rates decline in response to a policy change that reduces government food stamp expenditures, leaving the government deficit unchanged.

Fix real investment, and let household savings rates adjust. To maintain the nominal investment-saving balance with fixed real investment, household savings adjust, leading to a change in income available for household consumption.

Fix the trade balance in world prices, and let the exchange rate adjust. This closure rule introduces a new source of price change in domestic markets. For example, with this rule, a depreciation of the dollar causes the domestic price of both exports and imports to rise. Producers increase exports in response to the higher prices, while consumers of imports will shift toward domestically produced substitutes. Both actions put upward pressure on the domestic price level, reducing real household consumption.

The closure rules in the Food Assistance CGE model direct the impact of a shock away from the trade balance, real investment, and the government deficit and toward real household consumption. Even though a policy change may have an impact on the fixed accounts, by keeping them balanced at their initial levels, one can channel the impact into real consumption (through changes in personal income tax rates, household saving rates, and the exchange rate). This balance allows the model to summarize the impact of a policy change in terms of changes to real income and consumption.

The Food Assistance CGE Model: A Powerful Tool for Redistribution Analysis

As a result of the innovations discussed above, the Food Assistance CGE Model provides a powerful tool for analyzing the distributional consequences of food policy and economic change. The real strength of the Food Assistance CGE model is that it provides not just gross measures of economic change but distributional measures as well. This is an important ability for a model designed to examine food assistance programs. Like all welfare assistance programs, food assistance programs are redistributive; they take government funds collected through taxes and give them to poorer segments of the economy in the form of cash or in-kind assistance payments. A measure of the consequences of these programs should thus include their distributional impact. The Food Assistance CGE model is designed to trace the impact of economic or policy changes on the distribution of household consumption, labor supply, and

income, as well as on the distribution of industry production, labor demand, and sector income.

Unlike partial equilibrium or microlevel approaches,[8] the Food Assistance CGE model traces the economic consequences of household behavior across the economy. Though partial equilibrium and microsimulation approaches can model households in great detail, neither approach is able to capture wider economic ramifications of food assistance programs, including distributional ramifications. The results of these models can, however, be folded into a CGE model to examine the economywide feedback. For example, each household's response to a policy change in a microsimulation model can be aggregated to approximate the policy response by household groups for use in a CGE model.

Policy Simulations

In the policy simulation experiments, we asked two questions: "What would happen if funding for the Food Stamp Program were cut by $5 billion?" and "What would happen if food stamp benefits to low-income households were converted from food vouchers to cash?" Our choice of a $5 billion cut in the FSP approximates an annual average of earlier proposals to cut the FSP over the period 1996 to 2000, as discussed in Smallwood et al. (1995b). For each simulation we changed the initial conditions described in the base CGE model to reflect the hypothetical policy change and then, given the change, used the CGE model to calculate the new equilibrium. We then compared the new equilibrium with the initial equilibrium to reveal the economywide impacts of the policy change. It is possible to proportionately scale the results from this experiment for different FSP cuts or to flip the sign for an increase in program expenditures rather than a cut.

In the new equilibrium solution, prices equate supply and demand in the markets for goods, services, labor, and capital. In the Food Assistance CGE, the aggregate amount of capital is fixed, meaning that the new equilibrium does not reflect changes that are due to the creation of new capital. The types of changes captured in the new equilibrium therefore correspond to changes that would take about 2 years in an actual economy.

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[8]Citro and Hanushek (1991) provide a description of the use of microsimulation modeling.

Experiment 1: A Reduction in Food Stamp Benefits

In the first policy-experiment simulation, we assessed the economywide impacts of reducing annual food stamp expenditures by $5 billion. This simulation traces the impact of a redistribution of income from low-income households (by a cut in food stamps) to high-income households (by a cut in taxes). The economy-wide changes triggered by this redistribution followed a number of routes. The reduction in food stamps represented an immediate loss of food purchasing power by low-income households (modeled as proportional cuts in benefit payments to all recipient households with incomes at or below 130 percent of the poverty line). These households reacted to this reduction by reducing their consumption spending. The reduction in income taxes represented an immediate income gain to other, primarily high-income, households, which reacted to the rise in income by increasing their consumption spending and savings. Because lower income and higher income households spend their income on different arrays of goods, the redistribution of income triggered a redistribution in consumption demand. This shift in demand led to price and output adjustments. The output changes led to changes in labor demand. The interindustry linkages spread the impacts among the industries supplying intermediate goods.

Simultaneous with the changes triggered by adjustments in consumption, a set of changes was incited by adjustments in the amount of labor supplied by households. The loss in transfer benefits induced low-income households to increase their supply of labor. The reduction in taxes could induce higher income households to either increase their supply of labor (dominant compensated wage elasticity) or decrease it (dominant income elasticity). For the labor supply elasticities specified in table 5, labor supply increased. Together, changes in labor supply and demand then induced new equilibrium wages.

The general equilibrium framework of the Food Assistance CGE model allowed us to summarize the net results of all of the different adjustments described above. A redistribution of $5 billion is small relative to the whole economy, and the sectoral and economywide impacts are also rather small. However, they are not inconsequential. In the discussion that follows, we first describe the impacts of the $5 billion food stamp reduction on household spending on food and nonfood goods and services. Second, we examine the impacts on the farm, food processing, and other sectors of the economy. Third, we focus on adjustments in factor markets, such as the labor market. Finally, we summarize the distributional and aggregate impacts on households.

Impact on Household Consumption

In the simulation, the $5 billion reduction of food stamp benefits induced an economywide increase in consumption expenditures of $927 million.[9] Underlying this was an increase in consumption by mid- and high-income households of $5,892 million and a decrease in consumption by low-income households of $4,965 million (table 6). Since low-income households spend a larger amount of additional income (particularly food stamp benefits) on food than higher income households, the shift in income from low-income to mid- and high-income households resulted in a drop in food consumption of $1,222 million (and an increase in nonfood consumption of $2,118 million).

Mid- and high-income households devoted the largest share of their tax refund to nonfood consumption, with increased expenditures of between 0.08 and 0.16 percent on nonfood items. These households increased their consumption of food at home by only about $104 million (a change of roughly 0.03 percent). They increased their consumption of food away from home by $62 million (a change of roughly 0.03 percent).

As a result of the cut in food stamp benefits, low-income households reduced food-at-home expenditures by $1,326 million, with the largest reductions in miscellaneous foods ($560 million), red meat ($268 million), and fruits and vegetables ($249 million). These reductions amounted to between 3.1 and 3.5 percent of aggregate low-income household consumption of these items. Low-income households decreased consumption of food away from home by $32 million, or 0.32 percent. The reduced food consumption of low-income households did not equal the whole $5 billion food stamp benefit cut: these households also needed to make cuts in their nonfood budgets. Low-income household consumption of nonfood items dropped by $3,608 million, an average reduction of 1.5 percent of the aggregate expenditure on these items (table 6).

Impact on Farming, Food Processing, and Other Industries

The redistribution of consumption triggered by the reduction in food stamp funding caused a growth in overall production and a shift in production activity. Total real production grew by approximately $1,307

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[9]Unless otherwise specified, all changes are in real dollars (valued at old equilibrium prices) to provide direct comparison with pre-policy change values.

million[10] and the aggregate number of jobs (full-time equivalent) increased by 22,000 (table 7). Aggregate nominal sector income rose by $949 million.[11]

A disaggregation of the growth in production reveals that some industries shrank while others grew. The farm and food processing sectors had production decreases of $1,288 million, nominal sector income losses of $437 million, and job losses of 7,500. The hardest hit farm sectors were livestock, feed crops, and fresh fruits and vegetables (table 7). The food processing sector showed similar results, with the largest declines in miscellaneous food (an aggregate of highly processed food products), meat processing, dairy, and processed fruits and vegetables. These results reflect the fact that the largest reductions in household consumption were

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[10]Changes in production are not identical to changes in consumption (as reported in table 6) because consumption values include retail margins (including transportation).

[11]Sector income measures value-added net of factor taxes and indirect business taxes. It equals the returns to the owners of factor services from labor, capital, and land in agriculture. Nominal sector income is measured in post-policy change dollars and therefore provides a measure of the profitability of an industry once price and wage changes have been accounted for.

for miscellaneous foods, red meat, fruits and vegetables, dairy, and poultry. The drop in the production of feed crops was due to the decreased demand for them from the dairy, poultry, and livestock sectors.

The drop in demand for farm and food processing triggered small price changes, with the producer price for farm products falling by 0.04 percent and the purchaser price falling by 0.01 percent (table 7). The purchaser price change combines the change to the producer price with any change to the trade and transportation margins (the share of the price change that is absorbed by marketing services). For food processing, both producer and purchaser prices fell by 0.01 percent.

Nonfarm and nonfood processing sectors of the economy grew by almost $2,600 million, with the biggest gains in other services, health services, durable goods, and energy. Nonfarm and nonfood processing sectors gained almost 30,000 jobs (table 7), with nominal income growth of $1,387 million. Though most nonfood prices remained steady, there was a slight decline in purchaser prices for energy and durable goods manufacturing (-0.01). Both of these sectors provide inputs to agricultural production and experienced an initial

Table 6—Changes in household consumption due to the food stamp cut
Total consumption rose, although food consumption and consumption by low-income households fell

	Change in consumption			
Item	All households	Low-income	Mid-income	High-income
	Million dollars			
Total consumption	926.60	-4,965.00	1,403.10	4,488.50
Food at home	-1,221.90	-1,325.80	50.40	53.50
Dairy	-120.00	-130.00	5.00	5.10
Poultry	-90.10	-97.00	3.50	3.50
Red meat	-251.50	-267.60	8.20	8.00
Fish	-20.10	-22.20	.90	1.20
Fruit and vegetables	-228.20	-248.90	9.80	10.90
Miscellaneous food	-512.00	-560.00	23.20	24.90
Food away from home	30.70	-31.60	25.30	37.10
Nonfood consumption	2,117.71	-3,607.67	1,327.40	4,397.98
Tobacco & alcohol	12.10	-11.30	5.50	17.90
Clothing	93.00	-81.20	35.30	138.80
Other nondurables	150.10	-206.80	94.40	262.60
Durables	506.50	-338.60	181.90	663.30
Petroleum	135.80	-33.80	30.90	138.70
Energy	188.80	-36.90	22.80	202.90
Housing and finance	21.30	-1,747.40	476.40	1,292.20
Health services	501.90	-822.80	325.70	999.00
Education	36.00	-32.40	13.10	55.30
Other services	472.30	-296.40	141.50	627.20

Note: These changes are in real dollars (in pre-food-stamp-cut prices).

drop in demand. The rise in demand for financial and real estate services triggered a price rise for this sector.

The production and job losses resulting from the simulation were distributed across the Nation, with the greatest losses occurring in nonmetropolitan areas specializing in livestock and feed crops. The hardest hit area was the Plains States, with 441 nonmetro jobs lost (table 8). However, many nonmetro areas gained jobs after the food stamp cut. In the aggregate, nonmetro employment

expanded by over 1,000 jobs, supporting the observation that many nonmetro areas of the country have an economic base extending beyond agriculture. All metro areas of the country experienced job growth, gaining 21,000 jobs overall after the food stamp cut.

Impact on Factor Markets

The cut in food stamp benefits led to an increase of 22,000 jobs, with wages adjusting across skill levels to

Table 7—Changes in jobs, production, and sector income due to the food stamp cut
There was overall growth in production and jobs, but a reduction in farm and food processing production and jobs

Industrial sectors	Jobs	Real production	Nominal sector income[1]	Producer prices	Purchaser prices[2]
	Thousands	------*Million dollars*-----		------*Percent*-------	
Total	22.1	1,307	949	0	0
Total nonfarm nonfood	29.7	2,596	1,387	0	0
Construction	.5	41	9	0	0
Energy	1.0	361	151	0	-.01
Trade and transportation	1.7	122	20	0	0
Tobacco and alcohol	0	7	5	0	0
Apparel	.8	69	23	0	0
Nondurable manufacturing	.6	143	72	0	0
Durable manufacturing	3.3	531	193	0	-.01
Finance and real estate	2.0	196	174	0	.01
Food services (restaurants, etc.)	1.3	44	18	0	0
Health services	7.5	510	354	0	0
Education	.9	43	28	0	0
Other services	10.1	529	340	0	0
Total farm	-4.2	-397	-196	-.04	-.01
Dairy	-.4	-40	-8	-.03	-.04
Poultry	-.4	-43	-8	-.02	-.01
Livestock	-1.5	-156	-33	-.03	-.02
Cotton	.0	3	0	-.02	0
Food grains	-.1	-10	-12	-.06	0
Feed crops	-.9	-70	-62	-.06	-.05
Oilseed crops	-.2	-12	-16	-.06	-.06
Fruits and vegetables	-.6	-52	-38	-.03	-.02
Other crops	-.2	-16	-20	-.04	-.02
Total food processing	-3.3	-891	-241	-.01	-.01
Fish	.0	-10	-2	0	0
Meat	-.8	-198	-26	-.02	-.02
Poultry	-.3	-71	-18	-.01	-.01
Dairy	-.3	-101	-22	-.02	-.01
Grains	-.2	-96	-15	-.04	-.02
Fruits and vegetables	-.5	-103	-40	.00	.00
Miscellaneous foods	-1.2	-311	-119	-.01	-.01

[1]Sector income is measure of value added net of factor taxes and indirect business taxes and equals the returns to the owners of factor services from labor, capital, and land in agriculture. Nominal sector income is measured in post-policy change prices.
[2]A change to the price paid by consumers (purchaser or retail price) combines the change to the producer price with any change to the trade and transportation margins.

equate demand and supply. In the Food Assistance CGE model there is no involuntary unemployment, a common assumption in neoclassical labor-market models. As a result of the cut in benefits, labor supply increased as households responded to the impact on nonlabor income and after-tax wages and to any market-clearing wage adjustments. Labor demand also grew as production increased and as market wages fell in response to increases in labor supply. The different mix of skill levels supplied by low- and high- income households and demanded by industry produced a differentiated impact on wages and employment for the various labor skill levels (table 9).

For most skill levels, wages did not change to a noticeable degree once the labor market had reached its new equilibrium. Labor demand accommodated the increase in supply as industry production shifted out of food and into various services and manufacturing sectors. However, for mid-skill level-1 occupations, wages fell because a relatively large number of farm jobs, which are included in this category, were lost as production shifted out of agriculture. For high-skill level-1 occupations, the increase in supply was less than the increase in demand under the initial wage offer, pushing wages up to clear the market.

Table 8—Employment changes due to the food stamp cut
The cut led to growth in both metro and nonmetro employment

Regions and States	Metro	Nonmetro	Total	Regions and States	Metro	Nonmetro	Total
	Thousand jobs				*Thousand jobs*		
Northeast	5.604	0.373	5.977	Southeast	2.823	.369	3.192
Connecticut	.370	.019	.389	Alabama	.267	.058	.325
Delaware	.064	-.009	.055	Arkansas	.074	-.009	.065
Maine	.055	.054	.109	Florida	1.219	.016	1.235
Maryland	.434	.013	.447	Georgia	.507	.103	.609
Massachusetts	.756	.008	.764	Louisiana	.383	.050	.433
New Hampshire	.072	.051	.123	Mississippi	.096	.075	.170
New Jersey	.804		.804	South Carolina	.279	.077	.356
New York	1.885	.091	1.976				
Pennsylvania	1.046	.104	1.150	Plains	2.007	-.441	1.567
Rhode Island	.103	.007	.110	Kansas	.138	-.128	.010
Vermont	.016	.035	.051	Nebraska	.058	-.221	-.163
District of Columbia	.166		.166	North Dakota	.025	-.025	-.001
				Oklahoma	.229	.025	.254
North Central	4.474	.102	4.576	South Dakota	.017	-.039	-.022
Illinois	.979	-.012	.967	Texas	1.541	-.052	1.488
Indiana	.466	.069	.534				
Iowa	.069	-.178	-.110	Mountain	1.194	.114	1.308
Michigan	.840	.092	.932	Arizona	.358	.031	.389
Minnesota	.371	-.043	.328	Colorado	.298	-.002	.296
Missouri	.422	.040	.462	Idaho	.017	-.033	-.016
Ohio	.991	.116	1.107	Montana	.023	.022	.045
Wisconsin	.337	.020	.357	Nevada	.242	.024	.265
Appalachia	1.716	.487	2.203	New Mexico	.086	.032	.118
Kentucky	.193	.078	.272	Utah	.154	.010	.164
North Carolina	.526	.120	.646	Wyoming	.016	.031	.047
Tennessee	.400	.125	.525				
Virginia	.524	.083	.607	Pacific	3.024	.062	3.086
West Virginia	.073	.081	.154	Alaska	.049	.019	.068
				California	2.353	.004	2.357
				Hawaii	.093	.020	.113
				Oregon	.190	.031	.221
				Washington	.338	-.012	.326
				Total	21.008	1.067	22.075

Source: For the nonagricultural sectors, employment by industry and region are from County Business Patterns (U.S. Bureau of Census, 1997). Data on State metro and nonmetro agricultural employment are USDA-ERS estimates. We distinguished metro from nonmetro counties according to definition set by the Office of Management and Budget [see, www.ers.usda.gov/Briefing/Rurality/WhatisRural/].

Table 9—Impacts on job totals of the food stamp cut

The number of jobs increased, though wages for farm and food-related jobs fell

Skill level	Change in number of jobs	Wage change
	Thousands	*Percent*
All labor	22.07	0
High-skill 1	1.6	0
High-skill 2	5.34	.01
Mid-skill 1	4.35	-.01
Mid-skill 2	4.53	0
Low-skill	6.24	0

Note: Low skill occupations includes service occupations, handlers and laborers. Mid skill level-1 includes sales, administrative support, and farming. Mid skill level-2 includes manufacturing production and transportation workers. High-skill level 2 occupations include professional occupations. High-skill level 1 occupations include executive occupations.

While supplies of land and capital were fixed at the economywide level, these factors were mobile across the different production sectors.[12] Land moved among the different agricultural crops, with feed crops taking the biggest loss because of reduced livestock production. In addition to a reallocation of land among crops, the reduction in crop output linked to the fall in food demand induced a decrease in the aggregate price of land by 0.32 percent. Capital mobility was reflected in patterns of equipment purchases. With capital return differentials across industries, the reallocation of capital resulted in a slight (0.01 percent) increase in the aggregate returns to capital.

Impact on Household Income and Well-Being

Total net real income rose by $1,254 million dollars as a result of the food stamp cut, with the distribution of the income change following the tax and transfer change across households. Net real income fell by $4,965 million for low-income households and rose by $1,491 million for mid-income households and by $4,727 million for high-income households (table 10).

Every demographic type of household in the low-income group had a lower income after the food stamp cut. The magnitude of the fall in net real income for low-income households was approximately $36 million less than the

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[12]An alternative shortrun scenario treats capital stocks as fixed at the sector level. In this scenario, the increase in labor supply was 1.5 times greater, price adjustments for the food and farm sectors were 3 times larger, and production responses in the farm and food sectors were about 20 percent less.

initial $5 billion cut in food stamp benefits, for two reasons. First, low-income households increased their labor supply by the equivalent of 5,050 full-time jobs in response to the reduction in food stamp benefits. This labor adjustment plus wage adjustments generated an increase in real labor income of $12 million. Second, changes in real taxes and other components of income resulted in an increase in net real income of approximately $24 million.

Mid- and high-income households, including single-parent households, had an increase in income after the food stamp cut. The increase in net real income for these households was more than the initial $5 billion tax cut, for two reasons. First, mid- and high-income households responded to the increase in net wages (due to the cut in taxes) and the increase in labor demand (triggered by production shifts) by supplying more labor. Mid-income households increased their labor supply by the equivalent of 5,764 full-time jobs, generating an increase in real labor income of $206 million. High-income households increased their labor supply by the equivalent of 11,265 jobs and earned an additional $373 million in real labor income. Second, real taxes dropped by $151 million more than the $5 billion initial tax cut for mid- and high-income households due to adjustments triggered by a new set of prices and changes in the tax base.

Interestingly, elderly households, specifically mid- and high-income households, reduced their labor supply after the food stamp cut. This reduction is explained by the large increase in capital income (more than $120 million) that these households enjoyed thanks to the increases in production and returns to capital resulting from the food stamp cut. In response to this large income boost, these households reduced their labor supply (labor supply income elasticity is negative). High-income elderly households received almost 80 percent of their income from nonlabor sources (versus about 15 percent for two-parent high-income households), making them more responsive to changes in capital income than other household groups.

Experiment 2: A Cash-Out of Food Stamp Benefits

In the second policy simulation, we assessed the economywide impacts of converting the annual $18.75 billion of food stamp benefits paid to low-income households from coupons to cash transfers.[13] This conversion triggered a number of economic changes because con-

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[13]For the simulation, we do not consider food stamp benefits paid to mid- or high-income households.

sumers treat food stamps and cash differently when making consumption decisions. As discussed earlier, in the Food Assistance CGE model, we set the marginal propensity to consume food out of food stamps at 17 percentage points higher than the marginal propensity to consume food out of cash income. As a consequence of this difference, converting program benefits from coupons to cash altered the mix of goods and services purchased by food stamp recipients. The change in the consumption mix in turn generated changes in production, labor demand, and wages. These changes then influenced both low-income and high-income household labor supply and resulted in new levels of employment and wages.

The general equilibrium framework of the Food Assistance CGE model allows us to summarize the net results of the different adjustments described above. In the discussion that follows, we first look at the impacts of cashing out the benefits of the Food Stamp Program

on household spending on food and nonfood goods and services. Second, we examine the impacts on the farm, food processing, and other sectors of the economy. Third, we focus on adjustments in factor markets. We then examine the distributional effects on households.

Impact on Household Consumption

The cash-out of the Food Stamp Program, in which food stamp benefits were converted to cash payments, caused a fall in aggregate demand of $617 million,[14] with both large declines in food demand and large increases in nonfood demand (table 11). This pattern of change was primarily driven by the higher marginal propensity to consume food with food stamps than with cash income.

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[14]Again, unless otherwise specified, all changes are real (valued at old equilibrium prices), to provide direct comparison with pre-policy change values.

Table 10—Household income changes after the food stamp cut
Income rose for mid- and high-income households and fell for low-income households

Type of household	Labor supply (jobs)	Food stamps (nominal)	Labor income (real)	Taxes (real)	Net income[1] (real)
	Number	----------------------------Million dollars----------------------------			
Total households	22,074	-5,000	590	-5,175	1,254
Low-income	5,047	-5,000	12	-24	-4,965
Mid-income	5,764	0	206	-1,260	1,491
High-income	11,263	0	373	-3,891	4,727
Two parent	10,441	-1,010	243	-1,658	960
Low-income	1,385	-1,010	4	-7	-999
Mid-income	2,788	0	91	-487	582
High-income	6,267	0	148	-1,164	1,377
Single parent	3,005	-3,007	28	-161	-2,808
Low-income	2,680	-3,007	3	-7	-2,997
Mid-income	6	0	6	-21	26
High-income	319	0	18	-134	163
Two adult	8,148	-212	184	-1,686	1,783
Low-income	251	-212	1	-2	-210
Mid-income	2,855	0	73	-519	601
High-income	5,042	0	110	-1,165	1,392
Single adult	968	-484	113	-989	718
Low-income	695	-484	3	-8	-473
Mid-income	136	0	34	-203	240
High-income	137	0	75	-778	952
Elderly	-488	-287	23	-681	600
Low-income	35	-287	0	0	-286
Mid-income	-21	0	3	-30	42
High-income	-502	0	20	-650	844

[1]Net income includes labor income, capital income, retirement income, and most cash and noncash government transfers net of personal income taxes. Appendix A provides a list of the income sources included in this definition.

The cash-out induced a $3,274 million fall in demand for food at home. Low-income households were responsible for the bulk of this decline as they shifted their consumption toward nonfood items and services. Low-income households reduced their at-home food consumption by $3,273 million (8 percent). The largest drops in food demand were for miscellaneous foods, red meat, and fruits and vegetables. Food eaten away from home (not covered by food stamps) increased by $103 million for low-income households.

Aggregate nonfood consumption increased by $2,560 million, all of it from increases in consumption by low-income households. These households increased their nonfood consumption by $3,145 (1.3 percent), with the largest increases for housing, insurance, and finance ($1,296 million—1.35 percent); health services ($462 million—1.3 percent); and durable goods ($324 million—1.3 percent). For mid- and high-income households, aggregate nonfood consumption fell by $304 million and $281 million, respectively (approximately 0.1 percent). Thus, unlike the food stamp cut experiment, which generated higher levels of consumption for mid- and high-income households, the cash-out experiment

resulted in lower levels of consumption for these households. As will be seen in the next two sections, this outcome was driven by a reduction in demand for the type of labor supplied by mid- and high-income households, which was in turn driven by the production shift triggered by the shift in consumption by low-income households.

Impact on Farming, Food Processing, and Other Industries

Changes in low-income household consumption induced changes in production, sector income,[15] and jobs: aggregate industry output fell by $2,840 million,[16] sector income fell by $426 million, and 5,600 jobs (full-time equivalent) were lost (table 12). Underlying these aggregate changes were industries that shrank and industries that grew, with the pattern of change following the shift in demand.

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[15]Sector income is a nominal measure of value added (net of factor taxes and indirect business taxes) and equals the returns to the owners of factor services from labor, capital, and land in agriculture.

[16]Changes in production are not identical to changes in consumption (as reported in table 11) because consumption values include retail margins (including transportation).

Table 11—Household consumption changes after the food stamp cash-out

Total consumption fell, especially food consumption and consumption by mid- and high-income households

Item	Change in consumption			
	All households	Low-income	Mid-income	High-income
	Million dollars			
Total consumption	-616.7	-25.4	-308.6	-282.7
Food at home	-3,273.8	-3,272.9	-1.0	.2
Dairy	-318.4	-318.7	.1	.1
Poultry	-244.1	-244.1	0	0
Red meat	-671.4	-672.4	.7	.4
Fish	-53.3	-53.1	-.1	-.1
Fruit and vegetables	-611.8	-611.5	-.3	.0
Miscellaneous food	-1,374.8	-1,373.1	-1.3	-.3
Food away from home	97.0	102.8	-3.8	-2.0
Nonfood consumption	2,560.0	3,144.8	-303.8	-281.0
Tobacco and alcohol	89.2	91.2	-1.1	-.9
Clothing	186.8	196.7	-5.0	-5.0
Other nondurables	134.2	162.8	-16.0	-12.5
Durables	265.6	324.0	-28.9	-29.6
Petroleum	94.1	105.2	-5.0	-6.0
Energy	118.8	139.8	-6.1	-14.8
Housing and finance	1,035.0	1,296.4	-141.5	-120.0
Health services	331.3	462.4	-72.0	-59.2
Education	42.4	48.7	-2.7	-3.6
Other services	262.8	317.7	-25.4	-29.5

Note: These changes are in real dollars (pre-food-stamp cash-out prices).

Both the farm and food processing sectors had decreases in production averaging around 0.5 percent. In the farm sector, production fell by $1,085 million, nominal sector income by $540 million, and the number of jobs by 11,500. The most affected farm sectors were livestock production, feed crops, and fresh fruits and vegetables. The drop in the production of feed crops was due to reduced demand for them by the dairy, poultry, and livestock sectors. In the food processing sector, production shrank by $2,428 million, nominal sector income by

$657 million, and jobs by 9,000. The biggest declines were in meat processing and miscellaneous food.

In general, prices fell for food and farm goods and services, with the biggest decreases in the producer prices of food and feed grains and fruits and vegetables. The fall in the producer price for food processing was smaller (0.04 percent) than that for producer farm prices (0.11 percent). The larger price impact on farm goods relative to processed foods reflected a greater degree of factor mobility in food processing than in

Table 12–Changes in jobs, production, and sector income after the food stamp cash-out
Production and jobs declined overall, but aggregate nonfarm, nonfood production and jobs increased

Industrial sectors		Change in:			
	Jobs	Real production	Nominal sector income[1]	Producer prices	Purchaser prices[2]
	Thousands	------*Million dollars*-----		-----*Percent*-------	
Total	-5.6	-2,840	-426	0	-.01
Total nonfarm nonfood	15.0	673	771	0	.00
Construction	.7	25	-26	0	0
Energy	.7	70	76	.01	0
Trade and transportation	-12.8	-1,145	-710	0	0
Tobacco and alcohol	.1	64	39	.01	0
Apparel	1.4	106	34	0	-.01
Nondurable manufacturing	-1.3	-242	-75	0	0
Durable manufacturing	2.3	80	45	0	0
Finance and real estate	6.6	1,092	918	.01	.02
Food services (restaurants, etc.)	2.8	97	49	0	0
Health services	5.4	328	250	.01	.01
Education	1.1	48	32	.01	.01
Other services	8.1	151	140	0	0
Total farm	-11.5	-1,085	-540	-.11	-.04
Dairy	-1.0	-109	-21	-.09	-.10
Poultry	-1.1	-117	-21	-.05	-.04
Livestock	-4.0	-423	-90	-.08	-.06
Cotton	0	5	-1	-.07	0
Food grains	-.4	-29	-35	-.18	0
Feed crops	-2.4	-193	-169	-.16	-.14
Oilseed crops	-.5	-36	-45	-.17	-.16
Fruits and vegetables	-1.5	-139	-102	-.09	-.05
Other crops	-.5	-44	-55	-.10	-.05
Total food processing	-9.0	-2,428	-657	-.04	-.02
Fish	-.1	-29	-8	-.01	-.01
Meat	-2.3	-536	-69	-.06	-.04
Poultry	-.8	-194	-49	-.03	-.03
Dairy	-.7	-272	-58	-.04	-.03
Grains	-.6	-267	-42	-.10	-.05
Fruits and vegetables	-1.3	-283	-110	-.01	-.01
Miscellaneous foods	-3.3	-847	-322	-.02	-.01

[1]Sector income is a nominal measure of value added net of factor taxes and indirect business taxes and equals the returns to the owners of factor services from labor, capital, and land in agriculture.

[2]A change to the price paid by consumers (purchaser or retail price) combines the change to the producer price with any change to the trade and transportation margins.

agriculture, due to an assumption that total land use in crop production was fixed in the aggregate. With a lower degree of quantity adjustment in agriculture, prices played a greater role in market adjustment.

As a result of the decrease in agricultural and food production, almost all nonmetro areas of the country experienced job reductions, losing almost 8,000 jobs in the aggregate. The hardest hit nonmetro areas were located in the Plains and North Central States (table 13). The negative impact of the cash-out spilled over into many metro areas as well, particularly in the North Central States, illustrating how widespread the economic linkages are between agricultural industries and other industries.

Real aggregate nonfarm, nonfood production increased by $673 million, with a growth of 15,000 jobs (table 12). The largest increases in production occurred for housing, insurance and finance, and for health services. Some nonfood, nonfarm industries also declined. Both trade and transportation, and nondurable manufacturing had production falls ($1,145 million and $242 million, respectively) and job losses (12,800 and 1,300, respectively). The reduction in trade and transportation reflects the relative importance of these services in bringing food from the farm to households via food processing. The reduction in nondurable manufacturing was due to its relative importance as a supplier of intermediate goods to farming and food processing. In general, prices rose

Table 13—Metro and nonmetro employment changes due to the food stamp cash-out

Regions and States	Metro	Nonmetro	Total	Regions and States	Metro	Nonmetro	Total
	Thousand jobs				*Thousand jobs*		
Northeast	2.006	-.191	1.815	Southeast	.202	-.926	-.724
Connecticut	.174	-.003	.171	Alabama	-.017	-.103	-.120
Delaware	.017	-.049	-.032	Arkansas	-.120	-.291	-.410
Maine	.009	-.011	-.002	Florida	.060	-.118	-.058
Maryland	.114	-.040	.074	Georgia	.065	-.180	-.115
Massachusetts	.364	.001	.365	Louisiana	.105	-.056	.050
New Hampshire	.017	.021	.038	Mississippi	.014	-.184	-.170
New Jersey	.159		.159	South Carolina	.095	.005	.100
New York	.996	-.029	.967				
Pennsylvania	.112	-.078	.033	Plains	.088	-2.542	-2.453
Rhode Island	.052	.004	.056	Kansas	-.028	-.600	-.628
Vermont	-.007	-.006	-.014	Nebraska	-.097	-.770	-.867
District of Columbia	.146		.146	North Dakota	-.022	-.151	-.172
				Oklahoma	.059	-.173	-.115
North Central	-.069	-2.696	-2.764	South Dakota	-.035	-.214	-.249
Illinois	-.054	-.437	-.491	Texas	.211	-.634	-.422
Indiana	-.006	-.209	-.214				
Iowa	-.197	-.845	-1.043	Mountain	.198	-.647	-.449
Michigan	.073	-.076	-.003	Arizona	.063	-.014	.049
Minnesota	-.007	-.426	-.433	Colorado	.026	-.185	-.159
Missouri	.050	-.220	-.170	Idaho	-.041	-.237	-.278
Ohio	.182	-.170	.012	Montana	-.003	-.083	-.086
Wisconsin	-.109	-.312	-.420	Nevada	.121	-.001	.120
				New Mexico	.018	-.045	-.027
Appalachia	.264	-.383	-.119	Utah	.011	-.056	-.045
Kentucky	-.027	-.157	-.183	Wyoming	.003	-.026	-.023
North Carolina	.107	-.146	-.039				
Tennessee	.030	-.018	.011	Pacific	-.532	-.475	-1.007
Virginia	.145	-.073	.073	Alaska	.034	-.014	.019
West Virginia	.010	.011	.020	California	-.432	-.144	-.575
				Hawaii	.033	-.025	.008
				Oregon	-.040	-.097	-.137
				Washington	-.127	-.194	-0.322
				Total	2.304	-7.860	-5.556

Source: For the nonagricultural sectors, employment by industry and region are from County Business Patterns (U.S. Bureau of Census, 1997). Data on State metro and nonmetro agricultural employment are USDA-ERS estimates. We distinguished metro from nonmetro counties according to definitions set by the Office of Management and Budget (see, www.ers.usda.gov/Briefing/Rurality/WhatisRural/).

slightly for nonfood nonfarm goods and services, with the biggest increase in the purchaser price of finance and real estate services.

Impact on Factor Markets

The cash-out simulation resulted in a decrease of 5,600 jobs and a decline in aggregate wages of 0.01 percent (table 14). These results were driven by the shift in the structure of low-income consumer demand and the impact this shift had on the structure of production and labor demand and, ultimately, on household labor supply decisions. As in the food stamp cut simulation experiment, wages adjust to equate supply and demand, and there is no unemployment.

The shift in consumption and production had the biggest impact on the two mid-skill labor categories. These skill levels were heavily employed by those sectors that had the biggest fall in production after the cash-out: over 90 percent of the labor employed in agriculture was mid-skill 1, over 50 percent of the labor employed in food processing was mid-skill 2, and over 50 percent of labor employed in trade and transportation was mid-skill 1 (table 4). For these skill levels, both employment and wages fell as demand shifted away from these sectors (table 14): the number of mid-skill jobs fell by 9,910 and wages fell by 0.04 percent for mid-skill 1 and by 0.02 percent for mid-skill 2. Aggregate demand shifted primarily into various service sectors, which use a greater percentage of high-skill professional workers. For high-skill labor, employment and wages both rose as demand shifted into these sectors (table 14): the number of high-

Table 14—Impacts on job totals of the food stamp cash-out

The overall number of jobs decreased, but there was an increase in high-skill and low-skill jobs

Skill level	Number of jobs	Wage change
	Thousands	*Percent*
All Labor	-5.56	-.01
High-skill 1	.18	0
High-skill 2	2.27	.02
Mid-skill 1	-7.74	-.04
Mid-skill 2	-2.17	-.02
Low-skill	1.90	.01

Note: Low-skill occupations include service occupations, handlers and laborers. Mid-skill level 1 includes sales, administrative support, and farming. Mid-skill level 2 includes manufacturing production and transportation workers. High-skill level 2 occupations include professional occupations. High-skill level 1 occupations include executive occupations.

skill jobs rose by 2,450 and high-skill 2 wages rose by 0.02 percent. The number of low-skill jobs also increased (1,900 jobs), and so did the wage rate (0.01 percent). These increases can be traced to the increase in production in housing, insurance, and finance. Over 12 percent of the labor employed in this industry is low skill.

While supplies of land and capital were fixed at the economywide level, these factors were mobile across sectors. Land acreage moved among the different agricultural crops, with feed crops losing the most acres due to this sector's dependence on livestock production. The aggregate price of land fell by 0.9 percent. The reallocation of capital resulted in a slight (0.04 percent) increase in the aggregate return to capital.

Impact on Household Income and Well-Being

The cash-out experiment resulted in a net reduction in real income of $650 million. Net real income for high-income households fell by $300 million, for mid-income, $326 million, and for low-income households, $24 million (table 15). These changes stemmed from two primary sources. First, changes in labor supply and demand triggered changes in the amount and distribution of labor income. Mid- and high-income households held 5,414 fewer jobs after the cash-out. This decrease in the number of jobs, along with changes in wages, translated into a drop in real labor income of $314 million for mid-income households and $228 million for high-income households.

This result is explained by the high percentage of the labor supplied by mid- and high-income households is mid-skill labor, the type of labor hardest hit by the shift in production resulting from the cash-out. Almost 60 percent of labor supplied by mid-income households is mid-skill, as is about 50 percent of high-income household labor (table 3). Low-income households had only a small decrease in the number of jobs, losing only 143 full-time equivalent positions. Real labor income fell by $17 million for these households. This result stemmed from the increased demand for low-skill labor after the cash-out, and more than 50 percent of the labor supplied by low-income households is low-skill labor (table 3).[17]

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[17]Each aggregate household type supplies labor among the occupations in a specific proportion (table 3), given the initial relative wages among these occupations. In response to a change in relative wages due to a policy or some other type of exogenous shock to the economy, households may adjust the occupational mix for which they supply labor. The adjustments are inelastic (small) and strongly influenced by the initial pattern of occupations that the household type supplied.

An important aspect of the labor market impacts to mid- and high-income households is the shift of low-income household consumption into housing. In the time horizon of our analysis, this shift in demand does not result in the construction of new housing stocks but in a demand for better, higher priced housing that already exists. The adjustment assumes there is available housing (with a longer run perspective, there would be a stimulus to generate new housing). A characteristic of the housing market, given existing stocks of housing, is that there is little to no employment associated with supplying the housing. So, as demand shifts away from economic activity with relatively high labor-to-production ratios to activity with low to zero labor-to-production ratios, there is a significant impact on the labor market.

The second source of change to household income and well-being came from a change in taxes. To maintain government expenditures and other transfer payments at initial levels, real taxes increased by approximately $65 million after the cash-out. This increase was due both to price adjustments that increased the cost of fixed real government purchases and to economywide adjustments that affected other tax revenues. High-income households paid all of the tax increase—in fact, mid-income households actually had a reduction in their taxes of $1 million (triggered by their large fall in labor income).

Conclusions

The results of the two policy simulations demonstrate the degree to which economic activity and food stamp

Table 15—Impact on household incomes from the cash-out
Income for all household types decreased, though mid- and high-income households were the hardest hit

Type of household	Labor supply (jobs)	Food stamp income (nominal)	Labor income (real)	Taxes (real	Net income[1] (real)
	Number	------------------------Million dollars------------------------			
Total households	-5,556	18,746	-559	65	-650
Low-income	-143	18,746	-17	0	-24
Mid-income	-2,821	0	-314	-1	-326
High-income	-2,593	0	-228	65	-300
Two-parent	-2,485	3,786	-210	18	-232
Low-income	-72	3,786	-8	0	-9
Mid-income	-1,329	0	-134	-1	-135
High-income	-1,083	0	-69	19	-89
Single-parent	-312	11,274	-39	1	-45
Low-income	-36	11,274	-4	0	-7
Mid-income	-91	0	-13	0	-14
High-income	-184	0	-22	1	-24
Two-adult	-2,145	796	-187	17	-210
Low-income	-13	796	-1	0	-2
Mid-income	-1,143	0	-110	0	-114
High-income	-989	0	-76	17	-94
Single-adult	-539	1,814	-98	12	-121
Low-income	-20	1,814	-4	0	-6
Mid-income	-246	0	-53	-1	-54
High-income	-273	0	-42	12	-62
Elderly	-76	1,077	-24	17	-42
Low-income	-1	1,077	0	0	-2
Mid-income	-12	0	-4	1	-9
High-income	-63	0	-19	17	-31

[1]Net income includes labor income, capital income, retirement income, and most cash and noncash government transfers net of personal income taxes. Appendix A provides a list of the income sources included in this definition.