CGE Modeling and Developing Economies: A Concise Empirical Survey of 73 Applications to 26 Countries

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1. INTRODUCTION

In the last decade, there has been a proliferation of computable general equilibrium (CGE) models applied to developed and developing countries. In the case of the developing countries, this phenomenon is consistent with the overall observation that when it comes to economic-policy implementation, policy makers are increasingly relying upon the working of market forces and incentives rather than putting their faith in the outcome of centrally planned allocation procedures. CGE models, given their theoretical framework, are indeed better suited to simulate decentralized economic policies than alternative forms of modeling, such as linear programming and other resource-gap models, which have traditionally constituted the mathematical underpinnings of central economic planning.[1]

The basic theoretical framework of CGE models is well known: It is the modern version of Walras' model of the competitive economy. As such, in most CGE models found in the literature, only relative

[1]For a discussion of the relevance of CGE modeling for the analysis of development policies, see Dervis et al. (1982).

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prices matter, producers are profit maximizers facing nonincreasing returns of scale, consumers are insatiable utility maximizers, and production factors are paid according to their marginal-revenue productivity. The model's solution provides a set of prices, which, by making all these individual optimizations feasible and mutually consistent, clears all markets simultaneously.

However, CGE models are not mere numerical illustrations of Walras' model of the competitive economy. Given the fact that their main function is to simulate economic policies, they naturally have to include some modeling of the government or public sector. This in turn automatically introduces some degree of imperfect competition *lato sensu* through price-fixing, quantity controls, or transfer and taxation policies. Moreover, a nonneoclassical feature often found in CGE models is the absence, in certain parts of the economy, of price-responsiveness, whether in supply or demand. In short, CGE models apply to a spectrum of situations ranging from cases where, strictly in the Walrasian tradition, all prices are flexible, there is no rationing, and price-induced substitution in production, and consumption is the rule, to very un-Walrasian cases where price-fixing, rationing, and structural rigidities prevail. Those confronted with this second type of situation often call their model CGD, instead of CGE, with D standing for disequilibrium.

In this paper, we review 73 applications of CGE models to 26 different developing countries (Table 1). The emphasis is on the economic structure and the policy simulations of the models, and not on the econometrics and solution algorithms that were used by the various authors.[2] These countries vary greatly in terms of standard of living, degree of industrialization, relative openness to external trade, importance of the public sector, and nature of the policies pursued. Excluded from the survey are world CGE models where developing countries appear as one aggregated region or as a set of geographical

[2]For a survey of CGE models applied mainly to developed countries, see Shoven and Whalley (1984). On the econometrics of CGE models, see Jorgenson (1984) and Mansur and Whalley (1984). For a classification of 19 CGE models according to their solution algorithms, see Manne (1985). Our survey, although representative of the current state of the art, is not necessarily exhaustive: In their bibliography of CGE models applied to developing countries, Devarajan et al. (1986) list Costa Rica and Senegal as countries for which CGE models were constructed within the World Bank. Moreover, there exist several unpublished Ph.D. dissertations that are also national applications. For other surveys, see Borges (1986), de Melo (1987), Robinson (1986), Ginsburgh and Mercenier (1987), and de Janvry and Sadoulet (1986).

Table 1. 73 Applications to 26 Countries

Study no.	Country	Authors[a]	Model's name (if existent)
1	Argentina	Feltenstein (1980)	
2		Feltenstein (1983)	
3	Brazil	Taylor et al. (1980)	
4		McCarthy (1981)	
5		Adelman and Robinson (1987)	
6		Sadoulet and de Janvry (1985)	
7	Bangladesh	Keyser (186)	
8	Cameroon	Benjamin and Devarajan (1984)	
9	Chile	Taylor and Black (1974)	
10		Dick et al. (1984)	
11		Condon et al. (1985)	
12		Caballero and Corbo (1985)	
13	Colombia[b]	de Melo (1977)	
14		de Melo (1978)	
15		de Melo and Robinson (1980)	
16		Mayer (1983)	
17	Colombia, Ivory Coast, Kenya	Dick et al. (1983)	
18	Egypt	Eckaus et al. (1979)	GEM 1,2,3
19		Eckaus and Mohie-Eldin (1980)	GEM 1,2
20		McCarthy (1983)	GEM 2
21		Ahmed et al. (1985)	MISR 2
22	India[c]	Mohan (1984)	
23		de Janvry and Subbarao (1984)	
24		Taylor et al. (1984)	
25		Blomqvist and Mohammad (1986)	
26		Narayana et al. (1987)	
27	India, Kenya, Turkey	Gupta and Togan (1984)	
28	Indonesia	Gelb (1985a)	
29		Gelb (1985b)	
30	Ivory Coast[d]	Michel and Noël (1984)	
31	Kenya[e]	Blomqvist and McMahon (1984)	
32		McMahon (1986)	
33		Mwega (1986)	
34	Liberia	Hartley and Estache (1984)	Liberia I
35	Malaysia	Ahluwalia and Lysy (1981)	
36	Mexico	Gibson et al. (1982)	
37		Kehoe and Serra-Puche (1983)	Megamex
38		Serra-Puche (1984)	Megamex
39		Kehoe et al. (1984)	Megamex
40		Kehoe and Serra-Puche (1986)	Megamex
41		Levy (1987)	
42	Morocco	Mateus (1988)	
43	Nicaragua	Gibson (1985)	
44	Nigeria	Taylor et al. (1983)	
45	Pakistan	McCarthy and Taylor (1980)	

Table 1. (*continued*)

Study no.	Country	Authors[a]	Model's name (if existent)
46	Philippines	Clarette and Whalley (1985)	
47		Clarette and Roumasset (1987)	
48	South Korea	Adelman and Robinson (1978)	
49		Adelman et al. (1979)	
50		Chao et al. (1982)	Prolog
51		Kubo et al. (1983)	
52		Adelman and Robinson (1987)	
53	Sri Lanka	de Melo (1982)	
54		Blitzer and Eckaus (1986)	
55	Thailand	Grais (1981)	SIAM I
56		Drud and Grais (1983)	SIAM I
57		Grais (1983)	SIAM II
58		Sussangkarn (1983)	Variant of SIAM II
59		Amranand and Grais (1984)	SIAM II
60		Taylor and Rosensweig (1984)	
61		Devarajan and Sierra (1985)	
62		Bovenberg (1986)	
63	Tunisia	Cherif (1984)	
64		Bousselmi et al. (1985)	TANIT 83
65		Bousselmi et al. (1987)	TANIT 83
66	Turkey[f]	Dervis (1975)	
67		Dervis et al. (1982)	TGT
68		Dervis (1983)	TGT aggregate
69		Grais et al. (1986)	TQR
70		Lewis and Urata (1984)	
71		Lewis (1985)	
72	Venezuela	Boureuignon et al. (1983)	
73	Yugoslavia	Robinson and Tyson (1985)	

[a]Complete reference given in References, Part A.

[b]For Colombia, see also study 17.

[c]For India, see also study 27.

[d]For Ivory Coast, see also study 17

[e]For Kenya, see also studies 17 and 27.

[f]For Turkey, see also study 27.

subregions, such as, e.g., in Ginsburgh and Waelbroeck (1981), Hamilton, et al. (1984), and Deardorff and Stern (1986).

For each of the 73 applications—55 of which are less than 5 years old on the basis of their publishing dates—our survey focuses on:

1. The treatment of the production, private consumption, and external trade blocks (Section 2).
2. The type of macroeconomic closure and the sources of dynamization, if any (Section 3).
3. The nature and results of the simulations (Section 4).

We have assumed that the reader is already familiar with current economic modeling concepts and methods, and thus our presentation is intentionally space saving. Intensive use is made of synoptical tables, and the text is reduced to a minimum, avoiding the duplication of the information already contained in the tables.

2. THE TREATMENT OF THE PRODUCTION, PRIVATE CONSUMPTION, AND EXTERNAL TRADE BLOCKS

1. Production (Table 2)

The level of activity disaggregation is highly variable. Disaggregations with more than 10 activities generally correspond to traditional national accounting classifications with, in some cases, additional breakdowns between, e.g., staple and cash crops [30], formal and informal manufacturing activities [57], etc.[3] Small activity disaggregations tend to correspond to economic (versus accounting) breakdowns: tradables and nontradables, government-regulated and unregulated activities [e.g., 21]. Nested production functions (i.e., assuming intermediate input complementarity and primary factor substitutability) permit the distinction between gross and net (or value-added) production prices, which are particularly useful for commercial policy simulations where one looks at the differential impact of tariff and nontariff barriers on nominal and effective protection rates [e.g., 9 and 14].

2. Private Consumption (Table 3)

The degree of consumer disaggregation is highly variable (in general, however, not exceeding 15 consumer groups). The Geary–Stone linear and Carlevaro nonlinear expenditure systems permit a distinction between committed expenditures (which are fixed in volume) and un-

[3]The 1- or 2-digit number in brackets refers hereafter to the individual study numbers given in tables 1 to 8.

Table 2. Production

Countries		Argentina			Brazil		Bangladesh	Cameroon		Chile					Colombia				Egypt					India				Indonesia		Ivory Coast		Kenya		Liberia	Malaysia
Study no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Characteristics																																			
A. *Number of activities*	23	3	25	8	—	10	19	11	35	10	5	3	15	15	8	6	12	12	12	12	9	3	7	5	2	10	4	6	6	15	2	4	9	3	5
B. *Production factors*																																			
Aggregated value added																										x									
Aggregated capital and aggregated labor[1]	x	x		x			x		x			x						x	x	x															x
Aggregated capital and disaggregated labor according to[2]:																																			
qualification, schooling			x		x	x		x		x			x	x	x	x									x					x				x	
																					x		x							x	x	x		x	
rural, urban			x		x	x		x					x	x	x																				
status in the firm or property rights															x																				
government controlled or not																															x				
not specified											x						x										x								
Also land:																																			
aggregated				x			x			x						x		x	x	x	x	x			x										
disaggregated																											x					x			

C. *Production functions*																																			
Generalized Leontief	x	x					x																x												x
Cobb-Douglas generalized									x			x																							
nested				x				x	x				x	x	x			x	x	x	x							x	x	x				x	
CES generalized										x															x						x	x			x
nested			x		x				x		x											x													
Nested CRESH																x	x										x								
Others or not specified						x																		x		x		x	x				x		

[1]Capital and labor are said to be disaggregated in Table 2 when their disaggregation is different from that of production. As such, what we call aggregated capital and labor can, in some of the studies, be activity-specific.

[2]Non-mutually exclusive.

Table 2. (*continued*)

Countries	Mexico			Morocco	Nicaragua	Nigeria	Pakistan	Philippines	South Korea		Sri-Lanka			Thailand				Tunisia				Turkey					Venezuela	Yugoslavia
Study no.	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Characteristics																																						
A. *Number of activities*	8	14	14	21	15	10	40	6	4	11	7	7	29	29	6	8	—	7	9	4	4	22	3	22	4	6	6	18	15	15	12	19	7	8	13		65	18
B. *Production factors*																																						
Aggregated value added																				x	x													x				
Aggregated capital and aggregated labor[1]						x						x							x						x				x	x					x		
Aggregated capital and disaggregated labor according to[2]:																																						
qualification, schooling							x			x			x	x		x	x	x				x	x	x			x											x
																		x								x	x	x			x							
rural, urban	x	x	x	x	x			x			x		x	x	x	x	x																					
																						x		x		x												
status in the firm or property rights								x								x																						
government controlled or not																																x	x					x
not specified																																			x		x	
Also land:																																						
aggregated																		x				x	x	x		x												
disaggregated	x									x																												

C *Production functions*																																						
Generalized Leontief	x											x								x	x																	
Cobb-Douglas generalized					x				x		x																											
nested		x	x	x						x			x	x	x			x										x					x		x			x
CES generalized									x																x						x							
nested							x						x			x	x					x	x	x		x	x		x	x		x		x	x	x		
Nested CRESH																																						
Others or not specified						x		x											x																		x	

[1]Capital and labor are said to be disaggregated in Table 2 when their disaggregation is different from that of production. As such, what we call aggregated capital and labor can, in some of the studies, be activity-specific.

[2]Nonmutually exclusive.

Table 3. Private Consumption

Countries	Argentina			Brazil			Bangladesh	Cameroon		Chile			Colombia,					Egypt				India						Indonesia			Ivory Coast		Kenya		Liberia	Malaysia
Study no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Characteristics																																			
A. *Number of consumers*	1	3	4	2	9	10	10	1	1	1	1	1	1	1	8	1	2	6	6	6	2	2	7	3	1	10	3	1	1	5	2	4	7	1	1
B. *Expenditure system*																																			
Cobb-Douglas	x						x	x			x						x													x			x	x	
CES		x										x					x								x	x									
Linear (Geary-Stone)				x	x								x	x	x			x	x	x		x					x	x	x		x	x			
Non linear (Carlevaro)																					x														
Addilog (Houthakker-Sato)			x						x	x						x																			
Not specified						x																	x	x											
Only total consumption appears																																			x

Table 3. (*continued*)

Countries	Mexico					Morocco	Nicaragua	Nigeria	Pakistan	Philippines	South Korea	Sri Lanka								Thailand								Tunisia							Turkey				Venezuela	Yugoslavia
Study no.	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Characteristics																																						
A. *Number of consumers*	7	10	10	10	10	2	4	5	1	6	1	1	15	15	3	1	9	6	2	1	1	7	1	7	1	6	6	1	1	1	1	4	1	1	p	p	200	p
B. *Expenditure system*																																						
Cobb-Douglas		x	x	x	x							x				x							x													x			
CES																											x											
Linear (Geary-Stone)	x					x	x	x	x	x	x						x	x				x		x	x	x		x			x	x	x	x				
Non linear (Carlevaro)																	a		x	x	x								x	x								
Addilog (Houthakker-Sato)																																						
Not specified																																					x	
Only total consumption appears																																						

p = number of consumers not specified, but greater than one.

committed expenditures (which vary with disposable income or total consumption).[4] This is useful for policy simulations affecting pricing and rationing of basic consumer goods that are assimilated to committed expenditures [e.g., 19 and 64].

3. Imports (Table 4)

Traditional treatments (i.e., perfectly substitutable imports, which adjust to the difference between domestic demand and supply, or perfectly complementary imports linked to output by fixed coefficients) are often rejected in favor of more realistic treatments, e.g., à la Armington (1969), where one assumes a constant (commercial) substitution elasticity between domestic and imported commodities, the commodity users equating their marginal-substitution ratio to the domestic price ratio of locally produced and imported commodities. The Armington treatment accommodates intraindustry specialization and trade policies that are neither all-powerful (as with perfectly substitutable imports) nor powerless (as with perfectly complementary imports). In the case of import quotas, scarcity rents accrue entirely to some income groups—e.g., high-income urbanites [30]—or are part of value added of rent-seeking activities [e.g., 69].

4. Exports (Table 4)

Traditional treatments (in which exports adjust to the difference between domestic supply and demand or are exogenously determined) are frequently abandoned in favor of more realistic procedures where, despite the small-country assumption, relative prices play a role—e.g., there is a positive and finite foreign demand price elasticity (assuming some degree of intra-industry trade); export supply is a logistic function of the domestic price ratio of exports and local sales; the exports are treated à la Powell and Gruen (1968), who assume a constant elasticity of transformation between local and foreign sales, with producers equating their marginal-transformation ratio to the domestic price ratio of local and foreign sal

3. MACROECONOMIC CLOSURES AND SOURCES OF DYNAMIZATION

1. Macroeconomic Closures (Table 5)

As shown by Sen (1963), if production factors are paid according to their marginal revenue productivity, it is not possible to reach full

[4]See Geary (1950–1951), R. Stone (1954), and F. Carlevaro (1976).

Table 4. External Trade

Countries	Argentina		Brazil			Bangladesh	Cameroon	Chile				Colombia					Egypt				India				Indonesia		Ivory Coast		Kenya		Liberia	Malaysia
Study no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Characteristics																																			
A. *Imports*[1]																																			
Exogeneous				x																					x	x								
All imports are complements							x											x	x	x													x		
Constant elasticity of substitution between domestic and foreign products (Armington)[2]	x	x			x			x		x	x	x			x	x	x				x						x	x	x	x		x		x	x
Perfect substitution between domestic and foreign products[2]									x				x	x														x	x						
Not specified			x			x																		x											

Table 4. (*continued*)

Countries	Argentina			Brazil			Bangladesh	Cameroon		Chile			Colombia				Egypt				India					Indonesia		Ivory Coast	Kenya		Liberia	Malaysia
Study no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
B. *Exports*[1]																																			
Exogeneous				x	x							x						x	x	x						x							
Fixed shares in total export volumes																					x												x		
Foreign demand price-elasticity different from infinite			x					x	x	x						x	x							x			x		x			x			
Constant elasticity of transformation between quantity domestically sold and quantity exported (Powell-Gruen)					x						x																								
Logistic supply curve of exports								x							x															x					
Perfect transformation between domestic sales and exports or infinite foreign demand price-elasticity	x	x					x					x	x								x							x	x			x		x	x
Only total exports appear																																			
C. *Special Treatment*																																			
Only external current deficit appears																							x			x					x				
No external trade																					x														

Table 4. *(continued)*

Countries			Mexico				Morocco	Nicaragua	Nigeria	Pakistan	Philippines			South Korea				Sri Lanka					Thailand						Tunisia				Turkey				Venezuela	Yugoslavia
Study no.	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Characteristics																																						
A. *Imports*[1]																																						
Exogeneous																																						
All imports are complements		x	x	x	x		x			x					x																x							
Constnt elasticity of substitution between domestic and foreign products (Armington)[2]									x							x	x	x		x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x		x
Perfect substitution between domestic and foreign products[2]	x					x		x			x	x	x	x					x																			
Not specified																																						
B. *Exports*[2]																																						
Exogenous	x						x										x			x								x			x				x		x	x
Fixed shares in total export volume		x	x	x	x					x																												
Foreign demand price-elasticity different from infinite						x			x												x	x	x	x	x	x	x	x	x	x			x	x				

Table 4. (*continued*)

Countries			Mexico				Morocco	Nicaragua	Nigeria	Pakistan	Philippines			South Korea			Sri Lanka			Thailand							Tunisia					Turkey			Venezuela	Yugoslavia
Study no.	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Constant elasticity of transformation between quantity domestically sold and quantity exported (Powell-Gruen)																	x																	x				
Logistic supply curve of exports																x																					
Perfect transformation between domestic sales and exports or infinite foreign demand price-elasticity								x			x	x	x	x					x	x								x									
Only total exports appear															x			x																			
C. *Special treatment*																																						
Only external current deficit appears																																						
No external trade																																						

[1]Cases where there are import quotas (exogeneous), not identified.

[2]May have sub-set of complementary imports.

[3]Cases where there are export quotas (exogeneous), not identified.

Table 5. Macroeconomic Closures

Countries	Argentina		Brazil				Bangladesh	Cameroon		Chile		Colombia				Egypt						India				Indonesia		Ivory Coast		Kenya	Liberia		Malaysia
Study no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Characteristics																																			
Keynesian			x	x	x	x				x		x				x	x						x					x	x						
Kaldorian			x		x																			x							x				
Johansen	x	x			x								x	x	x											x					x[2]			x	
Classical					x			x	x	x	x						x	x	x	x	x	x				x	x	x	x	x	x	x	x	x
Fixed nominal exchange rate					x		x		x							x																			

Table 5. (*continued*)

Countries	Mexico						Morocco	Nicaragua	Nigeria	Pakistan	Philippines		South Korea			Sri Lanka					Thailand						Tunisia				Turkey					Venezuela	Yugoslavia
Study no.	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Characteristics																																						
Keynesian	x						x		x		x						x								x						x					x	
Kaldorian	x							x			x						x																				
Johansen													x	x			x			x	x							x									
Classical		x	x	x	x					x		x			x	x	x	x	x							x	x	x				x	x	x	x		
Fixed nominal exchange rate						x											x		x	x	x	x	x	x					x	x						x	x

[1]Undefined.

[2]Adjustment with private and public consumption.

[3]Savings-Investment equilibrium realised through financial markets.

employment of factors, given exogenous levels of real investment and public consumption. To make the system mathematically determined, the choice between alternative macroeconomic closures becomes mandatory. If there is no external trade, four possible general macroeconomic closures are available: Keynesian (absence of labor full employment or rigidity of the nominal wage), Johansen (endogeneity of public consumption or savings so as to equate total savings to the exogenously given real investment), Kaldorian (factors are not paid according to their marginal revenue productivity), and classical (real investment becomes endogeneous and adjusts to total available savings).[5] If there is external trade, the necessity remains to choose among these four macroeconomic closures when the exchange rate floats or is fixed in real terms; this necessity disappears in a fixed nominal exchange-rate regime, at the cost, however, of permanent long-term indebtedness.[6] Most of the authors do not give a convincing argument for their choice of a specific macroeconomic closure, given the type of economy they study [except 34, 53, and 72].

2. Sources of Dynamization (Table 6)

In 29 applications, some dynamization occurs. In almost all these cases, the dynamization procedures are essentially empirical and practical, i.e., they are not based on the existence of intertemporal individual profit or utility functions [except, partially, in 29 and 50], but are built around the adoption of greater values for production elasticities, the introduction of technical progress, exogenous changes in predetermined variables such as factor endowments, exogenous or endogeneous internal mobility of labor or capital (with or without financial markets), etc.

A concise description of the structure of the various CGE models should end with a few words on the treatment of government, money, and income distribution.

Government is viewed as an incentive-creating or interventionist sector, which may fix prices (e.g., for basic consumer commodities) or quantities (e.g., public-investment programs) and uses various other instruments (tariffs, taxes, subsidies, exchange rates, etc.), subject to

[5] In Table 5, Kaldorian is a generic name for all closures where the marginal-revenue-productivity distribution rule has been dropped in order to force savings to adjust to a given real investment level, whether the authors call the closure Cambridge, neo-Ricardian, neo-Keynesian, Marxian, or Kaldorian itself.

[6] See Dewatripont and Michel (1987) for the appropriate mathematical demonstration.

Table 6. Sources of Dynamization

Countries	Argentina			Brazil			Bangladesh	Cameroon		Chile			Colombia						Egypt				India					Indonesia		Ivory Coast		Kenya			Liberia	Malaysia
Study no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Characteristics																																			
No dynamic version		x		x	x		x		x	x				x	x	x	x	x	x	x			x	x	x		x			x	x		x	x	x
Dynamic version																																			
1. Changes in technical and behavioral coefficients								x														x						x	x						
2. Changes in economic policy parameters and international prices								x																		x		x	x						
3. Exogeneous increase in factor endowments								x																								x			
4. Capital mobility without financial markets			x			x		x			x		x									x						x	x			x			
5. Capital mobility with financial markets																					x														
6. Labor mobility								x					x								x	x						x	x			x			
7. Extension of the simulation period of dynamic adjustment in some of the equations	x											x													x										

Countries			Mexico				Morocco	Nicaragua	Nigeria	Pakistan	Philippines	South Korea			Sri Lanka			Thailand				Tunisia				Turkey				Venezuela	Yugoslavia
Study no.	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Characteristics																																						
No dynamic version	x	x	x	x	x	x	x	x	x	x	x	x					x			x			x	x			x		x	x			x			x		
Dynamic version																																						
1. Changes in technical and behavioral coefficients									x				x	x		x			x		x	x				x												
2. Changes in economic policy parameters and international prices									x												x	x				x		x							x			
3. Exogeneous increase in factor endowments															x	x					x	x						x				x			x			
4. Capital mobility without financial markets															x			x			x	x						x			x	x		x				x
5. Capital mobility with financial markets									x				x	x											x												x		
6. Labor mobility													x	x		x		x										x				x						
7. Extension of the simulation period of dynamic adjustment in some of the equations									x										x																			

its revenue constraints. It does not [except in 50] have an explicit utility function, individual or social, to maximize, and in none of the applications are provisions made for optimization decision rules based upon the existence of public or semipublic goods.

In the Walrasian tradition, where only relative prices matter, *money* (even when it exists) is neutral in general. As such, "inflation" is exogenous and is only reflected in changes in the numeraire's value, which permits the conversion of relative (real) prices into nominal (monetary) prices.[7]

Except if a Kaldorian macroeconomic closure has been adopted, the marginal-revenue-productivity rule of *distribution* prevails. Some of the studies, however, take into account other factors affecting income distribution: the existence of scarcity rents [e.g., 30], the necessity of maintaining a fixed relationship between wage rates in the public and private sectors [e.g., 58], and, last but not least, public transfer and expenditure redistributive policies [e.g., 48].

4. MAIN SIMULATIONS AND RESULTS

Tables 7 and 8 clearly show that at least in the case of developing countries to which CGE models were applied, the main concern was the impact of alternative external trade policies or changes in the world economy. At the origin, the problem was to assess the effect of tariff and nontariff barriers according to whether their impact was measured with partial-equilibrium indicators (such as the effective protection rate) or in a general-equilibrium framework [e.g., 9 and 14]. More recently, the CGE model has been increasingly used for the evaluation and design of external policies [e.g., 11 and 30], which, in some cases, become part of more comprehensive policy packages of the structural-adjustment type [e.g., 21 and 29].

New and relevant areas of study have also appeared: internal tax reforms [e.g., 37 and 38]; changes in the domestic price subsidy system [e.g., 19 and 64]; measurement of the welfare loss because of the existence of internal (versus external) distortions, such as wage differentials [e.g., 31 and 46]; alternative financing of public expenditures through the banking system [e.g., 60]; multiple-exchange rate policies [e.g., 21].

[7]For an alternative treatment of money, see studies [1] and [2] on Argentina by Feltenstein.

Table 7. Overall View of Simulations and Results[1]

Impact on \ Sources of simulations	External trade and financing exogenous shocks and policy measures	Labor market distortions and policy measures	Domestic taxation and expenditure policies	Domestic producer or consumer price subsidy policies	Monetary policy measures	Comprehensive policy packages
GDP, balance of payments, sectorial growth, employment	1, 2, 7, 8, 9, 10, 11, 12, 14, 16, 17, 24, 28, 30, 31, 35, 41, 46, 47, 48, 51, 54, 55, 57, 59, 61, 63, 64, 65, 67, 68, 69, 70, 72, 73	13, 31, 46, 66	4, 6, 33, 37, 38, 40, 55, 59, 61, 62	4, 19, 20, 23, 25, 26, 28, 39, 54, 63, 64, 65	1, 2, 60, 71	21, 23, 28, 29, 42, 44, 48, 49
Income distribution	5, 6, 7, 15	45, 58	6, 33, 37, 38, 40, 45, 58	23, 26, 39, 45		3, 23, 27, 29, 43, 48, 49, 53
The design of policy reforms	24, 42		6, 42			23

[1]Numbers given in the cells refer to the study numbers of Table 1 (one number may appear several times). Excluded are study nos. 18 and 34 (which only give model's structure), 22 and 50 (backcasts), and 56 (sensitivity analysis).

Table 8. Main Simulations and Results

Country	Study no.	Year	Main simulations	Main results
Argentina	1.	1978	50% decrease in tariffs with 15% devaluation and 12.98% decrease in money supply [M_1]	After one quarter: negative impact on balance of payments, total welfare and government revenue; after two quarters: improvement in the external account
	2.	1981	Computation of the industrial product import quota equivalent to a 25% devaluation	This quota, which reduces industrial product imports by at least 39.2%, is necessary
Brazil	3.	1959	Impact on income distribution of value changes in 19 policy instruments and exogenous variables	Direct measures (public transfers, literacy programs, etc.) have a stronger redistributive effect than fiscal measures aiming at changes in the income and consumption pattern
	4.	1975	Impact of a 20-billion cruzeiro increase in subsidies to agriculture, subsidies to industry, or social expenditures	None of the three measures is clearly superior when the objectives of growth, balance-of-payments equilibrium, and budgetary equilibrium are simultaneously taken into account
	5.	1960	Impact of export-led growth strategy (increase of exogenous exports, import propensities and capital stocks in the export sector . . .)	The effects of macro adjustment are small on the size distribution but very high on the functional and socioeconomic distributions of income; closure rules matter
	6.	1960	Impact of income policies and investment strategies on distribution of income	A predetermined investment strategy cannot be matched by an income policy that will keep profitability constant in all sectors
Bangladesh	7.	1977	50% decrease in tariffs, elimination of tariffs on nonagricultural imports, adjustment of the excise tax in order to reduce the trade deficit	Tariff reduction brings government into financial problems unless excise (or income) tax is pushed up The nutritional situation of population does not improve when tariffs are reduced
Cameroon	8.	1980	Increase of oil exports receipts and doubling of tariffs on food imports and imports of intermediate products	Decrease in the external competitiveness of other exports and very small increase of domestic food and intermediate goods production, except for construction inputs where the increase is more significant

Chile	9.	1962	Differentiated impact of a 10–20% reduction in tariffs in partial and in general equilibrium	The sign of sectorial output changes is correctly predicted, but their relative importance is underestimated, when partial-equilibrium analysis is applied
	10.	1981	Impact of a 25% decrease in the world price of copper, in the case of 7 alternative stabilization programs	The initial trade balance is maintained, if real wages are decreased by 1.9% and absorption by 2.7% provided that there is a transfer of manpower from mining to manufacturing expert activities
	11.	1977	Identification of the source of the 1982 depression: external (decrease in the world price of copper and increase in the international interest rate) or internal (overvaluation of the peso due to large foreign capital borrowing, which leads to a decrease in competitiveness)	Internal source of depression is the most significant
	12.	1975 (3rd quarter)	50% devaluation with or without full wage indexation	Sustained improvement in the trade balance, enhanced by partial (vs. full) average indexation
Colombia	13.	1969	Impact of an equalization of the urban wage rate of qualified and unqualified labor, in the absence or presence of factor mobility	If there is factor mobility (or not), GDP increases by 13.3% (or 5.7%), capital rate of return increases by 3.6% (or 0.4%), average appreciation by 5.7% of the peso; if there is factor mobility, some activities that were net exporters become net importers, and vice-versa
	14.	1970	Differentiated impact of a suppression of tariffs in partial and in general equilibrium	When partial-equilibrium analysis is applied, the direction of sectorial output changes is wrongly predicted, as is their relative importance
	15.	Typical year of the 1970s	Impact on income distribution of 4 alternative external trade policies: free trade, outward-looking (50% export subsidy rate, except for coffee), inward-looking (50% increase in manufacturing product import tariffs) and value-added direct subsidization of manufacturing activities (50% rate)	Outward-looking policy favors landlords; inward-looking policy slightly increases farmers' real income but strongly benefits urban population; value-added direct subsidization policy is very favorable to urban entrepreneurs and has strong adverse effects on rural entrepreneurs
	16.	Typical year of the 1970s	10% decrease in coffee exports with a constant external trade balance	Given low demand price elasticity for coffee, stimulation of other processed food and textile exports, as such increases external terms of trade
Colombia, Ivory Coast, Kenya	17.	1973 (Colombia and Kenya) 1976 (Ivory Coast)	Impact of a 10% increase in the real world price of coffee, cocoa and tea, without change in absorption or external trade balance	Without change in absorption, greater domestic price stability, but large foreign exchange reserves required; without change in external trade balance, modification of the real exchange rate is required

Table 8. *(continued)*

Country	Study no.	Year	Main simulations	Main results
Egypt	18.	1976	None; the quoted document gives the CGE model's structure used in studies nos. 19 and 20	None
	19	1976	Total or partial abolition of direct subsidies to consumers or producers of essential products	If official price of essential products is increased, depressive overall impact, consumers being obliged to devote a larger share of their income to the purchase of such goods; if decrease in the quantity supplied with subsidized prices remaining, overall stimulating effect, spending being made on other consumer goods
	20.	1976	Abolition of direct subsidies to consumers of essential products	Overall depressive impact: see study no. 19
	21.	1982	Impact of increase in prices of goods produced by state enterprises, given a package of complementary antideflationary measures, i.e., additional investment expenditures by state enterprises, devaluation of the commercial banks' exchange rate, additional foreign borrowing by the public sector, less borrowing of private sector funds by the public sector	As time increases (from 1 to 10 years), the deflationary effect of the price increase becomes more and more difficult to correct by the antideflationary package
India	22.	1951	Tracking the 1951–1984 evolution of the Indian economy with sensitivity tests given alternative population growth rates, changes in final demand patterns and alternative technical substitution elasticities	Changes in final demand patterns have the most significant impact on sectorial growth and urbanization rates
	23.	1977–1978	Policies studied include technological and irrigation programs, price support programs, price incentive to supply response, food subsidy program	Distribution objectives cannot neglect production performance; price support programs are highly regressive on distribution of real income
	24.	Not specified	Impact of a 15% devaluation given different export supply elasticities	Even with a low export supply elasticity (0.5), contractionary effect of devaluation is offset
	25.	1979–1980	Numerical evaluations of rent seeking losses under varying assumptions concerning the way the rent-yielding licenses are allocated	Under the conventional form of rent seeking, the efficiency losses were found to range from 10% to 25% of GNP; under second type of rent seeking they were estimated at 2.5% and 5.5% of GNP
	26.	1980	Model is run to analyze public distribution of food grains, foreign trade and aid policies, investment policies and rural works program	Financing free food with urban income tax as contrasted with financing it with reduction in investment leads to higher growth and better income distribution

India, Kenya, Turkey	27.	Not specified	Impact on income distribution of 4 alternative policies: i) interventionist (fixed real wages and exchange rate), ii) semiinterventionist (no fixed real wages), iii) semiliberal (no fixed exchange rate), iv) liberal (additional 10% decrease in tariffs)	iv) determines the smallest GDP loss and is especially favorable to nonagricultural workers at the expense of capital-holders
Indonesia	28.	1975	Impact of: i) alternative uses of additional oil income revenues (public investment, private consumption, subsidies, etc.), ii) removal of domestic petroleum price subsidies, iii) policies aiming at neutralizing undesired side-effects of oil booms (e.g., increase of domestic prices relatively to international prices and skewing of the economy towards the nontraded sectors)	If i), directly transferring all oil income to households results in their gain exceeding the oil windfall because of real exchange rate effects; hence, a liberal import policy for consumer goods may be sufficient to ensure that the private sector realizes part of the windfall gains; if ii), the deflationary impact of higher domestic petroleum prices is almost offset by larger public investment expenditures; if iii), in principle, subsidy policy should be used to offset these undesired side-effects (or "Dutch disease"), but it is inconsistent with using a portion of oil income to expand public absorption
	29.	1975	Simulations of absorption policies characteristic of a representative oil exporter when there are oil windfalls	The oil windfalls are insufficient to satisfy hopes of accelerated growth, partly because of capital flight spurred on by restrictive domestic financial policies and anticipation of the need to realign the real exchange rate when oil revenues fall
Ivory Coast	30.	1980	Given a 50% reduction target of the external current deficit: i) necessary depreciation of the CFA franc, (considered as the "national" currency) given existing tariffs and quotas, ii) necessary overall import tariffs and exports subsidy rates, given quotas and fixed parity, iii) necessary fiscal surcharges if quotas are abolished, given fixed parity	If i), necessary CFA franc depreciation of about 11.0%; if ii), 35% tariff rate and 42.5% export subsidy rate, i.e., a 50% increase with respect to the existing situation; if iii), fiscal surcharges ranging from 6.0% to 36%, depending on the type of product
Kenya	31.	1978	Impact of tariff changes given existing distortions between rural and urban wage rate or their removal	Overall welfare gains greater from the removal of wage rate distortions than from tariff changes
	32.	1964	Coffee prices are stabilized and Kenya is subject to a quota or not; foreign and domestic goods are assumed either good or poor substitutes	Even when domestic and imported commodities are poor substitutes, Kenyan economy can adjust to changes in coffee price and revenues
	33.	1976	Incidence of taxes, levies, and income transfers	The personal and company levies when compared to a neutral product VAT are progressive on the income of urban household groups but have mixed impact on the rural household groups

Table 8. *(continued)*

Country	Study no.	Year	Main simulations	Main results
Liberia	34.	1982	Decrease in public expenditures; increase in tariffs, export subsidies, domestic taxes, and foreign capital inflow; removal of fixed unitary parity between Liberian $ and US $	Structural adjustment program gives good results; improvement in the export and domestic sectors; important reduction in the government budget deficit and in the current account deficit
Malaysia	35.	1971	Devaluation of the ringgit	Overall depressive effect given the low price-elasticity of export supply (mainly rubber)
Mexico	36.	1975	Impact under alternative macroclosures of an increase in nonagricultural wages, a rise in investment, and the introduction of a guaranteed price for corn and beans	The impact on income distribution and on the internal terms of trade varies often in sign (±) depending on the type of macroclosure adopted
	37.	1977	Impact of the 1980 tax reform, which introduced the TVA	Decrease of government revenue; larger increase in rich and poor people's standard of living than in the case of middle classes
	38.	1977	Impact of the January 1981 decision, which exempted food products from TVA	Largest favorable impact on rural population employed in agriculture and food-processing activities
	39.	1977	Implementation of value-added subsidy system for domestic commerce activities with different subsidy rates	Larger redistributive impact with subsidies to commerce activities that cater to the poor (public markets, etc.) than with indirect fiscal measures designed for greater equity
	40.	1977	Impact of an increase in indirect tax rates with (1) oil subsidies retained, (2) subsidies abolished on agricultural production, and (3) food consumption subsidies on selected goods abolished	Reducing food subsidies has an adverse effect on the poorer consumer groups; a policy that retains food subsidies has to increase indirect taxes; this has an adverse effect on the upper-income groups
	41.	1975	Impact of quantitative restrictions on competitive imports and the balance of trade	Quantitative restrictions on competitive imports can increase the trade deficit while lowering real GNP and real-wage rate
Morocco	42.	1985	Simulation of typical stabilization package; this includes a cut in government expenditures, an increase in tax rates or in prices charged by public enterprises and devaluation	The social costs of adjustment cannot be ignored and may be very different across different policy designs

Nicaragua	43.	1981	Impact of i) an expansion in the output of the Area de Propiedad de Pueblo (APP), ii) an increase in foreign credits, and iii) a devaluation of the cordoba	If i), improvement of real incomes of workers and peasants (both absolutely and as a share); if ii), urban employment grows faster than agricultural employment (the foreign exchange constraint being more binding in industry) but general increase in real income of all groups; if iii), especially favorable to workers and peasants when devaluation is used to stimulate exports and provided that there is no nominal wage increase
Nigeria	44	1984	Impact of i) 30% devaluation of the naira, ii) higher tariffs on capital and intermediate goods, iii) higher tariffs on consumer goods, iv) 30% subsidies for agricultural and manufactured exports, v) cut in real public investment, vi) reduced agricultural input subsidies, vii) higher domestic oil prices, and viii) reduction of the wage-indexing coefficient from 0.9 to 0.6 (1984) and 0.8 (1985–86)	If these 8 measures are taken as a policy package, no significant change in real output (expansion from the devaluation and contraction from other measures balance off), inflation takes place (reducing real wages by 17% despite partial indexing), current external account improves
Pakistan	45.	Typical year of the 1970s	Impact of 7 alternative policies related to the food situation: abolition of subsidies to consumer's price of rice, with or without increase of public purchases of nonagricultural goods; 10% increase in nominal wages; land reform; increase of 50% in fertilizer subsidy; increase in rural or urban public expenditures	Largest redistributive impact with land reform
Philippines	46.	1978	Impact of trade distortions (tariffs, export taxes, quotas) in the presence or absence of rent-seeking activities and Harris–Todaro wage differential between rural and urban sectors	The social cost of trade distortions (measured as national income loss) is approximately double in the presence of the rent-seeking activities and Harris–Todaro wage differential
	47.	1978	Complete trade liberalization by suppression of all tariffs and export taxes	The deadweight loss of trade taxes is about 34 percent of income
South Korea	48.	1968	Impact of income distribution of 4 sets of comparative static experiments (taxes and transfers, agricultural policies, trade and industrialization policies, technological and manpower policies) and of 3 sets of dynamic experiments (rural policies, urban policies, combined rural-urban policies)	In the case of static experiments, size distribution of income quite insensitive to various simulations, which suggests that greater equity also requires changes in the system's distribution of assets and its basic rules of operation; in the case of dynamic experiments, an outward-looking reformed capitalist package leads to more equity while maintaining overall growth; this is not the case with an inward-looking market socialist package where for the same increase in equity there is less growth

Table 8. *(continued)*

Country	Study no.	Year	Main simulations	Main results
	49.	1968	Experiments selected from study 48	See study 48; results compared with those of a long-run economic-demographic model (the BACHUE model) different from a CGE model and applied to the Philippines; conclusions of the 2 models are strikingly similar
	50.	1973	Does the CGE model give a good backcast of the South Korean economy between 1973 and 1982?	Yes, for private consumption; underestimation of output and export growth, the CGE model not having taken into account measures favorable to exporters, which are not reflected in the price system
	51.	1963	Impact of: i) a smoothing between 1963 and 1973 of capital inflow with a constant cumulative corresponding volume, ii) a decrease between 1963 and 1973 of annual capital inflow with a 38% decrease of the cumulative corresponding volume	In both cases, comparable impact on GDP; in case ii, more favorable impact on the external trade balance, the won being depreciated
	52.	—	Impact of export-led growth strategy (increase of exogenous exports, import propensities and capital stocks in the export sectors . . .) (see study 5)	The effects of macro adjustment are small on the size distribution but very high on the functional and socioeconomic distributions of income closure rule matters (see study 5)
Sri Lanka	53.	1970	Impact of 4 alternative strategies: socialist (real asset redistribution from rich to poor, from private to public sector), economic (decrease in the wage rate of unskilled urban manpower), green revolution (improved seeds and large-scale irrigation works), industrial (technical progress in manufacturing)	First, green revolution, then industrial strategy have the largest impact on growth and on the fulfillment of basic needs
	54.	1983	Impact of increases in international and/or domestic oil prices	The constraint on the trade deficit leads to a reduction in domestic income when the price increase is not passed on to the domestic economy; in the other case the contractionary effect of a price increase become even more pronounced

Thailand	55.	1980	In order to correct the unfavorable impact on growth of a slowdown in agricultural activity and of an increase in world oil prices: increase in taxes on oil products and decrease in export taxes and government spending	A decrease in export taxes has the largest impact on GDP
	56.	1980	Impact of a marginal change (1%) in the value of 12 economic policy instruments and 14 structural parameters	The most favorable impact on growth, balance of payments and price results from a more efficient use of intermediate products (energy inputs, in particular)
	57.	1982	Impact of a 20% decrease in the world nominal oil price in 1984 and increase of that price between 1986 and 1989 at a 9% annual rate	Slow increase in output and employment, in particular in the informal manufacturing sector and in construction
	58.	1975	5% increase in government personnel	Real-wage increase for secondary school graduates
	59.	1985	In order to increase rice producer's price: i) 5% decrease in the rice export tax, ii) building of government rice stocks equal to 8% of national rice output	If i), increase in the quantity exported and in the domestic price; if ii), increase in domestic and export prices of rice and crowding-out effect due to additional government borrowing
	60.	1980	Impact on private investment crowding-out (or crowding-in) of alternative fiscal and monetary policy measures: i) 5% increase in real public expenditures; ii) 50% reduction in central bank advances to commercial bank marginal reserve requirement; iv) increase by 0.02 of the government loan ratio from the commercial banks; v) combination of i and iv; vi) 10% devaluation of the baht; vii) as in vi with low export elasticities	Crowding-out if ii, iii, iv, v, and vii; crowding-in if i and vi; comparison of i (where increase in real public expenditures is financed by central bank) and v (where such increase is financed by commercial banks) shows that impact on private investment of alternative ways of financing public expenditures is significant
	61.	1973	Assessment of the degree of optimality of the policy followed by Thailand during the two oil shocks, i.e. no structural adjustment to changes in world conditions and heavy borrowing from abroad at high-interest rates after 1975	The economy's impressive performance during the 1970s was at the cost of sizeable debt-service payments and slower growth in the 1980's than would have been the case with a different time profile of foreign borrowing and a different (profit-induced) sectorial allocation of investment
	62.	1973	Impact of alternative fiscal measures: six domestic taxes on goods and services and two trade taxes	An "efficient" tax package that accounts for other distortions in a heavily distorted economy differs from an efficient package that ignores the other distortions

Table 8. *(continued)*

Country	Study no.	Year	Main simulations	Main results
Tunisia	63.	1980	i) 20% dinar depreciation, ii) overall 10% tariff, iii) decrease in subsidies to the purchases of oil, food and manufacturing products, iv) drop in the investment rate from 32% to 20%	If i), increase in domestic prices, depressed consumption and investment, if ii), improvement in the external current account and smaller increase in domestic prices, if iii) increased growth, improvement in the external current account and higher real wage rate, if iv), adverse effect on the external current account and on growth
	64.	1983	Impact of: i) 10% increase in real investment; ii) 25% increase in the price of bread; iii) overall 10% increase in tariffs; iv) 10% increase in import quotas; v) 10% devaluation of the dinar; vi) as in v with removal of domestic price controls; vii) combination of iii and vi	If i, additional need for foreign savings with little growth; if ii, overall insignificant impact; if iii, little growth effect and increased external deficit; if iv, little overall impact, if v, 3.7% increase in GDP; if vi, little growth effect but significant improvement in the external current account; if vii, comparable with impact of measure vi
	65.	1983	Impact of: i) a 10% decrease in the production of oil; ii) a 10% decrease in the international prices of oil products with fixed prices on the domestic market	If i, decrease of 1.6% of GNP and important increase in the current account deficit (+ 10.52%); ii, decrease of 0.51% of GNP and less important increase in the current account deficit (4.46)
Turkey	66.	1972	Impact of 4% and 5% growth in the real wage between 1972 and 1981 (vs. 3%)	Significant changes in sectorial growth rates due to direct (or technological) and indirect (or demand) substitution
	67.	1977	Breakdown of explanatory factors of the lira overvaluation: i), differential inflation, ii), external terms of trade worsening, iii), increase in the price of imported oil, iv), slowdown in the rate of migrant remittances, v), others	Factors i, ii, iii, iv, and v explain respectively 37, 11, 21, 18, and 13% of the 52% overvaluation of the lira
	68.	Typical year of the late 1970s	20% decrease in export demand	Lira depreciation that favorably affects export sectors with high demand price elasticity and import substituting sectors, and that unfavorably affects export sectors with low demand price elasticity and producers of nontradables

	69	1978	Abolition of import quotas with or without a 50% tariff decrease	6% GDP increase; little additional gain to be expected from tariff reductions
	70.	1978	Computation of the lira overvaluation between 1978 and 1981	Smaller overvaluation of the lira and even appreciation in 1980 and 1981, had the second oil shock not taken place
	71.	1978	Impact of: raising time deposit interest rates, savings-investment elasticities, wage rigidities, and mark-up pricing rules	The macroeconomic performance of the economy depends heavily on assumptions about the rigidity of wages; the role of markup pricing rules is less clear; the impact of freeing time deposit rates and removing credit subsidies depends on the relative magnitude of savings and investment elasticities
Venezuela	72.	1975	Short-term and long-term impact of a 20% decrease in the domestic price of imported machinery and transportation equipment	Overall demultiplier effect: decrease in domestic competing activity, and in prices and wages; imports become more expensive and, with time, domestic manufacturing activity picks up
Yugoslavia	73.	1976	Breakdown of explanatory factors of dinar overvaluation: i) drop in export receipts, ii) differential inflation, iii) increase in oil prices, iv) slowdown in the rate of migrant remittances	Factors i, ii, iii and iv explain, respectively, 29.2, 44.0, 9.8, and 17.0% of the 20.5% dinar overvaluation

5. CONCLUSION

CGE models have been widely used for the simulation of development and stabilization policies. Indeed, these models have the advantage of allowing simultaneously for decentralized planning mechanisms based upon price responsiveness and substitution possibilities, and for non-Walrasian features existing in real economies (price stickiness, rationing, technological rigidities). Moreover, their solution does not require the explicit formulation of some multiobjective social welfare function. Although the original emphasis was on external trade and financing policies, it has not solely remained so.

In the future, the success of CGE modeling will certainly depend on the capacity of the model builder to identify the most relevant macroclosures, to introduce into the system credible sources and procedures of dynamization, to link real and financial markets, and to derive concrete policy recommendations from a large range of simulations. Although it is not examined in this survey, an effort to produce reliable parameter values for the CGE models' numerical specifications, instead of mere "guesstimates," is also called for.

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Part A—The 73 Applications

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