



Economic Commission for Latin America and the Caribbean

Macroeconomic effects
of damages on the economy
of the affected country

Natural disasters in the Caribbean

Disaster	Country	Damages
Gilbert (1988)	Jamaica	65% of GDP
Hugo (1989)	Montserrat	200% of GDP
Debbie (1994)	St. Lucia	18% of GDP
Luis and Marilyn (1995)	Antigua	65% of GDP
Georges (1998)	St. Kitts and Nevis	50% of sugar harvest
Lenny (1999)	Barbuda	95% of agricultural crop
Michelle (2001)	Jamaica	1% of GDP

Contents

- Introduction
- Stages in damage assessment and evaluation
- Measurement and valuation of secondary effects
- Summary of general economic effects
- Reconstruction scenarios

Introduction

- Objectives
- Functions of the macroeconomist
- Two approaches to disaster evaluation
- Expected and actual economic performance (Delta)
- Recapitulation of direct and indirect damage
- Financial implications and technical cooperation

Measuring the damage “delta”

Previous situation

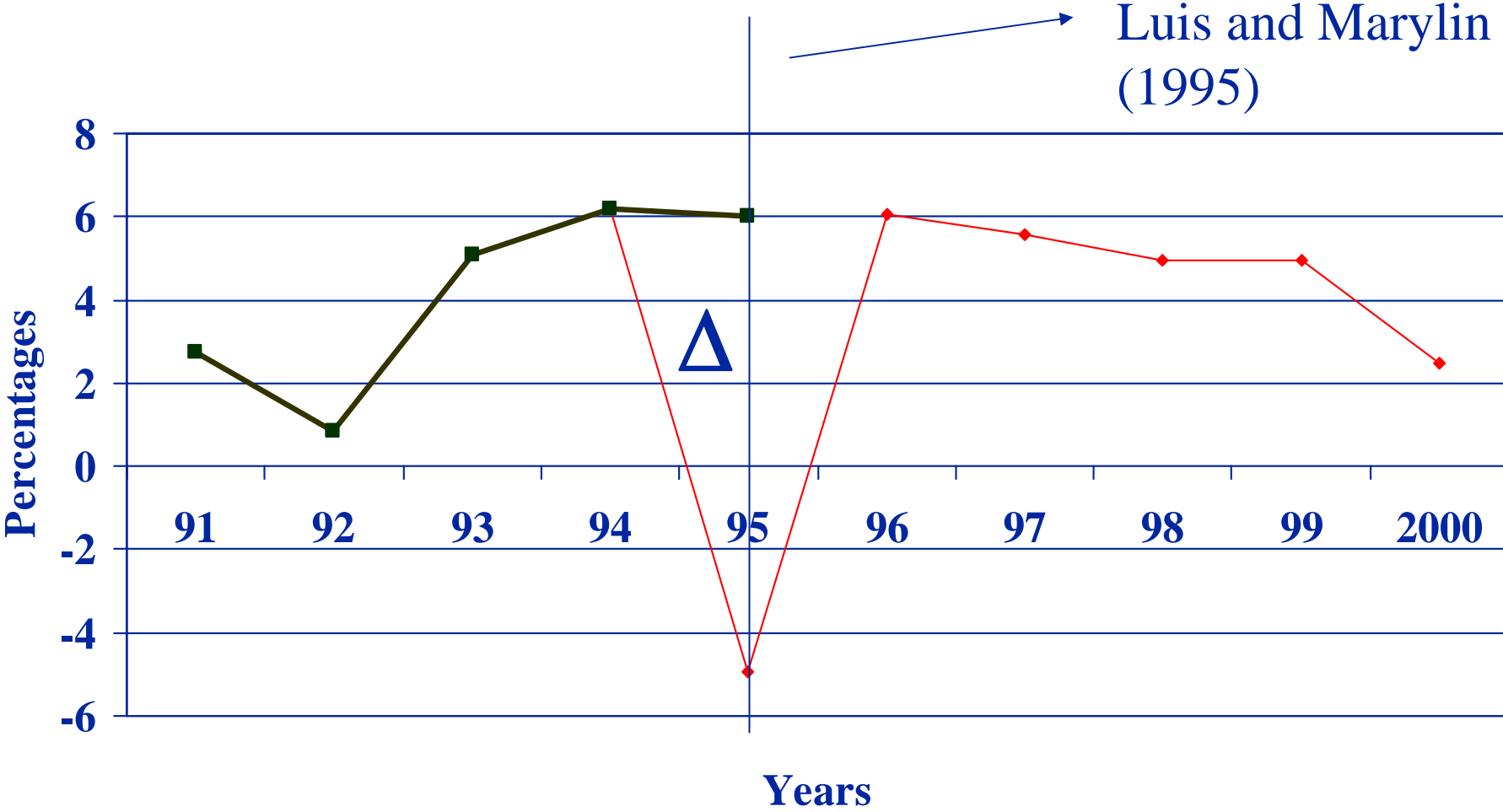
Measurement of direct and indirect damage
on the pre-existing situation (baselines, by sectors)
Differentiation of resulting scenario with the disaster
from that without the disasters
Possibility of several scenarios depending on
reconstruction assumptions

Expected
development in 3 -5
years
(without disaster)

Effect of the disaster
In 3-5 years
(ex post)

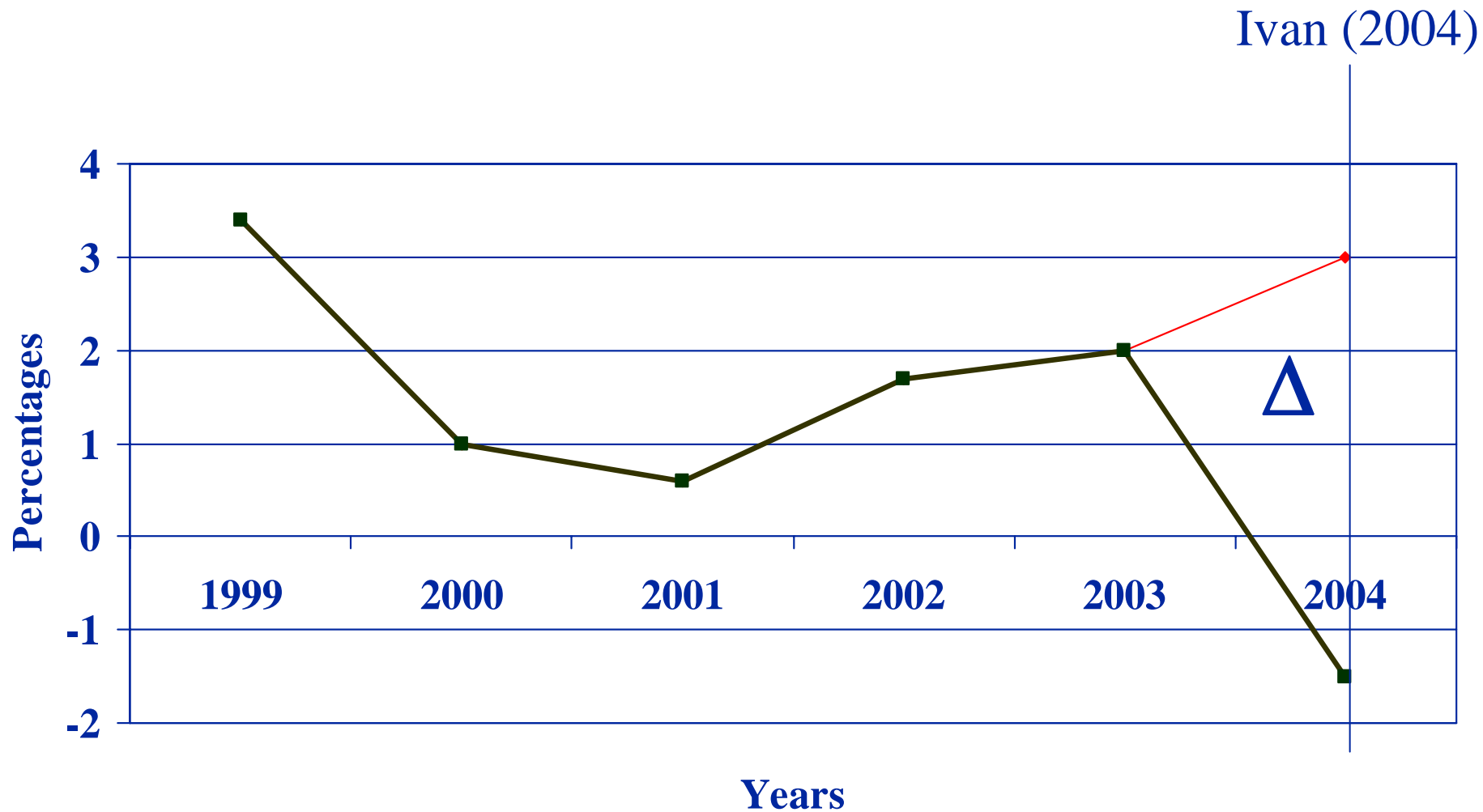
Rate of growth of GDP in Antigua and Barbuda

1991 - 2000

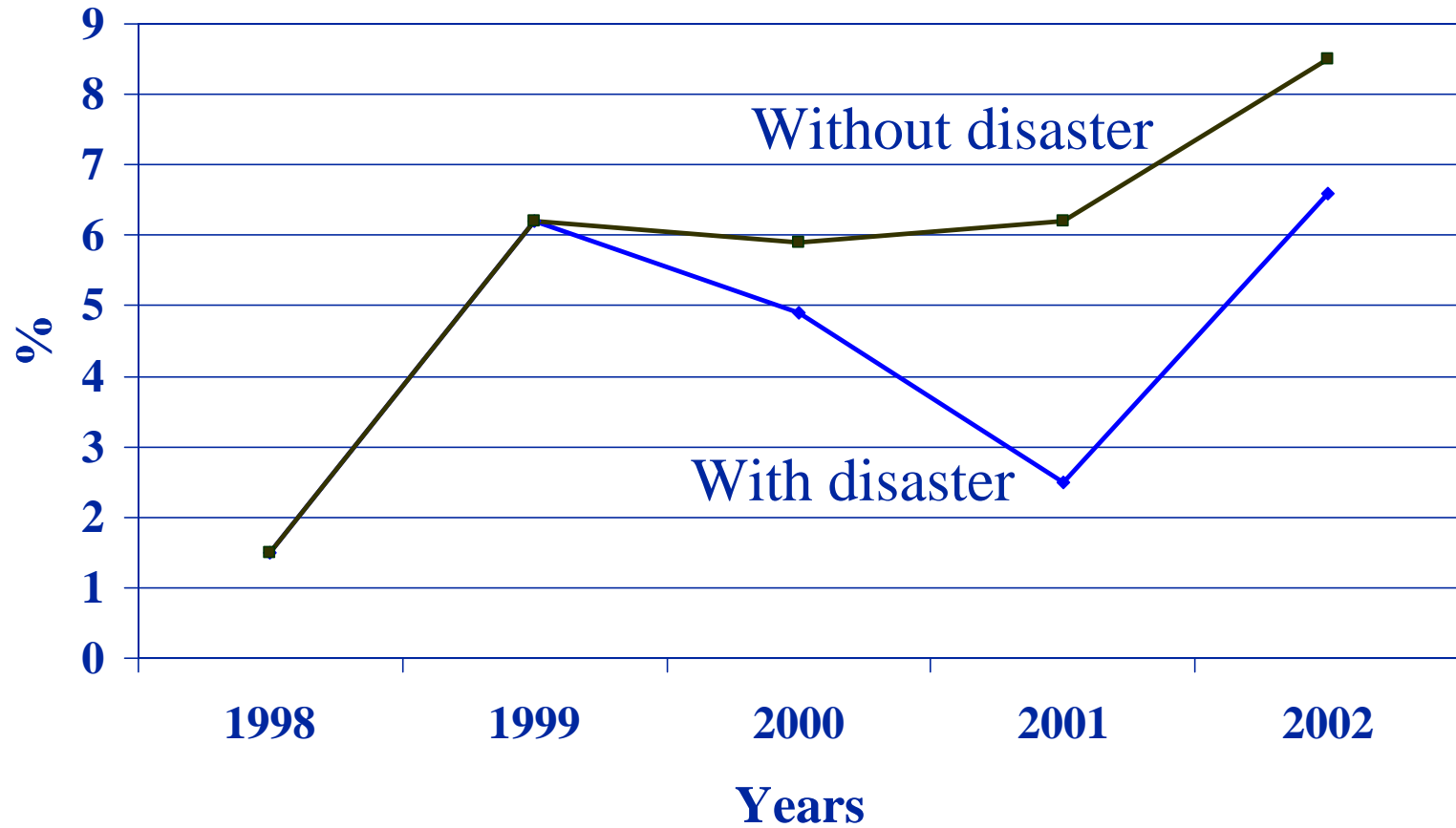


Rate of growth of GDP in Cayman Islands

1999 - 2004



Economic Scenarios



Stages in damage assessment and evaluation

- The pre-disaster situation
- Expected performance of the economy in the disaster year
- Situation following the disaster

Stages in damage assessment and evaluation

The pre disaster situation

Comprehensive understanding of trends prior to disasters

Baselines of the economy

Macroeconomic databases and models

Understanding of projections prior to the disaster

Projection of economic growth after the disaster

Effects on main macroeconomic variables

Stages in damage assessment and evaluation

The expected performance

Most important sources of information:

Target variables

Indices of macroeconomic activity

Budget

Inflation

Unemployment

External sector

Restrictions

Data

Time

Stages in damage assessment and evaluation The post-disaster situation

Present a summary of the economic repercussions of the disaster.

Summary and analysis of damage to fixed assets and estimation of interruption of the production of goods and services. The summary should include the import requirements

Summary of main economic indicators

Stages in damage assessment and evaluation

The post-disaster situation

The Summary analysis is essential for designing restoration and reconstruction programmes and for the orientation of external aid.

The estimation of direct and indirect damage will be provided by the sectoral specialists using the methods described or suggested for each sector.

The damage is assessed at current prices in the year the disaster occurred.

Production values and value added

Secondary effects

Macroeconomic aggregates

- Economic growth
- Investment
- Public finance
- Inflation
- Unemployment
- Debt
- Balance of payments
- Financial variables

Measurement and valuation of secondary effects

1. Economic growth

Measure of economic activity

Obtained on the basis of sectoral data

Obtained at current prices

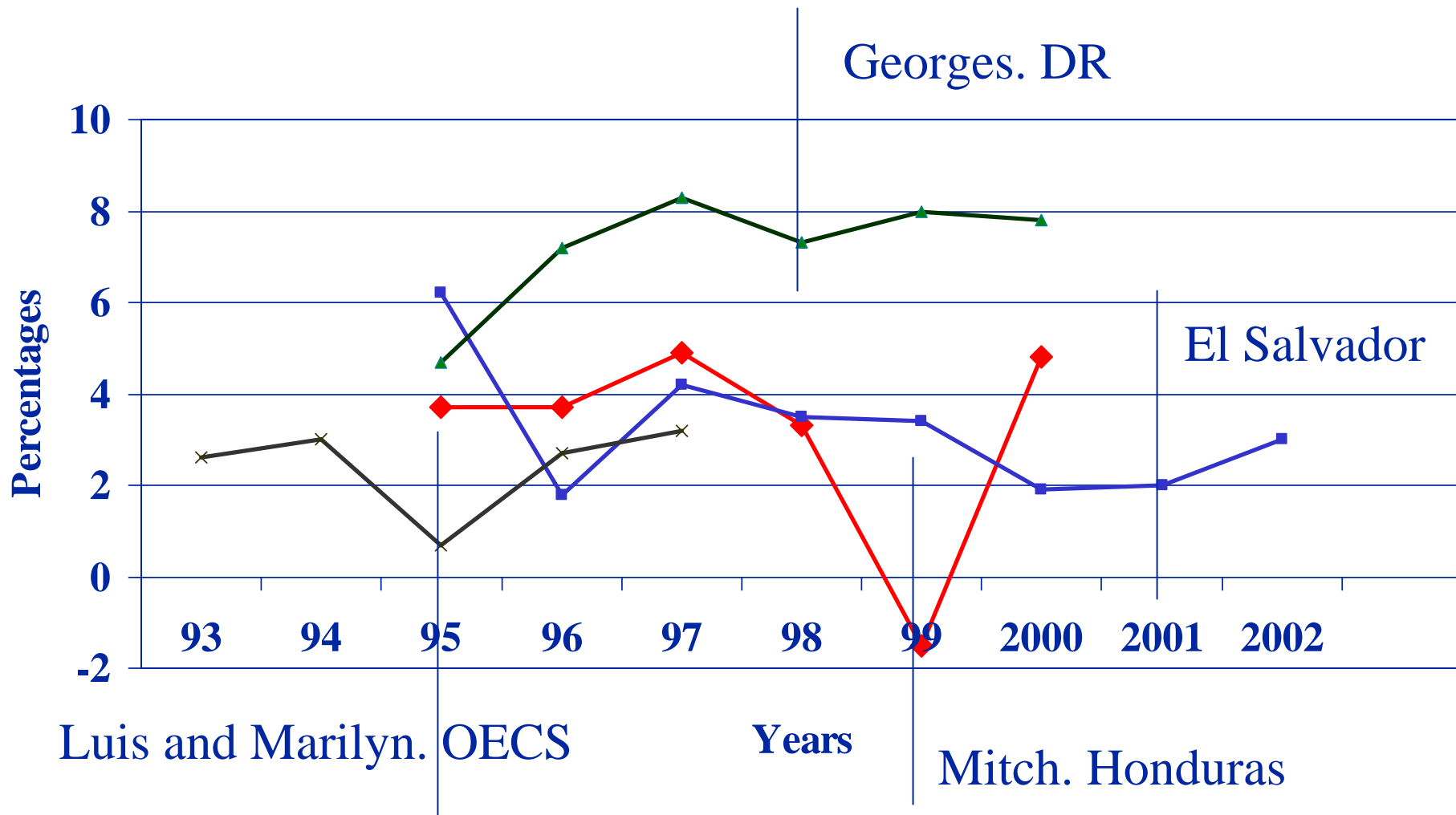
Need to express GDP in constant prices

Use constant disaster year prices.

Time domain for forecasts

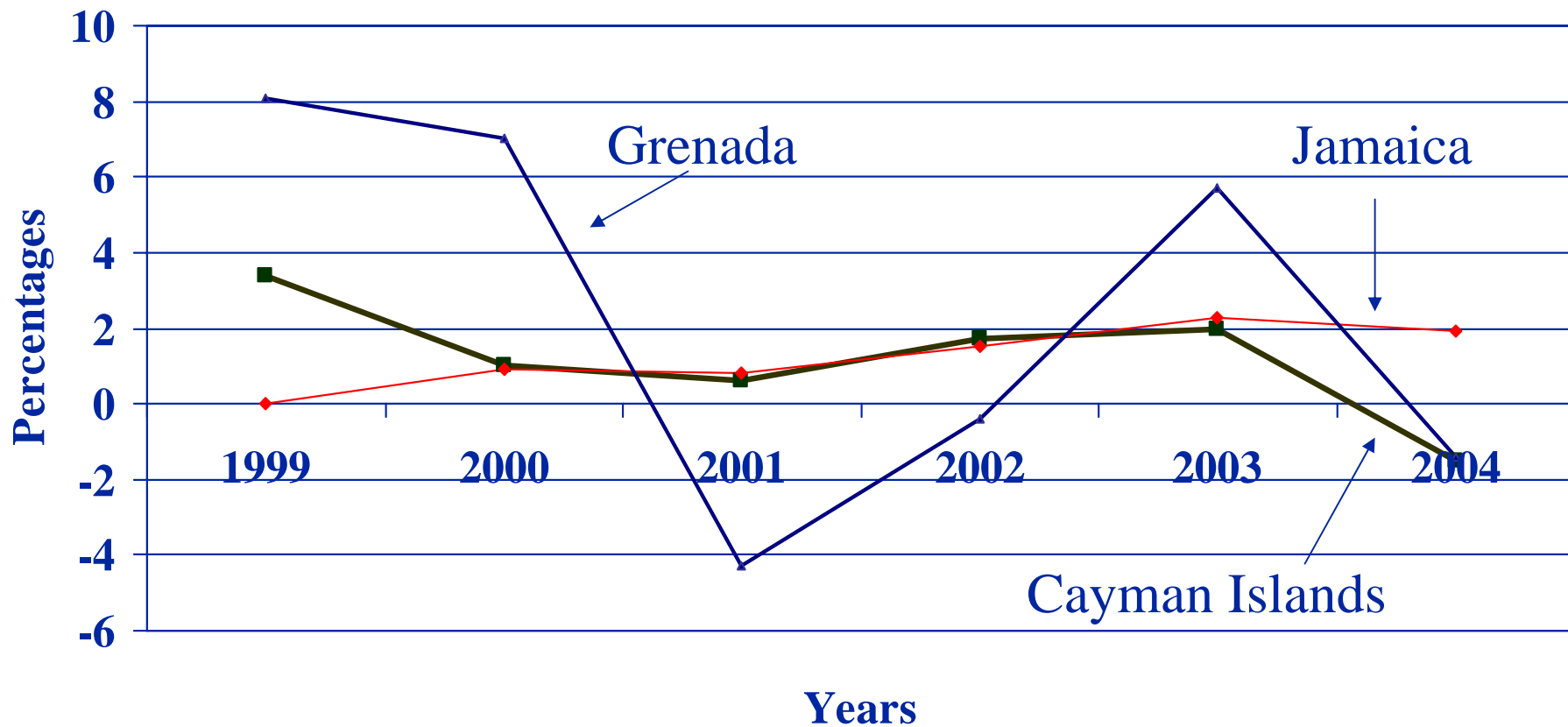
Rate of growth of GDP

Effects of Natural Disasters on different countries



Rate of growth of GDP in States affected by Ivan

1999 - 2004



Measurement and valuation of secondary effects

31 Disasters between 1970-2001

Date/event/magnitude

Preliminary Results

First quarter $g_{t0} > g_{t-1}$ and $g_{t+1} > g_{t0}$

Third and fourth quarter $g_{t0} < g_{t-1}$ and $g_{t+1} > g_{t0}$ (22%).

Measurement and valuation of secondary effects

2. Investment

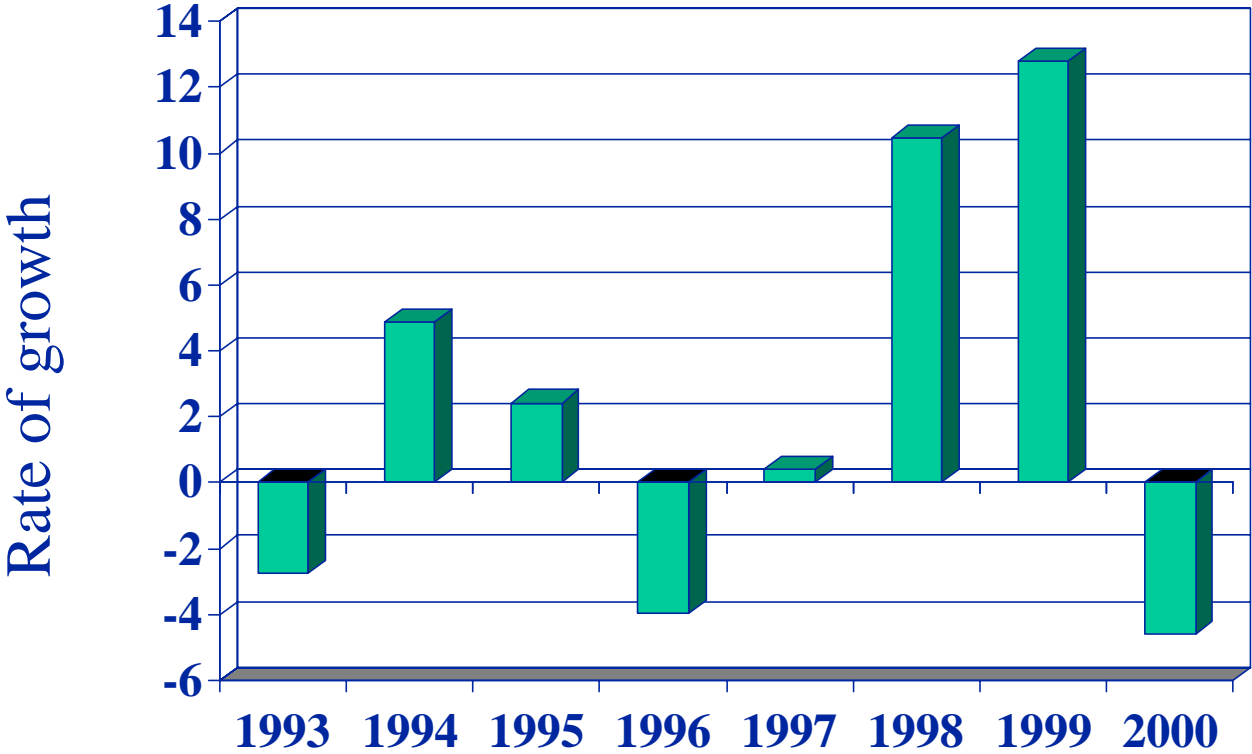
Interruption of investment projects.

Inventory losses

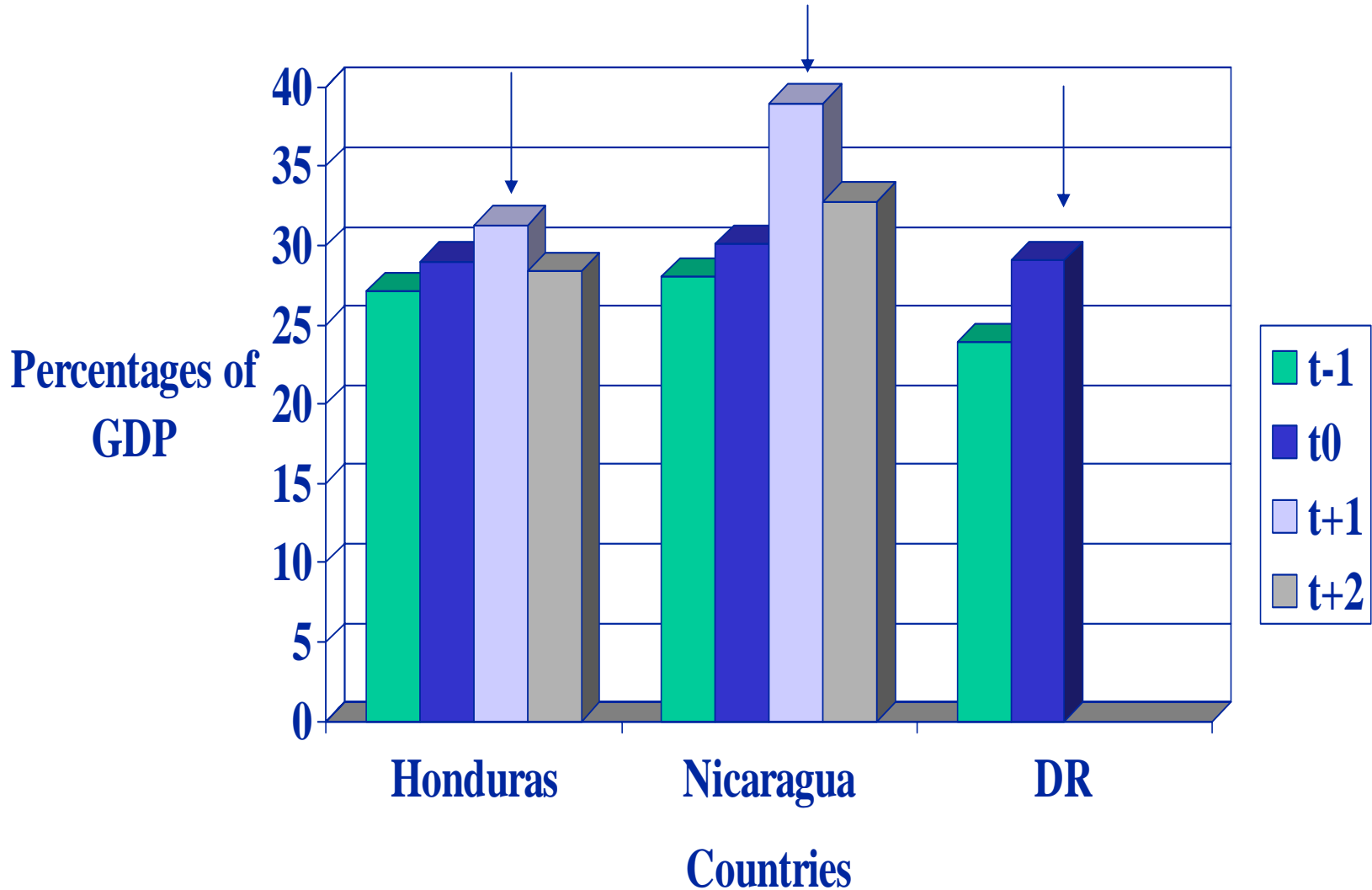
Factory and equipment destruction

Disruption of trade channels

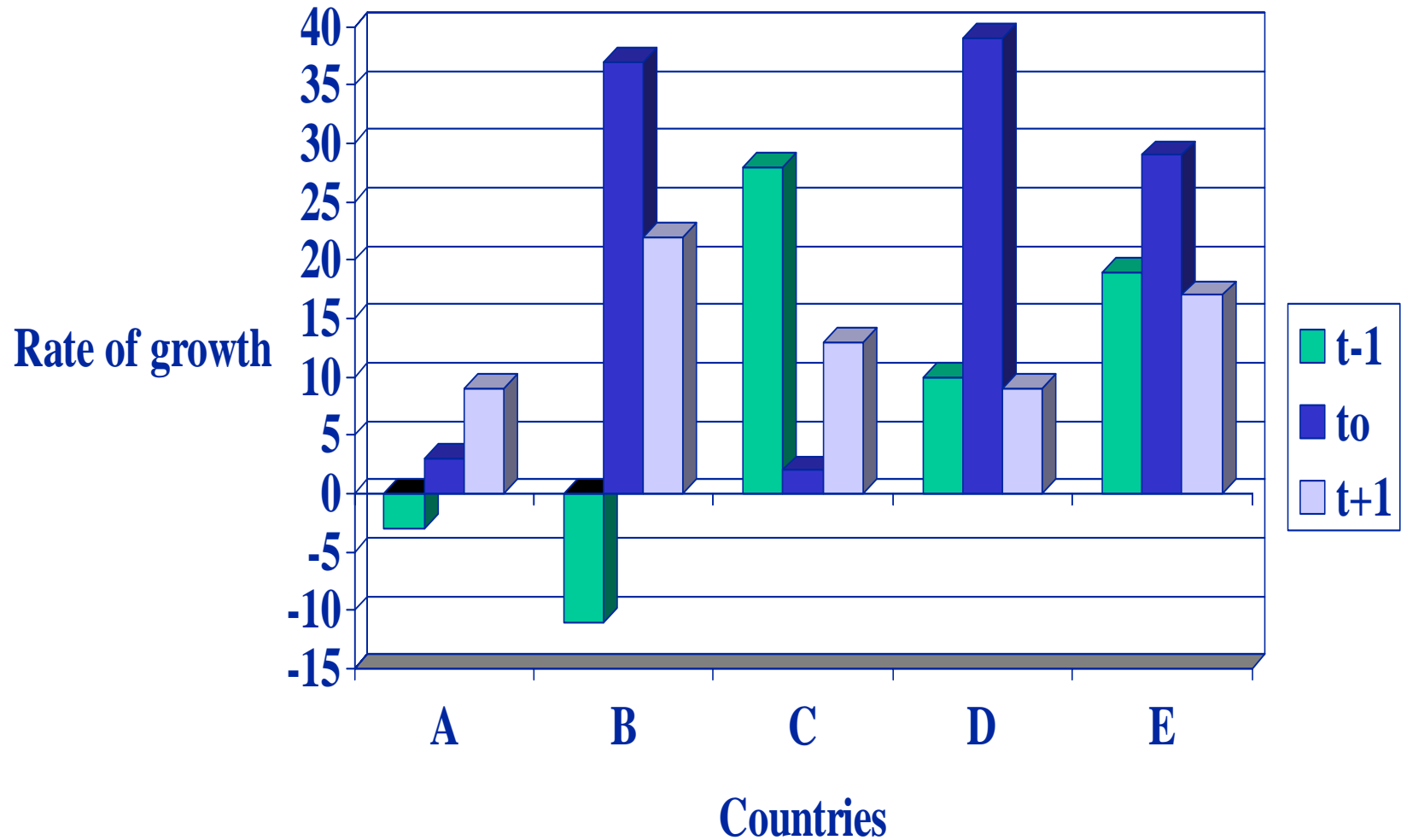
Rate of growth of the construction sector in St. Lucia



Gross capital formation



Gross capital formation



Measurement and valuation of secondary effects

3. Public finances

Composition and presentation of the budget

Resource gap

Fiscal trends (over, undervaluation, debt, policy measures)

Analytical presentation

- Changes in current revenue and expenditure

- Changes in capital expenditure

- Financing needs

Central government budget Grenada

				Pre-Disaster	Post-Disaster
Central government	2001	2002	2003	2004	2004
	In Million EC\$				
Current income	284.85	292.52	323.60	354.90	280.10
Current expenditures	257.97	291.43	285.10	338.40	334.80
Capital account	-116.90	-211.26	-95.90	-78.30	-91.60
Fiscal result	-90.02	-210.17	-57.40	-61.60	-145.00
	As % of GDP				
Fiscal result with grants	-8.40	-19.30	-4.90	-4.80	-12.00
Fiscal results without grants	-12.60	-21.50	-9.90	-9.30	-18.70

Measurement and valuation of secondary effects

3. Public finances

Larger sample

13 out of 26 countries increased their fiscal deficit in
to.

Measurement and valuation of secondary effects

4. Inflation

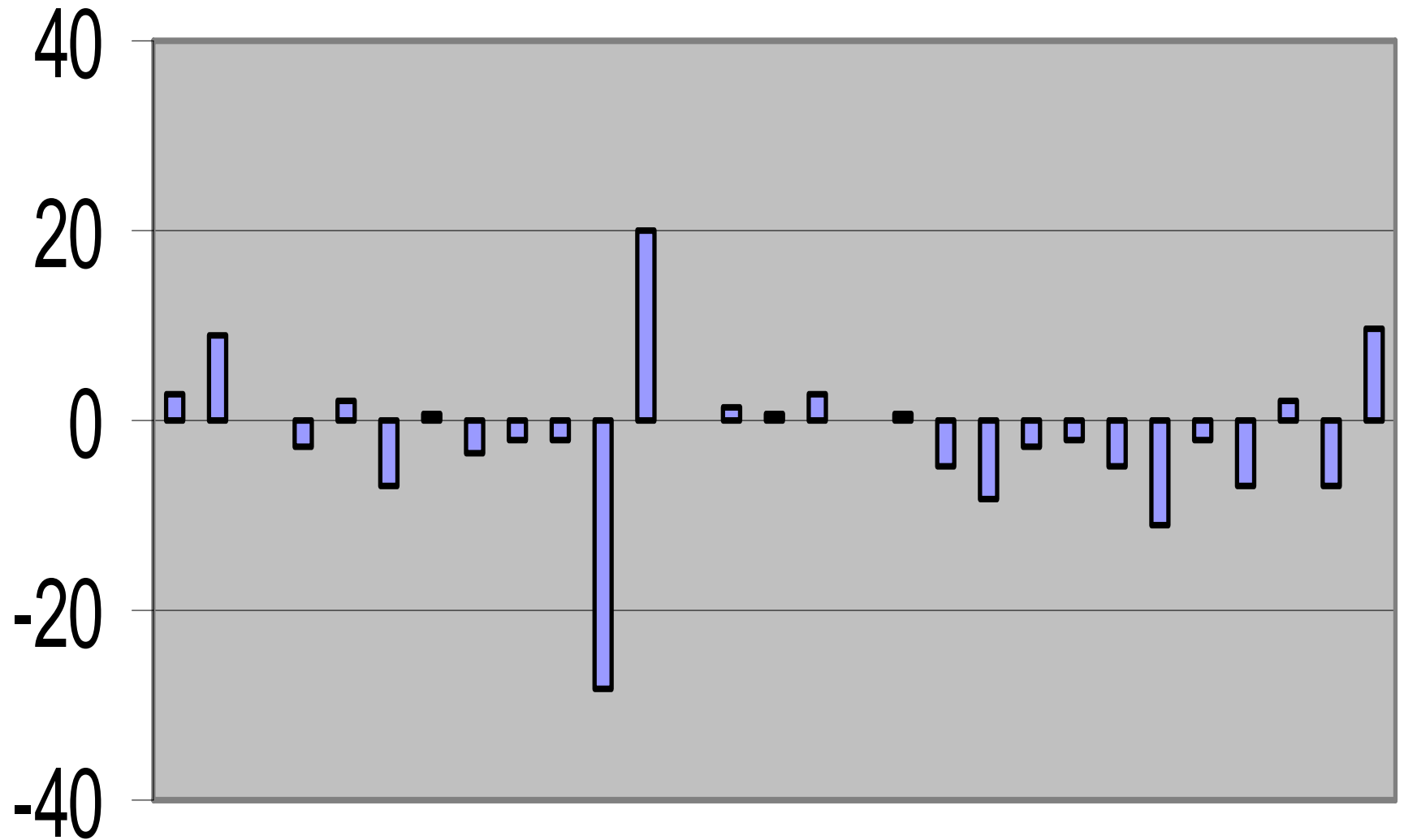
Effect on inflation through supply shortages and excessive liquidity and spending; higher costs.

Decomposition of the price index

No discernible pattern.

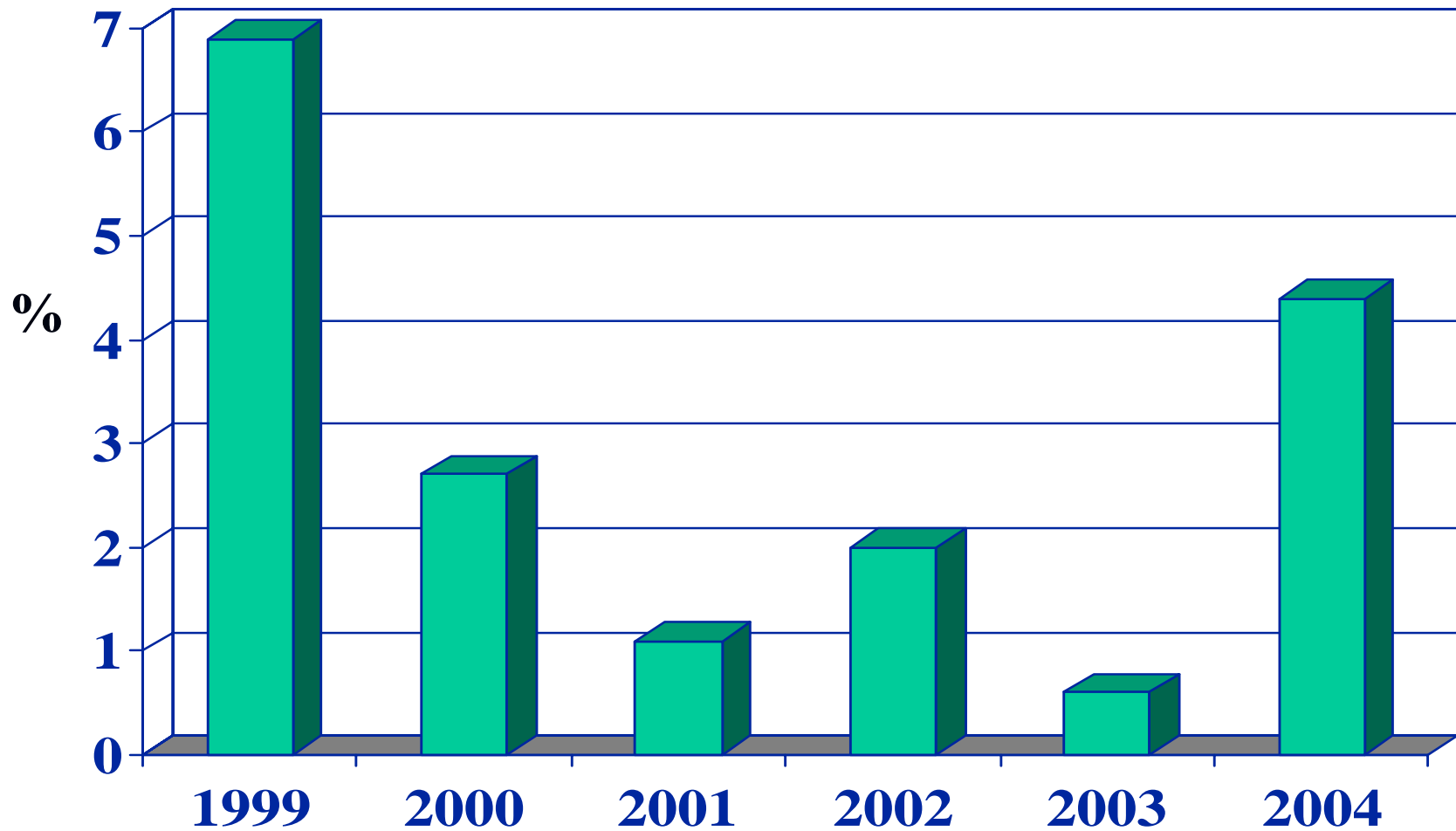
Data availability

Difference in the rates of inflation $t-1$ and t_0



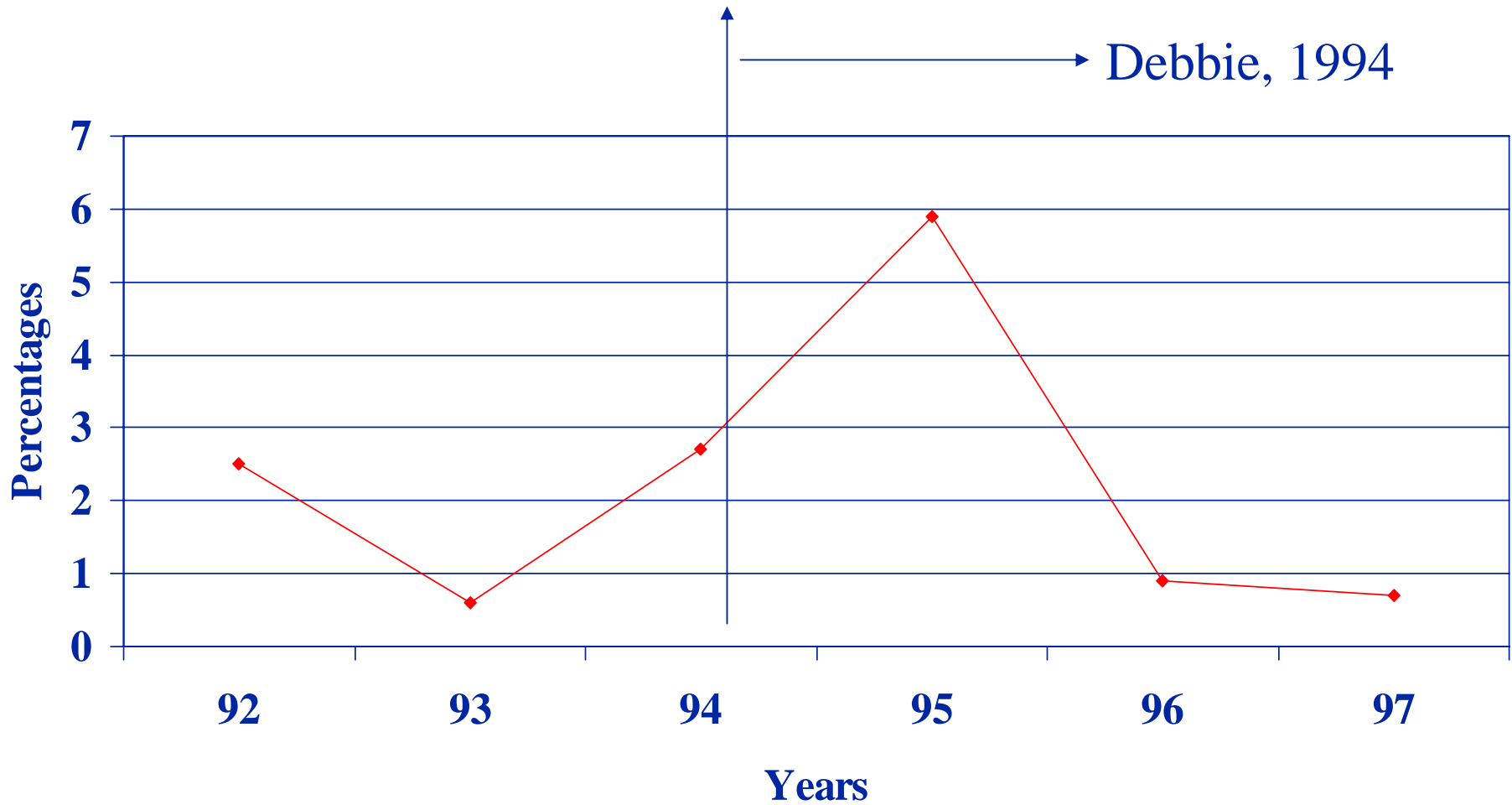
Average rate of inflation in the Cayman Islands

1999 - 2004



Inflation in St. Lucia

1992 - 1997



Measurement and valuation of secondary effects

5. Unemployment

Destruction of productive capacity and growing demand (occupational requirements) for certain types of work during the disaster and the reconstruction phase.

6. Debt

Rise due to emergency loans (experience in Caribbean 1970-1997).

Temporary debt relief and its implications (Dominican Republic, Georges, 1998).

Measurement and valuation of secondary effects

7. Balance of payments

Flows of goods and services

Decrease in exports and service earnings

Increase in imports

Estimation of tariff reduction effect

Insurance and re-insurance

Unilateral transfers

Donations and remittances

Capital and financial account

Estimated on the basis of the needs for medium and long term external financing of restoration and reconstruction

Balance of payments

Dominica 1993-1997

	93	94	95	96	97
Goods	-118	-129	-143	-129	137
Services	48.9	36.4	34.5	64.9	84.0
Income	-17.3	-29.9	-36.0	-53.2	-46.5
Transfers	23.5	19.1	21.2	27.5	28.3
Capital transfers	26.3	23.2	52.3	57.4	60.8
Financial account	53.9	80.5	78.9	26.6	14.2
FDI	35.7	61.1	146.1	48.1	57.0

Balance of payments

Jamaica, 1999-2004

				Pre-disaster	Post-disaster
	2001	2002	2003	2004	2004
Current account balance	-757	-1074	-765	-722	-757
Merchandise balance	-1618	-1871	-1942	-1992	-2103
Exports fob	1454	1309	1386	1588	1541
Imports fob	3073	3180	3328	3581	3644
Services balance	383	315	560	606	576
Income account	-438	-606	-571	-651	-632
Unilateral transfers	916	1087	1189	1315	1402
Financial and capital balance	757	1074	765	722	757
Net foreign direct investment	525	407	374	146
Financial capital	781	1091	765	721	752

Measurement and valuation of secondary effects

8. Financial variables

Net foreign assets will reflect the result of the balance of payments.

Net domestic credit. Changes in liquidity during the reconstruction period.

Financial system's deposits. Shift away from deposits to cash.

Are there macroeconomic patterns of natural disasters?

Limited data

Calendar time

Growth (reconstruction efforts)

Fiscal accounts (decrease in tax revenues, increase in capital expenditures, external financing)

Balance of payments (greater imports, decline in exports, increase in transfers, investment)

Consistency in measurement

Comprises two steps: establishing an audit trail and checking the consistency of the data

Establishing an audit trail

Purpose of an audit trail

Criteria for the evaluation of the damage

The process of data reconciliation

Sources of data discrepancies

Rules of thumb to check data

Summary of general economic effects

Summary appraisal of the disaster's repercussions

Losses on existing assets

Interruption of flows of income and increased expenditure

Secondary effects

Summary table

Identify the order of magnitude of damages

Capture the effects on private and public sectors

Present the import requirements

II. DAMAGES OR IMPACT TO BE ESTIMATED, QUANTIFIED, VALUED

SECTOR	External impact	MACROECONOMIC IMPLICATIONS
PRODUCTION SECTORS		
Farming (including livestock, fishing, forest resources)		
Industry		
Comerce		
Services		
- Finance and banking		
- Tourism		
- Personal		
INFRAESTRUCTURE		
Water(drinking irrigation, drainage, sanitation and water disposal).		
Energy(generation, transmission, distribution)		
- Electricity		
- Others (oil, gas, etc.)		
Transportation and communications		
Social Aspects		
Education		
Health		
Housing and human settlements		
Cultural Heritage		
Social conditions (social fabrics: employment, etc.)		
Environmental aspects		
TOTAL		
Fiscal implications		
- Income		
- Revenue		

III. MACRO IMPACT/ GLOBAL (current value)	Ex-ante situation (current period)	Resulting situation Ex-post (current period)	Short run and medium run projections
1. GDP			
EXTERNAL BALANCE			
- Exports			
- Imports			
A - TRADE BALANCE			
B - CURRENT BALANCE AND CAPITAL ACCOUNT			
- Net credits			
- Donations			
- Private current transfers			
- Other income			
2. FISCAL BALANCE			
- Revenue			
. Expenditure			
3. CAPITAL ACCOUNT			
- Gross capital formation			
- domestic investment			
- foreign direct investment			

Summary Table

Belize

Keith

Summary. Estimate of damages Belice, Keith (2000)	
Total damage as % of GDP	45.7
Total damage as % of exports	78.8
Direct damage as % of gross capital formation	92.0
Indirect damage as % of consumption	12.7

Summary of general economic effects Jamaica (Michelle, 2001)

Type of damage	Short term	Medium term	Long term
Agriculture	Price increase Loss of livelihoods	Economic hardship in recuperation	Changes in employment
Housing	Loss of assets Displacement	Opportunity to rebuild	Changes in location
Infrastructure	Loss of installed capacity	Fiscal effects Reconstruction	

Scenarios

In the scenarios it is important to take into account the reconstruction costs, emergent reconstruction priorities and reconstruction strategies.

The scenarios should take to account suppositions regarding the capacity of absorption of the economy of external resources and also its institutional development.

The scenarios should be based on historical performance of variables and should include the reaction of economic variables to changes in the level of available resources.

Scenarios

The recommended scenarios are:

Optimist

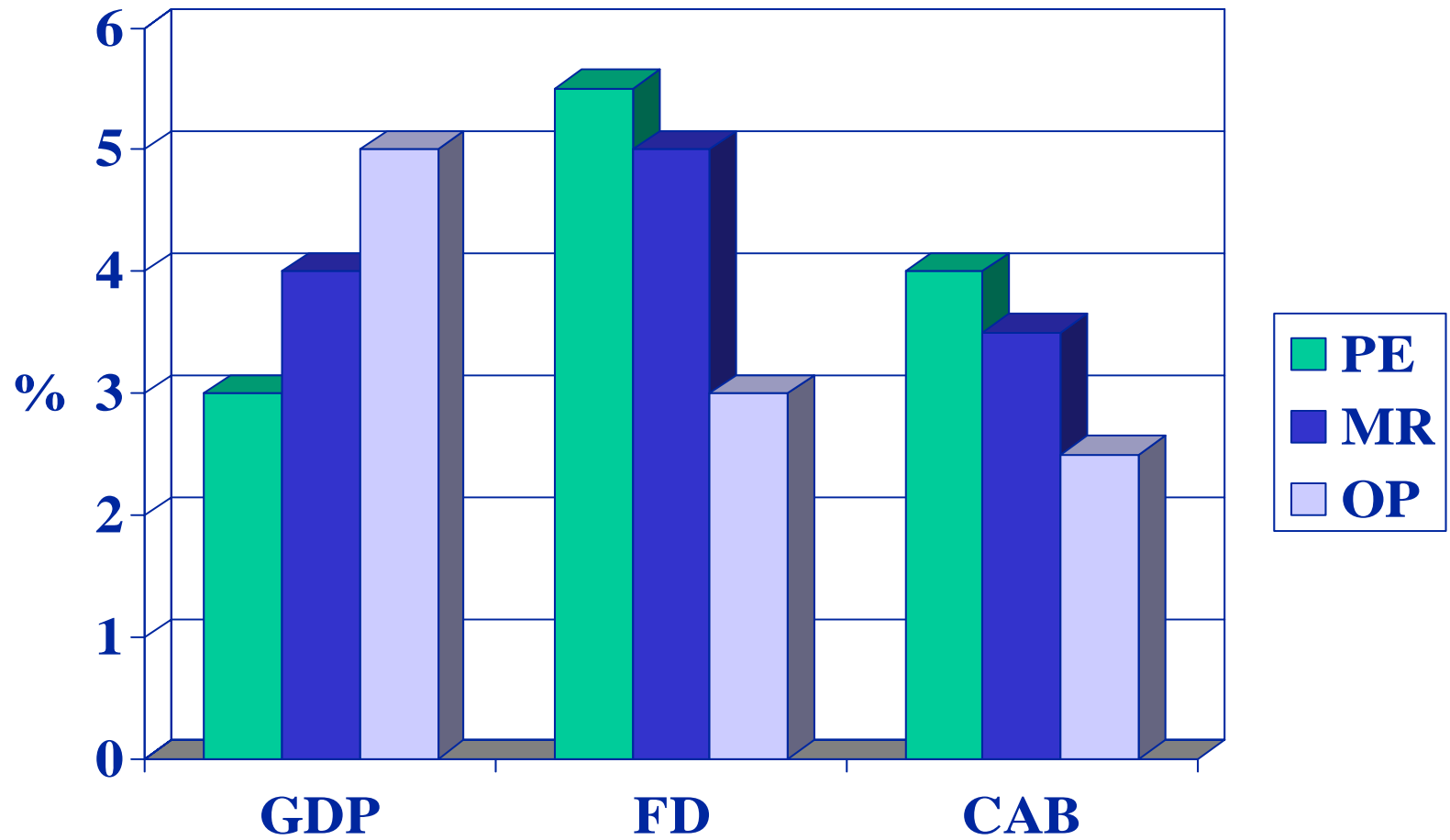
Middle of the road

Pessimist

Assumptions for each scenario and implications

The basis for estimating scenarios depends on the magnitude of external resources. This will determine the level of public expenditure and investment.

Scenarios 2001



Macroeconomic Models

Consistency models

Stock-flow and circuit approach

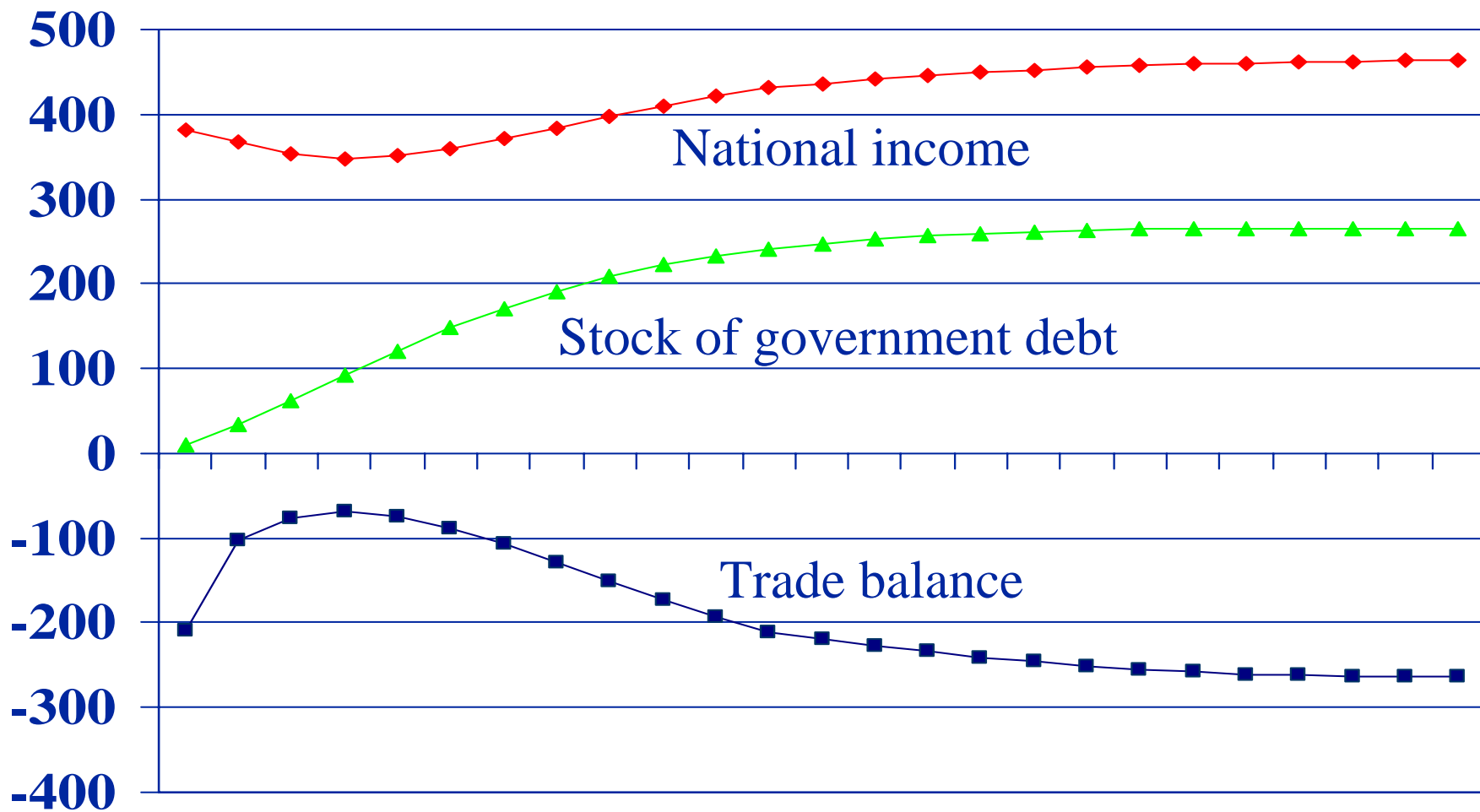
Compatibility of set of economic configurations

Fixing some parameters (fiscal stance, elasticities)

Consider data limitations

Macroeconomic Models

Preliminary results



Requirements for a good evaluation

- ✓ Define clearly the areas and sectors of damage
- ✓ Define the links between the areas of damage and the main macroeconomic variables
- ✓ Define clearly the criteria to value the damage
- ✓ Use real as opposed to nominal magnitudes
- ✓ Identify strategic information sources
- ✓ Recapitulation of damage

Self-assessment

- ✓ Explain direct, indirect damage and secondary effects.
- ✓ Why is it necessary to have a knowledge of the economic prior to the natural disaster and what indicators would you use to assess the performance?
- ✓ What are the main purposes of summary table?
- ✓ What is the meaning of gross value of production and value added.
- ✓ Describe ways to check the consistency of the data.
- ✓ List the requirements of a good evaluation.
- ✓ Describe the elements to take into account when providing alternative reconstruction scenarios.

Exercise

- Using the information provided in tables D.1.6 to D.1.8.
 1. Provide an analysis of the summary of the damage.
 2. Present an overview of the pre-disaster situation.
 3. Analyse the impact of the disaster on the productive sectors.
 4. Assess the overall magnitude of the disaster on the basis of the summary tables.

Exercise

- Summary damage (Tables 1 and 2)
 1. Total damage is estimated at BZ\$ 560 million.
 2. Direct damage is 423 million and represents 75% of the total.
 3. Indirect damage is 136.8 million.
 4. Most of the affected sectors are the productive sectors.
 5. Tourism and agriculture represent over 47% of the direct damage.
 6. Losses of infrastructure account for 16% of total damage.

Exercise

- Summary damage
7. Damage to the social sectors is as significant as damage to infrastructure.
 8. The most important damage occurred in housing (12% of the total damage).
 9. As shown in table 2 direct damages are equivalent to 93% of gross capital formation.
 10. Indirect damage is 46% of savings and 12% of consumption.

Exercise

- The pre-disaster situation (Tables 2, 3 and 4)
 1. Rapid growth in 2000.
 2. Total exports increased 27% in the first quarter 2000.
 3. Total imports increased 18% in the same period.
 4. The trade deficit increased 97.5 BZ\$ million in the second quarter.
 5. Fiscal deficit for 1999-2000 was estimated at 0.6% of GDP.

Exercise

- Impact on productive sectors (Tables 1 and 4)
 1. The agricultural sector would suffer moderately (-1%) and reflect the decrease in output of sugarcane (-6%).
 2. Manufacture would benefit (1% without Keith and 3% with Keith).
 3. Construction would benefit. 19% without Keith and 26% with Keith.

Exercise

- Impact on productive sectors
 1. Electricity and water will experience a negative growth rate. 2.2% without Keith and -6.3% with Keith.
 2. In the service sector the rate of growth without Keith was estimated at 5% and at 4.5% with Keith.

Exercise

- Fiscal Impact (Table 5)
 1. Decrease in the rate of growth of total revenue from 22% in 1999-1998 to 12% in 2000-1999.
 2. Increase current expenditure from 6% to 78% in the same period.
 3. Increase in capital expenditure from 15% in 1999-1998 to 110% in 2000-1999.
 4. Fiscal deficit would increase from 0.% to 3.2% of GDP.

Exercise

- Economic Growth GAP

