Nonfarm Prospects Under Agricultural Liberalization

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Abstract. *What does the United States stand to gain from liberalizing international trade in agriculture? This article estimates potential dollar gains and simulates the relocation of workers out of agriculture and into nonfarm activities Different nonfarm sectors would expand under three cases of macroeconomic adjustment to the change in farm policies The benefits of full liberalization would arise largely from the implied reduction in the Federal budget deficit The greatest benefits would result if in addition to liberalization, macroeconomic policies that stimulate investment or net exports were pursued*

Keywords *Liberalization, nonfarm employment, computable general equilibrium modeling*

Budget pressures, the new farm bill, and the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) have fueled debate on how liberalizing agriculture will affect the United States Does farm sector activity indeed raise the gross national product (GNP), particularly when subsidies add to the government budget deficit? If the United States liberalizes agriculture but reduces farm employment, could these farmworkers be employed more efficiently in other sectors?

This article presents estimates of the efficiency and employment implications for the nonfarm economy of complete multilateral agricultural liberalization under three plausible macroeconomic adjustment scenarios Relative to 1986 (the latest year for which enough detailed data were available), multilateral agricultural liberalization may allow for real GNP gains of $4 5 billion in the United States because about 200,000 full-time workers will move from farming to nonfarm sectors Since the gains from freer trade and markets are achieved by a reallocation of economic resources, an economywide computable general equilibrium (CGE) model is appropriate for simulating reallocation and estimating possible gains The simulation analyses indicate that benefits from multilateral liberalization have less to do with removing the policy distortions than with reducing the government deficit

Agricultural liberalization is a catchall term meaning complete market orientation, which implies the termination of coupled farm income support, government stocking to support prices, restrictions on imports, all export enhancement programs, and restrictions on participants' land use Liberalization is multilateral when all other countries also end domestic support that affects trade, import protection, and export subsidies

Previous multimarket and CGE analyses of liberalization found different comparative-static economywide gains for the United States The WALRAS applied general equilibrium model (*4*) was used to estimate that real output in the United States could increase by 0 1-0 2 percent under unilateral liberalization (*18*) [1] This gain is $7 4 billion relative to the 1986 real GNP of $3 7 trillion The Static World Policy Simulation (SWOPSIM) multimarket model estimated nominal GNP gains, relative to 1986, of about $9 billion (*21*) Robinson, Kilkenny, and Adelman used a nonlinear Walrasian CGE model to estimate real GNP gains of about $10 billion relative to 1991 for multilateral liberalization (*19*) Hertel, Thompson, and Tsigas used a log-linear CGE model to estimate that unilateral liberalization could result in a $6 6-billion nominal GDP reduction but in a real domestic income gain of $5 billion relative to 1982 (*8*)

Previous estimates may be biased, however, because of how factor supplies or government budgets are modeled In most previous models, liberalization was simulated by assuming or imposing that farm program spending changes would not affect the government budget For the WALRAS experiments, household income tax rates were allowed to fall in order to hold the government budget deficit constant The SWOPSIM multimarket model does not model the government explicitly Hertel, Thompson, and Tsigas assumed that saved revenues are redistributed back to households (*8*) Only Robinson, Kilkenny, and Adelman allowed both the savings and the tax revenue increases to reduce the U S Government budget deficit I used the same approach for this article

There are two possible paths of adjustment when the government budget deficit declines through saved farm program expenditures (*13*) In the first, more savings may be available for private domestic investment Factors of production would be pulled into the investment goods-producing sectors In the second, foreign capital investment may fall, which is consistent with the behavior of foreign investors who respond to a reduction in U S interest rates (and the value of the dollar) as government borrowing falls Decreased foreign capital inflows would reflect a reduced trade defi-

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[1] Italicized numbers in parentheses cite sources listed in the References section at the end of this article

cit The reduced value of the dollar would dampen imports and stimulate exports In the second case, factors of production would be pulled into the import-competing and export-oriented sectors

The reallocation of labor across sectors can change GNP simply because labor productivity and wages differ across sectors These differences are due, in part, to variations in labor-augmenting capital across sectors (*10*), and because some sectors are willing to pay higher real wages to elicit higher productivity (*14*, *15*) These two factors are interrelated because workers in capital-intensive industries are generally paid higher wages (*5*, p 78)

There are three ways to handle the observed variations in factor returns across sectors in CGE models One approach, possible in all types of models, is to assume that these differentials are due entirely to immobility and to impose this assumption on the model The other two ways allow for mobility but link the observed differences to the factor or to the sector The former approach uses economywide data on compensation paid to the factor and quantity employed to calculate the economywide rate of return (*22*) Then the number of units of average return-earning factors employed by each sector is imputed as the compensation paid divided by the economywide average return, which associates the variations across sectors with the factors The latter approach calculates sector-specific returns to each factor and then the proportional divergences paid by each sector from the economywide average return ($WFDIST_{if}$, see "Nominal flow parameters," app 1) The result associates the variations in factor returns with the sectors, which is consistent with the efficiency wage hypothesis and empirical evidence on the United States (*16*) This article relies on a version of the model in (*19*) which associates the variations in labor productivity with the sectors

Another problem with previous CGE analyses concerns land supply Total land available was assumed exogenous and fully employed Liberalization entails removing set-aside constraints on land use This was modeled by imposing that acreage once set aside would come back into production This would necessarily increase real output Furthermore, because land substitutes for labor, capital, or other inputs, estimates of outmigration of the other factors of production may be overstated

Hertel, Thompson, and Tsigas modeled overall land supply inelasticity while allowing for elastic supplies of land for any one particular use (*8*) They detailed the farm sectors and specified a range of alternative uses of land, such as for crop production or pasture Set-aside restrictions are modeled as *ad valorem* equivalents This modeling specification may simulate the conversion of grain acreage, for example, into grazing land (*8*, p 269) A simple version of this assumption, which can be applied in models where the farm sectors are aggregated, is to distinguish cropland from total land supply; then simulate the levels of cropland use to maximize producer profits Cropland use is thus endogenous but less than or equal to total available arable land supply, which is inelastic I applied that approach

CGE models are good tools for estimating the economywide impacts of sector-specific policies because farm policies, interindustry linkages, market distortions in the nonfarm economy, and the government and trade budgets are all explicit I used the CGE model to replicate the pattern of production, employment, prices, income, and other variables in the U S economy in 1986 with the farm policies in place to provide a benchmark, then conducted experimental simulations I calculate the influence of a policy as the difference between the simulation of the economy given the change and the benchmark solution

Multilateral liberalization is simulated under three plausible macroscenarios In the first scenario, called *transfer*, government expenditures on farm programs are redistributed as transfers to households (equal to providing decoupled income support or reducing household income taxes), so that there is no change in the government deficit or aggregate savings

In the second, the *invest* scenario, the Federal Government's farm program expenditures are saved, reducing the deficit More funds are available for domestic private investment (*1*) Since this is a shift between public and private domestic use of loanable funds, rather than a change in supplies or demands for funds, the rate of interest (exogenous) remains unchanged

In the third scenario, the *balance of payments* (BOP), the demand for loanable funds declines because of the government budget deficit reductions Although no asset markets exist in the CGE model, interest rates clearly could fall The exchange value of the dollar would fall, foreign capital inflows would decline, and the current account balance would improve The polar case of complete capital inflow offset is modeled by reducing foreign capital by the same amount as the reduction in the government deficit The depreciation of the dollar is endogenously determined in the model, given this change in the balance of payments

The discussion of these scenarios focuses on employment patterns and output in the nonfarm economy This article reports which sectors displaced farmers would move to to achieve the optimal longrun pattern of resource allocation The three patterns reported correspond to the three possible macroscenarios The discussion provides a point of departure for the important task of quantifying adjustment costs Farm sup-

port policies are "inextricably intertwined with the problem of factor market adjustment" (*7*, p 4) Adjustment costs will depend on how much it costs to relocate, how much of farm skills are useful in nonfarm jobs, or how much retraining costs Factor market adjustments to farm policy changes are also intertwined with monetary and fiscal policies, because these policies determine the sectoral composition of aggregate demand

The Model Assumptions

A version of the 10-sector USDA/ERS CGE model of the United States is used to conduct the experiments (*20*) (See (*12*) for an explanation of the farm program modeling) The 10-sector model explicitly simulates only the five major U S farm policies deficiency payments, loan and stocking programs, export enhancement, import quotas, and acreage restrictions Since the 10-sector model generates the same overall real GNP level, pattern, and macroeconomic results as the 30-sector model (which disaggregates the food and fiber system more finely), it is just as useful and more clear as a model of the nonfarm economy Appendix 1 shows the main model equations and parameter values

The model distinguishes three agricultural sectors (dairy and meat, grains and oilseeds, and other agriculture), five industrial sectors (light consumer goods, basic intermediates, capital goods, construction, and electronics), and two service sectors (trade and finance, and other services) (app 2)

The relevant differences among the sectors for these experiments are the character of demand facing the sector, the capital/labor ratio, and the factor returns in the sector relative to average returns (tables 1 and 2) These are the relevant differences because they indicate how policy changes influence employment First, labor will move to sectors favored in the particular macroeconomic aggregate demand adjustment scenario Second and all else equal, labor will move to more labor-intensive or high-productivity sectors And, because productivity differs across sectors, these movements will spawn variations in estimated GNP across scenarios even though primary factor supplies change little

The horizontal rows in table 1 show the character of demand The dairy and meat sector has little to do with trade under the existing policies Only 0 3 percent of that sector's output is exported, and imports constitute less than 1 percent of domestic sales Final consumer demand equals 8 9 percent of the dairy and meat sector's output, which consists mainly of intermediate goods processed into light consumer goods Grains and oilseeds are also intermediate goods (66 percent relative to output), but export demand accounts for 18 4 percent of the output from the farm-

Table 1—Importance of trade, domestic consumption, investment demand, and intermediate demand, by sector

Sector	E/XD	M/X	C/XD	I/XD	INT/XD
			Percent		
Dairy and meat	0 3	0 9	8 9	0	98 2
Grains and oilseeds	18 4	2	2 0	0	66 2
Other agriculture	3 5	9 7	32 6	0	74 8
Light consumer goods	3 6	6 6	43 6	1 7	54 9
Basic intermediate goods	4 5	16 3	13 0	8	96 6
Capital goods	13 0	17 6	15 8	32 1	42 9
Construction	0	—	0	61 5	19 7
Electronics	11 6	26 1	48 2	20 6	39 5
Trade and finance	2 4	—	53 9	4 1	37 5
Other services	5 8	4 5	43 6	7	37 4

— = Does not apply

E/XD is exports relative to production M/X is imports relative to sales, and C/XD is private consumption relative to production

XD is real domestic production

I is investment demand relative to production and INT is intermediate use relative to production The percentage ratios will not sum to 100 because they have different denominators Government consumption is not shown Final demands C and I include imports

Source Model solution for 1986 benchmark

gate Other agriculture, which includes vegetables and fruits that are not processed serves final consumer demand Electronics, trade and finance, and other services are largely demanded by consumers, while the capital goods and construction sectors serve investment demand

Exports are especially important in the grains, capital goods, and electronics sectors, where import competition is strong Import competition also faces the other agriculture sector (sugar, tobacco, vegetables, fruit), where imports make up 9 7 percent of domestic sales

Table 2 reveals the importance of the sectors in value added, real GNP, the relative factor returns in the sectors, and relative factor intensity Given the size of the service sectors, the relative returns and intensity information can be interpreted in comparison with those sectors

A ratio of profits or wages relative to the economywide average that is larger than 100 percent indicates that factors in a sector receive compensation for higher than average productivity or riskiness, or receive subsidies, and, factors are immobilized to some degree Notice the relatively high return to capital in the light consumer goods sector (223 percent of average) provided by protection against imports, such as the Multifibre Arrangement concerning textiles and apparel, and quotas against imported processed dairy products and processed sugar Those policies also keep the share of imports low relative to sales

The variations in sectoral wage rates compared with the average reflect either that labor receives compensation in some sectors for higher productivity or the

Table 2—Sector contribution to value added, real GNP, relative factor returns, and relative factor intensity

Sector	Value added	Gross output	Rents	Wages	Capital/ labor ratio
	--Percent-		*----Ratio to average---*		
Dairy and meat	0 30	1 20	121 2	58 7	2 5
Grains and oilseeds	95	1 18	105 1	43 5	2 7
Other agriculture	77	78	78 0	56 3	6
Agricultural results	2 02	3 16	106 1	53 7	
Light consumer goods	6 94	10 90	223 3	99 6	4
Basic intermediate goods	9 94	13 84	155 8	138 4	1 4
Capital goods	5 07	8 37	50 7	145 4	4
Construction	4 94	7 31	204 1	142 4	2
Electronics	1 94	2 26	84 6	77 9	2
Industrial results	28 83	42 68	154 1	126 8	
Trade and finance	16 85	14 47	128 6	96 2	4
Other services	52 30	39 69	86 1	91 4	1 4
Services results	69 15	54 16	90 1	93 9	
Economywide results	100 00	100 00	100 0	100 0	1 0

Value added is value added by labor, land, and capital at product market prices Gross output is real GNP originating in the sector in constant (1982) dollar terms Rents are rates of return to productive capital by sector expressed as the percentage ratio to the economywide average Wages are rates of return to labor by sector as a percentage ratio to the economywide average wage

Source Model solution for 1986 benchmark

distortions in the labor market Labor appears most productive in the basic intermediate goods, capital goods, and construction sectors [2] Any changes that provoke labor to move out of agriculture will bring about an improvement in economywide productivity and an increase in GNP as typically measured The source of the measured increase in GNP is known as a "composition effect" (*3*) The final column in table 2 indicates that the first two farm sectors are relatively capital-intensive The relatively labor-intensive sectors are other agriculture, light consumer goods, capital goods, construction, electronics, and trade and finance

For CGE models, these data represent general equilibrium Wages and rents are endogenously determined to clear factor markets throughout the economy The contributions of sector-specific productivities, factor market rigidities, and risk to relative factor returns, however, are held exogenous across sectors in all experiments [3] The assumed Cobb-Douglas production technology rules out any factor-intensity reversals [4] All else equal, labor released from agriculture will move to sectors where it is paid for being most productive or used relatively intensively

Real GNP Under Multilateral Liberalization

The basic liberalization experiment consists of dismantling import protection policies, constraints on land use, and terminating the $26 billion spent on farm income and price supports Liberalization in other countries is modeled by using estimates of world price and trade changes from the SWOPSIM global agricultural sector model (*21*) to update import demands and export supplies to the rest of the world, variables that are exogenous to this model

Liberalization is simulated assuming sectorally mobile labor and immobile capital and endogenous land supply When the restrictions on land use end, a level of cropland demand is chosen to maximize profit from production, while a level of cropland supplied is chosen to maintain the rate of return to cropland This procedure assumes a perfectly elastic longrun supply of cropland, which may be converted to pasture Given this mix of assumptions about factor mobility, the solutions represent medium-run to longrun equilibria

The SWOPSIM model (and all global models) estimates that multilateral liberalization enhances demand for U S grains and oilseeds, causing an increase in world prices which is passed on to the U S market price The domestic price increase mitigates, but does not fully offset, the effects of lost income and price supports on net revenue from production The overall impact is a downsizing of gross returns to labor, capital, and land in agriculture [5] The main farm sector adjustments are that land supplied for crop production diminishes and some labor moves out of the farm sector

The magnitude of economywide efficiency gains from liberalization depends critically on the macroeconomic adjustment to the change in farm program expenditures Figure 1 and table 3 present the simulated changes in economywide real GNP, by aggregate sectors and overall, for each of the three macroscenarios The fourth bar in each set of figure 1 indicates the change in real (constant 1982 dollar) GNP for each scenario

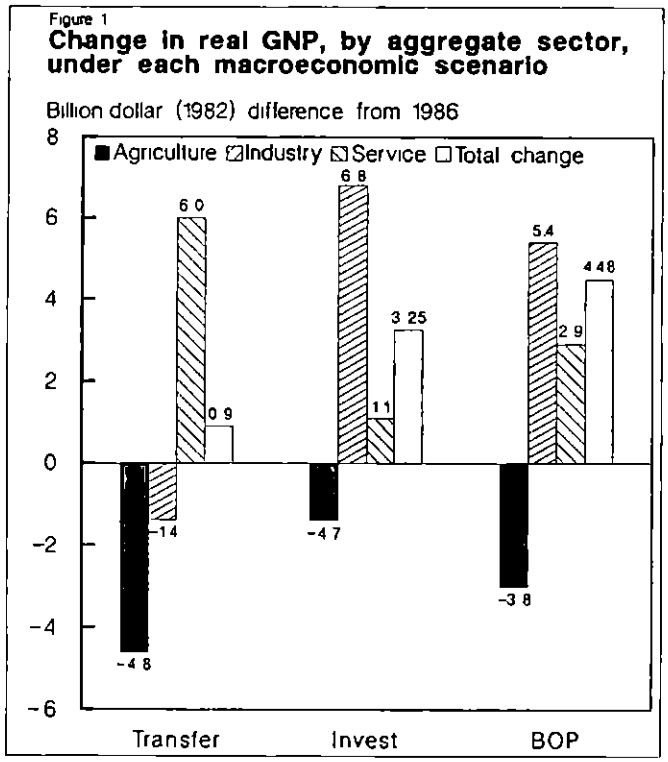
[2]Factor productivity differences are typically measured from data on constant dollar value-added shares to labor, employing full-time equivalent units of labor (*11*) The same data are used in the CGE model to measure relative factor return differences

[3]For contrasting views of the interactions between farm policies and risk, see (*6, 8*)

[4]The simulation results are robust with respect to various homogeneous technology specifications This is because the substitutability between primary factors of production is moot as long as relative factor prices do not change Since agriculture is a small employer of labor, and cropland supply is modeled as elastic at prevailing land prices in the long run, even a drastic reduction in the demand for primary factors in agriculture will not affect longrun relative factor prices or cost shares

[5]For discussions on the farm sector price, quantity, and income effects of unilateral or multilateral liberalization see (*2, 8 21*)

Figure 1
Change in real GNP, by aggregate sector, under each macroeconomic scenario



Under the *transfer* scenario, agriculture and industry contract, services expand, and overall GNP climbs slightly If unspent farm program money is not saved, there are insignificant economywide gains of $90 million real GNP (relative to a $4,000-billion economy) The farm program money, when saved, can be either invested domestically (*invest*) or allowed to offset foreign capital investment (BOP) In both the *invest* and BOP scenarios, real GNP increases $3 3 billion and $4 5 billion (1982 dollars), respectively, demonstrating the importance of reducing the government deficit Multilateral liberalization of agriculture alone is not the most important policy prescription for real economic growth

Why is it that real GNP barely improves when farm program savings are withheld from reducing the deficit? There are two interrelated reasons First, the income transfer part of the policy change simply substitutes one class of consumer demand (from farm households) for another (from taxpayers, which includes farm households) Thus, the composition of aggregate demand remains the same under the *transfer* scenario Final consumer demand is largely for services (note the pattern in CLES, in app 1) Second, since productivity in the service sector is generally below average but higher than in agriculture (table 2), overall GNP improves only slightly as labor moves from agriculture to services

Efficiency gains are much higher under the *invest* and BOP scenarios because of the type of final demand

Table 3—Real GNP changes under multilateral liberalization, by macroscenario

Sector	Scenario[1]			
	Base	Transfer	Invest	BOP
		Billion dollars		
Dairy and meat	12 2	11 87	11 84	11 91
		(–2 70)	(–2 92)	(–2 38)
Grains and oilseeds	43 1	39 88	39 84	40 29
		(–7 48)	(–7 56)	(–6 52)
Other agriculture	34 0	32 99	32 93	33 29
		(–2 96)	(–3 14)	(–2 09)
Agricultural results	89 3	84 7	84 6	85 5
Light consumer goods	240 0	238 37	237 87	238 88
		(– 68)	(– 89)	(– 47)
Basic intermediate goods	346 8	346 65	347 88	349 21
		(– 04)	(31)	(69)
Capital goods	209 7	209 88	212 80	212 76
		(09)	(1 48)	(1 46)
Construction	202 4	202 43	206 59	202 31
		(01)	(2 07)	(– 04)
Electronics	74 6	74 78	75 15	75 74
		(25)	(74)	(1 53)
Industrial results	1,073 5	1,072 1	1,080 3	1,078 9
Trade and finance	658 8	660 29	659 57	659 19
		(23)	(12)	(06)
Services	1,890 2	1,894 75	1,890 58	1,892 70
		(24)	(02)	(13)
Services results	2,549 0	2,555 0	2,550 1	2,551 9
Total real GNP	3,711 8	3,711 89	3,715 05	3,716 28
Change from base[2]		0 09	3 25	4 48

[1]Percent change relative to benchmark in parentheses
[2]Real GNP in constant (1982) billion dollars

stimulated The construction and capital goods sectors expand Labor generates relatively high real output in the sectors that supply investment goods This shift of labor to higher productivity uses has a positive composition effect on real GNP

The most balanced pattern of nonfarm expansion is under the BOP scenario The real depreciation associated with the change in the balance of payments stimulates U S exports, which are produced by a variety of sectors including grains and oilseeds, capital goods, and electronics To meet the demand, more land is kept in grain and oilseed production, and labor moves to the capital goods sector Labor productivity appears quite high in the capital goods sector These two patterns of resource use account for the relatively large real GNP gains

The BOP scenario provides the highest overall economywide gains of about $4 5 billion by terminating about $26 billion in farm program expenditures The implication is that for every $100 of deficit-reduction savings due to ending farm programs and reducing the trade deficit, the economy gains $17 20 of additional real GNP

Employment Patterns Under Multilateral Liberalization

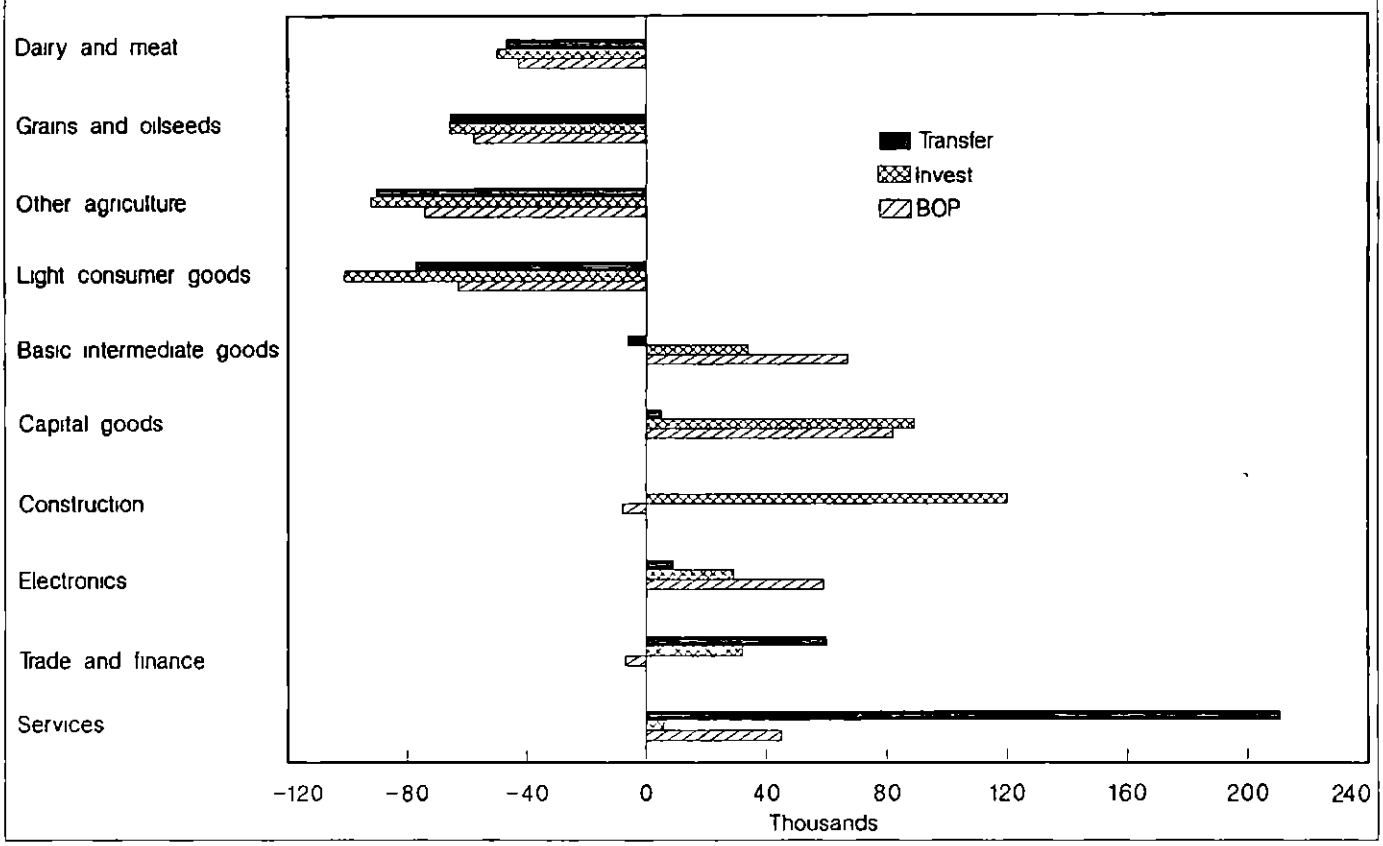
The pattern of employment under liberalization is very sensitive to the macroscenario (fig 2) Sectoral employment changes differ across the three macroscenarios In each case, labor moves out of the agricultural and light consumer goods (food and feed processing) sectors The longrun assumption of full employment means that all displaced farmers are reemployed elsewhere in the economy, a relocation that results in real GNP gains

Why and where do factors relocate? Liberalization pushes labor out of agriculture because farm value added falls Most of the program crops are in the grain and oilseed sector, and these sectors contract when subsidies are eliminated The reduced supply raises farm-level market prices well above market prices under the programs The higher grain and oilseed market prices ease the strain on crop sectors but hurt livestock sectors High feed crop prices mean increases in intermediate costs in the dairy and meat sector Since the rise in intermediate costs exceeds the increase in market price, value added declines This reduces the sector's return to labor, so labor moves elsewhere and dairy and meat sector output contracts

Liberalization's effect on employment among agricultural sectors, however, depends only slightly on the macroscenario As noted above, the grain and oilseed sectors retain more resources under the BOP assumptions because export demand is strong Foreign demand strengthens farm market prices so much that value added per unit of grain output after multilateral liberalization is only 4 percent lower than in the base year, according to our model That suggests that domestic farm market prices rise almost enough under multilateral liberalization to offset the loss of large deficiency payments and price supports

Farm price increases are costly to some nonfarm sectors Increases in market prices for agricultural products are passed on to the food processing industries in the light consumer goods sector as higher costs for intermediate goods, squeezing value added in the light consumer goods sector Multilateral liberalization pushes 101,000 full-time equivalent workers (under the *invest* scenario) out of the light consumer goods sector (fig 2)

Figure 2
Relocated full-time equivalent workers across sectors under multilateral liberalization under three macroeconomic scenarios



Labor moves to capture relative wage gains in the growing sectors, which are determined by the macroeconomic policies concomitant with liberalization Under the *transfer* scenario, most displaced labor moves to services Construction and capital goods industries are favored under the *invest* scenario because these sectors supply investment goods These labor-intensive industries provide a strong pull to reemploy agricultural labor, so that there are almost 20 percent more job changes under the *invest* scenario than under the BOP assumptions

The basic intermediate goods and electronics manufacturing sectors are favored under the BOP scenario These are important import-competing sectors, and the depreciation improves their competitiveness by making imports appear more expensive in dollar terms [6] These sectors also display high labor productivity The expansion of these high-productivity sectors explains the larger real GNP gains under the BOP scenario The gain equals about $17,700 in additional real output per worker who changes jobs, the most optimistic estimate among the three macroscenarios

An important determinant of adjustment costs is the number of job changes required to reach the new equilibrium The high number of job changes (309,000) economywide required for an optimal allocation under the *invest* scenario may mean higher adjustment costs than for the BOP or transfer scenarios The lowest number of job changes (253,000) economywide is required for the BOP scenario. The model predicts that 175,000-208,000 workers are expected to leave agriculture simply due to changes in policy during the 5- to 10-year liberalization period The simulations do not include estimates of the changes in agricultural employment from causes other than agricultural liberalization such as technical change [7] For example, forces not modeled here induced 279,000 workers to leave agriculture between 1980 and 1985, even with farm programs (*23*)

Conclusions

Agricultural liberalization would likely benefit the economy, and certain nonfarm sectors may expand under multilateral termination of farm support programs The analysis suggests that agricultural support programs have been a drag rather than a stimulus on GNP, especially given the Federal budget and trade deficits Terminating programs multilaterally may allow the United States to benefit from real GNP gains of $4 5 billion (1982 dollars)

In 1986, the United States spent $31 4 billion on farm programs Liberalization concomitant with government deficit reduction would not only save that amount but would also generate $3 25-$4 48 billion of additional real GNP If we ignore the crowding out due to deficit spending, liberalization would generate $0 09 billion of real GNP This suggests that deficit spending is much more costly in terms of GNP forgone than farm programs

This analysis shows that the government budget deficit did more to retard general economic growth than the 1985 farm bill, even in the peak farm program spending year of 1986 Deficit spending stimulates GNP when there is unemployment, but stimulates currency appreciation and trade deficits when the economy is fully employed (as in the recent past) The corollary multilateral liberalization alone provides small overall benefits If farm policy is liberalized, but the farm program savings are simply redistributed to households, the gains are insignificant Only when the savings reduce the government budget deficit do significant gains occur

The analysis relative to 1986 must be re-interpreted for the 1990's The government budget deficit continues high, but unemployment has also been increasing Thus, the effects of liberalization in the 1990's would probably be lower than the effects estimated relative to 1986 Real GNP gains due to liberalization may approach $1 25-$1 72 billion (constant 1982 dollars)

In the long run, agricultural liberalization will likely cause relocation of up to 208,000 workers from the farm sector and up to 101,000 from the food and fiber sectors to industry and/or service sectors If liberalization occurs with real currency depreciation, the trade sectors may offer more employment opportunities Barring depreciation, the reduced Federal budget deficit should spur private investment demand, stimulating employment in construction and other capital goods sectors

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[6] This analysis ignores potential pricing-to-market noncompetitive strategies that may be used by foreign exporters to maintain their U S market share If foreign suppliers price to market, they adjust their own prices to maintain constant dollar prices

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Appendix 1—CGE model

Indices $_{i,j}$ = sector, $_{f}$ = factor, $_{hh}$ = household, $_{ins}$ = institution

Market quantity		*Market price*
$FE_{i,f}$	Factor employment	WF_f
X_i	Composite good supply	P_i
XD_i	Domestic output	PX_i
XXD_i	Domestic sales	PD_i
E_i	Exports	PE_i domestic, PWE_i world
M_i	Imports	PM_i domestic, PWM_i world

Demand

CD_i	Final demand for private consumption
DK_i	Final demand for fixed investment
DST_i	Inventory investment by sector
GD_i	Final demand for government consumption
GDTOT	Aggregate real government consumption
ID_i	Final demand for investment goods
INT_i	Intermediate input demand

Income/expenditures

PVA_i	Value added per unit output	INDTAX	Indirect tax revenue
DEPRECIA	Total depreciation charges	INVEST	Total investment
ENTSAV	Enterprise savings	NETSUB	Total export subsidies
ENTTAX	Enterprise tax revenue	REMIT	Net remittances
FBOR	Net foreign borrowing	SAVINGS	Total savings
FXDINV	Fixed capital investment	SSTAX	Social security revenue
FSAV	Foreign savings	TARIFF	Tariff revenue
GENT	Transfers to enterprises	TOTHHTAX	Household tax revenue
GOVSAV	Government savings	YF_f	Factor income
GR	Total government revenue	YH_{hh}	Household income
HHSAV	Total household savings	$YINST_{ins}$	Institutional income
HHT	Transfers to households		

Policy instruments

$DEFPAY_i$	Deficiency payments
$ITAX_i$	Indirect business tax rate
PIE_i	Producer incentive equivalent
PL_i	Loan rate
QR_i	Import quota
TE_i	*Ad valorem* export subsidy rate
TM_i	*Ad valorem* tariff rate
TMQ_i	Quota premium (domestically received)
TP_i	Target price
XP_i	Program participating output
XS_i	Commodity stocks

Economywide variables

EXR	Exchange rate	FS_f	Factor supplies
PINDEX	Price index	RGNP	Real gross national product

Parameters

Supply

$\alpha_{i,f}$	Factor share in value added
AD_i	Production function shift
AT_i	Supply shift
γ_i	Export share parameter in CET supply
$IO_{i,j}$	Input-putput coefficients
η_i	Export-domestic transformation in CET exponent

Demand

AC_i	Demand shift
$CLES_{i,hh}$	Expenditure share
$GLES_i$	Government expenditure share
δ_i	Import share parameter in CES demand

Demand

σ_i	Import-domestic substitution elasticity
ρ_i	CES exponent = 1/1+σ
$E00_i$	Foreign demand shift
ϵ_i	Foreign demand elasticity
∂_i	CCC stocking parameter
$IMAT_{i,j}$	Capital composition coefficients

Nominal flows

$WFDIST_{i,f}$	Proportion of sector to average
$SINTYH_{hh,ins}$	Household share of net income
MPS_{hh}	Household savings rate
$HTAX_{hh}$	Household income tax rate

Selected parameter values

Sector	η	γ	σ	δ	∂	ϵ	$CLES_i$	$GLES_i$
Dairy and meat	3 0	0 01	4 0	0 26	3 0	3 0	0 33	0 06
Grains and oilseeds	1 3	43	4 0	18	3 0	5 0	04	1 04
Other agriculture	1 5	16	4 0	40	3 0	–	66	18
Light consumer goods	1 5	17	2 0	21	–	–	14 60	3 26
Basic intermediate goods	1 5	21	75	07	–	–	5 56	3 68
Capital goods	1 5	30	75	07	–	–	3 61	10 66
Construction	1 7	*	–	–	–	–	–	12 35
Electronics	1 5	28	1 1	25	–	–	3 20	2 02
Trade and finance	2 7	*	–	–	–	–	21 70	2 72
Other services	2 7	01	5	*	–	–	50 30	64 03

* = very close to zero – = not applicable $CLES_i$ and $GLES_i$ each sum to 100 percent

Equations

Domestic farm programs

$DEFPAY = (TP-PL)\ XP$	Each program sector
$XS = XS00 + XS0\ (PX/PL)^{-\partial}$	Each stocked sector
$PIE = [DEFPAY + (PL-PX)\ XS]/XD$	Each program sector
$PVA_i = PX_i\ (1-ITAX_i) - \Sigma_j IO_{j,i}\ P_j + PIE_i$	Each program sector

Production, factor demand, and supply

$XD_i = AD_i\ \Pi_f\ FE_{i,f}^{\alpha i,f}$	
$WF_f\ WFDIST_{i,f}\ FE_{i,f} = \alpha_{i,f}\ PVA_i\ XD_i$	
$INT_i = \Sigma_j\ IO_{i,j}\ XD_j$	
$XD = AT\ [\gamma\ E^{\eta} + (1-\gamma)\ XXD^{\eta}]^{1/\eta}$	All sectors

Demand

$ID_i = \Sigma_i\ IMAT_{i,j}\ DK_j$	
$CD_i = [\Sigma_{hh} CLES_{i,hh}\ (1-MPS_{hh})\ YH_{hh}\ (1-HTAX_{hh})]/P_i$	
$GD_i = GLES_i\ GDTOT$	
$X = AC\ [\delta\ M^{-\rho} + (1-\delta)\ XXD^{-\rho}]^{-1/\rho}$	All goods markets

Trade and trade policies

$M/XXD = [PD/PM\ \ \delta/(1-\delta)]^{1/(1+\rho)}$	Each import good
$E/XXD = [PE/PD\ \ (1-\gamma)/\gamma]^{1/(\eta-1)}$	Each export good
$E = E00\ [(PE/EXR\ (1+TE))/PWE]^{-\epsilon}$	Large export sectors
$PM = EXR\ PWM\ (1+TM+TMQ)$	All import sectors

Nominal flows

$YF_f = \Sigma_i WF_f\, WFDIST_{i,f}\, FE_{i,f}$

$YINST_{labor} = YF_{labor} - SSTAX$

$YINST_{proprietors} = YF_{land} - FRETAX$

$YINST_{enterprise} = YF_{capital} + GENT - ENTSAV - ENTTAX - DEPRECIA$

$YH = \Sigma_{ins}(SINTYH_{hh,ins}\ \ YINST_{ins})$

$GR = TARIFF + FRETAX + INDTAX + TOTHHTAX + SSTAX + ENTTAX + FBOR\ EXR$

$GOVSAV = GR - [\Sigma_i P\ GD_i + GENT + HHT + \Sigma_i\ PIE_i\ \ XD_i]$

$SAVINGS = HHSAV + GOVSAV + DEPRECIA + FSAV\ EXR + ENTSAV$

Market clearing

$FS_f = \Sigma_i\ FE_{i,f}$	f=labor and capital
$P\ X = PD\ XXD + PM\ M$	All goods markets
$PX\ XD = PD\ XXD + PE\ E$	All goods markets
$X = INT + CD + GD + ID + DST$	All goods markets

$\Sigma_i PWM_i\ M_i = \Sigma_i PWE_i\ E_i + FSAV + REMIT + FBOR$

$SAVINGS = INVEST$

GNP and price index

$GNP = \Sigma_i(PVA_i - PIE_i)\ XD_i + INDTAX + TARIFF$

$RGNP = \Sigma_i\ CD_i + DST_i + ID_i + GD_i + E_i - M_i$

$PINDEX = GNPVA/RGNP$

Appendix 2—Sector aggregation

Sector	*Major industries*	*BEA industry classification*
Dairy and meat	Milk, eggs, meat animals, poultry	1-1 03
Grains and oilseeds	Wheat, corn, rice, soy, cotton, peanuts, flax	2 01, 2 0201-2 0203, 2 06
Other agriculture	Sugar, tobacco, fruits, vegetables, nuts, other	2 03, 2 04-2 0503, 2 07, 3 0, 4 0
Light consumer goods	Food and kindred products, leather, footwear, feed, textiles, apparel, furniture, containers, printing	14-26, 33-34
Basic intermediate goods	Mining, petroleum, chemicals, plastic, rubber, glass & stone, iron & steel, fabricated metals	5-10, 27-32, 35-42
Capital goods	Munitions, engines, machinery, communications, trucks, motor vehicles, some electrical	13, 43-50, 52-54, 56 03 56 04, 57 03, 59-61
Construction	Private & government construction	11-12
Electronics	Office equipment, household appliances, semi-conductors, equipment, miscellaneous electronics, TV, radio, other	51, 55, 56 01-56 02, 57-57 02, 58, 62-64, 81, 84-85
Trade	Wholesale and retail trade, banking and insurance	69-70
Services	Real estate, services, noncomparable imports, transportation, and government	65-68, 71-79, 80, 82

Note BEA industry classification from Appendix B "Industry Classification of the 1977 Input-Output Tables," *Survey of Current Business*, p 80, May 1984

Poking Around Rural America with an Expert Guide

A Taste of the Country: A Collection of Calvin Beale's Writings *Edited by Peter A Morrison University Park The Pennsylvania State University Press, 1990, 260 pages, $28 50*

Reviewed by Sonya Salamon

Let's face it Demographers write useful papers, but the prose involved in reporting numbers is typically not very engaging A singular exception has been Calvin L Beale who, during a career spanning almost 40 years as a demographer with the U S Department of Agriculture, has, with style and grace, produced oft-cited papers and books that track rural peoples and places It is no accident that newspaper reporters, in particular, seek Beale out He always rewards them with a pithy and quotable aphorism that succinctly captures the human story of changes within the populations, the small towns, and the economy of rural America Seldom can a highly respected professional in a field also speak to the general public in words easy to understand Beale, however, reads the census like a novel and translates the plot into well-turned phrases that are highly informative and jargon-free His ability to do this derives from his uncanny encyclopedic knowledge of rural geography, history, and demography and a gift for synthesizing these data, enabling him to place new numerical facts in the appropriate spatial, economic, and social context

Due to his position as a government demographer, Beale's work has more often appeared as congressional testimony, talks, or Economic Research Service reports than in the more easily accessible form of academic journal articles

Thus, Morrison, the editor, performs a commendable service by gathering together gems by Beale that, while published, would require real detective work to uncover Such papers might have remained fugitive documents had Morrison not included them in this volume Of particular interest is a sprinkling of Beale's field notes, written in conjunction with his "busman's holidays" throughout the Nation's countryside Beale devotes these travels, during which he has visited half of the 2,400 nonmetropolitan counties in the country, to poking about in cafes, cemeteries, churches, and towns He interviews people or makes observations about the remnants of the past, such as abandoned buildings or the transition from German to English on tombstones, or such changes as community newcomers that tell the human story behind the census record of population fluctuations, persistence, or anomalies Because of the relative obscurity and remoteness of rural populations in this vast country, emerging patterns and trends tend to escape the notice of all but the most astute observer The field notes, while somewhat amusing, also reveal the deep respect Beale has for the uniqueness of local peoples The book lacks, unfortunately, any examples of Beale's trademark courthouse photographs taken in each county seat he visits

The book is divided into three parts and gathers a wide range of demographic issues Two perspectives emerge in Beale's work Policy issues tend to thread through the fabric that charts overviews of rural diversity, whether regional or topical Beale keeps in mind the policymakers inside the Washington, DC Beltway as he describes important differences in issues, such as the growth of rural populations or poverty, differences that might escape the notice of those who do not travel the countryside and talk to people The other focus is on a sequence of topics that has intrigued Beale by being odd or counterintuitive Such issues have occupied him in his travels over the years and connected him with researchers in other disciplines It was, for example, an interest in the variation of rural midwesterners' fertility that caused our paths to cross in the late 1970's, when Beale attended a presentation of mine on ethnic differences in Illinois farm-family land transfers

Included in the book's first section are two of the regional issues that motivated Beale's investigative activities Beale had noted and mapped a correspondence of high fertility, ethnicity, and religious affiliation among midwestern farmers Verifying the origins of pockets of ethnic farmers required much digging After immigration from Europe declined around the turn of the century, census reports, until 1980, did not provide accurate information about ethnicity Beale observed that, after 1970, high rural fertility had shifted out of the South to the North-Central region, and he sought an explanation Using county atlases of township plat maps, Beale demonstrated the close connection between the persistence of Catholic ethnic groups among farmers, for example, and high fertility in local enclaves Most of the data are published here for the first time This paper illuminates Beale's unique ability to combine historical and local sources to explain patterns no one else would have thought to consider important Also included in the section is a little known paper, reprinted from a 1972 *American Anthropologist* article, that deals with obscure mixed-racial populations found primarily in the U S South who, in the terminology of the period, Beale described as "white-Indian-Negro" (p 33) Beale locates a number of the groups, explains their origins, lists their many names, and comments on the chances of their

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persistence It is this paper that contains a prime example of the wit in Beale's work After citing in his introduction the highly negative observations about the character of the Melungeon people, made by a woman who had lived among them, as "thieving," "untruthful," and "exceedingly immoral," Beale pens the comment "Miss Drumgoole was essentially a sympathetic observer "

The second section is devoted to Beale's work in characterizing the economic and demographic transformations of the 20th century These selections are particularly illustrative of how Beale used his geographic knowledge to combat what he terms "Procrustean policy beds, of the one-size-fits-all variety all too common in public affairs" (p 59) The pieces gleaned from various book chapters, congressional testimony, and reports focus on the scheme Beale developed for characterizing the country by 26 subcultural regions, distinguished by variation in their settlement patterns, economic activities, environmental resources and constraints, and ethnic makeup A second chapter is concerned with a continuing Beale interest—rural communities in the North-Central region With the Federal Government's rural policy in mind, Beale shows that misconceptions abound about all rural communities "dying," and the effect of decline or stability where each occurs Another selection of the amusing and interesting results of field trips closes out the section, illustrating Beale's essentially anthropological interest in a variety of southern minority groups

In the third section, Morrison includes Beale's seminal 1975 article on the rural population revival of the 1970's that challenged many previously held assumptions about the country's migration and growth patterns Because Beale personally knew the explanation for the growth in a particular area, he was able to show that no one cause explained this shift and that growth had not occurred evenly in all regions or even within regions Another chapter elegantly sketches the sweeping changes in the farm population, with transformations in age patterns, family size, succession and migration, and why these changes have come about Beale's more recent concern with the social geography of rural poverty is illustrated in two chapters that examine the relationship among natural resources, the rural economy, and particularly, persistent minority poverty Showing the spatial relations of rural employment and natural resources in a series of county maps makes a striking impact not possible in a table It illustrates Beale's ability to translate numbers into a short and pungent message

The record of Beale's career provides evidence to those who rely only on macrodata for the value of onsite investigation What is behind numbers is the reality of people who make the choices that generate trends Beale's encapsulated record of rural America is well worth a read by anyone who is fascinated by the diversity and shared features of its past and present