluses vs foreign liabilities): solvency of the economy as a whole.

Sustainability

- Sustainability analysis: clearly prospective evaluation by observer of choices made by agents depending on their own expectations. Raising questions about sustainability implies necessarily a comparison of the forecasts of analyst with those of the agents. No “sustainability issues” with perfect foresight, or with strict RE assumption .
- Introducing uncertainty, on the part of agents and analysts, not that simple.

Sustainability

- Bohn (1991): solvency condition generally not equivalent to equality between debt and expected present value of surpluses discounted at risk-free rate. Intuition: risk properties of public debt do matter, specifically the covariances of payments and consumption. In an analysis with complete markets (and a closed economy), the condition would be given by surplus flows valued at state-contingent prices.
- This solvency condition implies assigning a higher relative value to the surpluses generated in bad states, which does not happen in the present value of risk-free-rate discounted expected surpluses

Sustainability

- Several issues raised: treatment of specific risk features of (public) debt, appropriate valuation of future flows of primary surpluses.
- In any case, analysis admits (and stresses) contingent nature of behaviors and contractual promises, but in a RE framework (and, a fortiori, with complete markets), strictly does not admit “sustainability problems”: every decision is optimal given info, and debt payments match exactly the values expected by the parties in the realized states, the probability of which was correctly assessed.

Sustainability

- Standard form of financial contract (esp. for government debt): formally non-contingent stream of payments, with “risk premium” incorporating expectations that in some circumstances full repayment will not be realized.
- Not easy to define “default” precisely, since outcome was implicitly contemplated by parties, but in unspecified conditions.

Sustainability

- Given existence of interest premia, sustainability does not imply generation of surpluses to service debts in “all states” (cf. Mendoza and Oviedo, 2004; also Burnside, 2004). The question may be posed as whether observed yield differentials value “fairly” repayment prospects.
- Non- trivial problem: distributions of (endogenous) macro variables determining “repayment capacity”, parameters that influence incentives to service debts and outcome of potential restructuring (see for example, Jeanneret, 2009).

Sustainability

- In practical terms, for macroeconomic purposes may have to rely on simpler forms of evaluation, taking account of limitations. Value of sensitivity analyses, and attention to endogeneity of variables, particularly interest rates. As rule of thumb: close look at configurations where credit expansions seem to be based on expectations of large productivity increases; recognition that some situations do require large-scale re-definitions of contracts.

Types of crises

- Types of crises. Financial disturbances and associated wealth losses can have a quite large range of intensities; policy responses probably depend on the nature, the diffusion and the magnitude of the shock or disappointment.

Types of crises

- Suggested argument:
 - relatively small shocks can be absorbed by credit and goods markets without calling for specific interventions
 - over some threshold, sustaining output and spending would require stopping the amplification of falls in asset prices through provision of liquidity
 - with stronger shocks, even those measures would not avoid sizable drops in expenditures, and a propagation of defaults of agents with fragile solvency positions: direct government spending could prevent that by sustaining demand (assuming public sector can afford it)
 - In extreme cases, standard monetary and fiscal policies cannot change the fact that widespread bankruptcies have to be dealt with.

Comments on macro models

- Macro requires framework(s) and models to analyze interrelated behavior of multiple agents in intertemporal setups.
- Models of well coordinated optimal behavior (GE) where agents form expectations in correspondence with the stochastic environment they collectively generate (DS, as is understood), given assumed “frictions”, can be useful benchmarks and instruments to represent economies, particularly when working in “normal conditions”.

Comments on macro models

- However, the DSGE analysis raises logical questions, and can hardly address representation of large- scale coordination failures of the type that crises appear to be.
- Logical issues:
 - Lucas critique: what is a regime change for agents presumed to know all relevant distributions. Note: policy shift can produce crisis by strongly disappointing previous expectations...
 - Changes in specification and parameter revisions that modify behavior of agents “inhabiting” the models, that were by construction not contemplated even probabilistically in the pre-existing models where agents decided as if “their” model was to be used for all the future, and were assumed to optimize with rational expectations.

Comments on macro models

- Logical issues:
 - Estimation of current generation models (possibly at frontier of processing capacity of analysts) with past data, as if agents already able to implicitly solve new model to generate forecasts and behavior when the modeller presumed that an older model was relevant.
 - Reasonable practice of studying policy alternatives with sensitivity analysis across models. However, incompatible with RE: in each model, agents presumed to act as if this was uniquely valid.

Comments on macro models

- Some recent developments: models with “expectational shocks” (Beaudry and Portier, 2004, and other papers), treated as “rare events”, more attention to financial propagation mechanisms, possibly together with shifts in expectations (e.g. Christiano, Ilut, Motto, Rostagno, 2008), increasing recognition of learning effects, particularly on growth trends (Boz, Daude, Durdu, 2008).
- Sophisticated practical tools, convenient properties for sets of uses. But not standards of rigor or presumption of general validity.

Comments on macro models

- Questions concretely motivated by crises:
 - Probabilities of large expectational biases in certain sets of circumstances (difficult to discuss about “insurance policies” without notion of hazard chances). Asks for specific analysis of learning, expectations, aiming for practical, usable propositions; also, analysis of microfoundations as behavior of multiple interacting agents.
 - Parameters determining depth, intensity of propagation of financial disturbances. Probably calls for analysis of properties of credit networks (incipient literature in that direction).

Comments on macro models

- Questions motivated by crises:
 - Ways of determining features of events (“types of crises”) to guide policy treatments over time.
 - Specific mapping of tradeoffs to help rationalize policy choices.
- Crises raise essential analytical and practical problems. Important to recognize uncertainty, by agents and analysts, and work on it. Beyond competition of approaches (mark of quite incomplete knowledge), interest in exploring complementarities of “views from different sides”.