Exported to Death: The Failure of Agricultural Deregulation

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In 1996, free market Republicans and budget-cutting Democrats offered farmers a deal: accept a cut in farm subsidies and, in return, the government would promote exports in new trade deals with Latin America and in the World Trade Organization (WTO) and would eliminate restrictions on planting decisions.[1] In economic terms, farmers were asked to take on risks heretofore assumed by the government in exchange for deregulation and the promise of increased exports.[2]

This sounded like a good deal to many farmers, especially since exports and prices had been rising for several years. Many farmers and agribusiness interests supported the bill, and it was in keeping with the position of many farmer representatives and most members of Congress from farm states who already supported the WTO, the North American Free Trade Agreement (NAFTA), and the extension of fast-track trade negotiating authority, usually in the name of supporting family farmers.

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1. *See* John Carey, *Commentary: Let the Markets Do Their Job*, BUSINESS WEEK, June 28, 1999, at 33.

2. *See* Jon Lauck, *Against the Grain: The North Dakota Wheat Pooling Plan and the Liberalization Trend in World Agricultural Markets*, 8 MINN. J. GLOBAL TRADE 289, 293-313 (1999) (providing a succinct description of government intervention in world agricultural markets in the twentieth century).

But for family farmers, the Omnibus Farm Bill—and the export-led growth strategy upon which it was based—has been a massive failure. The U.S. farm trade balance declined by nearly $12 billion between 1996 and 1998, and prices have plummeted.[3] August U.S. corn prices fell from $4.30 per bushel in 1996 to $1.89 in 1998, or 56 percent. Wheat prices fell from $4.57 per bushel in 1996 to $2.46 in 1998, or 46 percent.[4]

TABLE 1. CHANGES IN THE DISTRIBUTION OF WORKING FARMS, 1993-1998

	Size Class: Annual Sales					
	$1,000,000 or more	$500,000-$999,999	$250,000-$499,999	$100,000-$249,999	$50,000-$99,999	total
	Number					
1993	15,829	32,628	75,008	237,574	224,584	585,623
1997	19,967	36,986	88,288	220,293	199,836	565,369
Percent change	26.1%	13.4%	17.7%	-7.3%	-11%	-3.5%
Number gained or lost	4,138	4,358	13,280	-17,281	-24,748	-20,254
Number lost with gross incomes of $50,000 to $250,000						-42,029

Source: Access site: *http://www.econ.ag.gov/Briefing/fbe/fi/fiscdmu.htm.* Select years 1993 and 1997 to retrieve data.

The combination of export dependence and deregulation has left increased numbers of family farmers facing extinction.[5] At the same time, U.S. agriculture becomes more centralized in the hands of large farms and national and multinational companies.[6] Contrary to the Department of Agriculture's rosy predictions, the plight of farmers is likely to get worse under current

3. *See* U.S. Department of Commerce, *Table 20. U.S. Total Agricultural Trade Balances with Individual Countries* (visited Sept. 23, 1999)

4. *See* USDA National Agricultural Statistics Service, *Agricultural Prices Monthly* (visited Oct. 10, 1999); Joint Economic Committee and Council on Economic Advisors, U.S. Congress, 1998 and 1999, *Economic Indicators* (visited Sept. 26, 1999) (indicating the seasonally adjusted Consumer Price Index (CPI) for monthly price deflators).

5. *See supra* Table 1 (for data on recent declines in the number of small farms in the U.S).

6. *See id.*

policies.[7] Expanding supplies are likely to outpace the growth in demand for U.S. farm products; restricted access to foreign markets will continue; and the strong dollar, actively supported by the U.S. Treasury, will further depress the prices farmers receive for their goods.[8]

It is time to end this cruel hoax on the American family farmer. In the short-term, the U.S. government should stabilize income and reduce excess supplies. This could be achieved by: (1) reducing the value of the dollar in order to boost farm prices; (2) shifting subsidies away from large farms and corporate farmers to small farms; (3) a renewal of set-aside and other land-conservation programs. For the long-term, the U.S should establish regulatory mechanisms to restore supply-demand balance and accelerate shifts to high-value products. These goals could be accomplished by: (1) increasing expenditures for research, development, and infrastructure; (2) supporting new uses for farm products.

I. FREEDOM TO FAIL: THE OMNIBUS 1996 FARM BILL

For more than a half-century after the Great Depression, government policies helped create a highly successful U.S. agricultural sector by reducing risks to family farmers.[9] Crop insurance reduced production risk, and a variety of price and income support programs, plus set-aside programs that paid farmers to remove excess land from production, reduced price risks. But the Omnibus 1996 Farm Bill eliminated price and income supports and replaced them with annual income payments, to be phased out over seven years on a fixed declining schedule.[10] The 1996 farm bill also eliminated the set-aside program, thus giving farmers, in the words of one commentator, "the freedom to plant what they wanted, when they wanted. With prices rising and global demand soaring, lawmakers and farmers were happy to exchange the bureaucratic rulebook for the Invisible Hand."[11]

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7. *See* Daryll E. Ray, Overview of Agriculture Today and In the Future, Address at the University of Tennessee Milan No-Till Field Day (July 22, 1999) (arguing that the reduction of government price and income supports coupled with the destabilizing effects of international trade will continue to suppress agricultural prices into the next century).

8. *See id.*

9. *See* Ralph M. Chite and Mark Jickling, *Managing Farm Risk in a New Policy Era*, CONGRESSIONAL RESEARCH SERVICE REPORT FOR CONGRESS 97-572 at 2 (last modified Jan. 22, 1999).

10. *See id.*

11. *See* Carey, *supra* note 1, at 33.

The rapid growth in U.S. agricultural exports–more than doubling between 1985 and 1996–encouraged farmers to accept the deregulation strategy.[12] But rising exports have not translated into rising incomes. Due to globalization and relentless declines in the real prices of basic farm products, the structure of American agriculture has been transformed, and, as a result, real U.S. farm income has been steady or declining for many years despite the long-run trend of rising exports.[13]

In the two decades from 1978 to 1997, real grain prices were slashed in half. Then, in 1998, prices fell an additional 10-20 percent, pushing many small farmers to the brink of bankruptcy.[14] In this environment, only the largest and most capital intensive farms are able to survive and prosper.[15]

There are about 2 million farms in the U.S., but three-quarters of those generate minimal or negative net incomes.[16] Since farms with less that $50,000 in gross revenues tend to be primarily part-time or recreational ventures, this section analyzes working farms that generate gross revenues in excess of $50,000 per year.

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12. *See* US Department of Agriculture, *Table 1. U.S. International Trade In Goods and Services Balance of Payments Basis* (visited Sept. 23, 1999) <http://www.ita.doc.gov/industry/otea/usfth/aggregate/Hl98t01.txt>.

13. *See* DARYLL E. RAY, THE ECONOMIC STRUCTURE OF AGRICULTURE: RHETORIC VERSUS REALITY(1988). With rising excess capacity and declining farm prices, an increase in export revenues will not offset lower export prices. This, Ray argues, helps explain the downward trend in farm incomes. In general, the demand for agricultural products is price-inelastic. In other words, the percentage response in total quantity of agricultural goods demanded tends to be much less than a given percentage reduction in price. *Id. See also* U.S. Dep't of Agric., *Agricultural Income and Finance Situation and Outlook* (visited Sept. 23, 1999) <http://usda.mannlib.cornell.edu/reports/erssor/economics/ais-bb/1998/agricultural_income_and_finance_12.18.98>.

14. Real corn prices declined from $5.28 per bushel in 1978 to $2.65 in 1997, then to $2.36 in 1998. Real wheat prices declined from $7.08 per bushel in 1978 to $3.87 in 1997, then to $3.01 in 1998. *See* U.S. Dep't of Agric., *Prices Rec'd by Farmers: Historic Prices & Indexes 1908-1992 (92152)* (visited Sept. 23, 1999) <http://usda.mannlib.cornell.edu/data-sets/crops/95152/.>; USDA National Agricultural Statistics Service, *Agricultural Prices Monthly* (visited Sept. 24, 1999. These numbers were converted to real prices using the CPI-UX1 deflator. *See* Joint Economic Committee and Council on Economic, U.S. Congress, 1998 and 1999, *Economic Indicators* at Table 23. Simple annual averages of monthly real prices were used to compute annual average revenues, in real terms.

15. See Ray, *supra* note 13, at *(i)* (With reference to the 1985 Food Security Act, Ray notes that agribusiness "enthusiastically embraced" the government's adoption of export-oriented agricultural policies).

16. *See supra* Table 1.

Within this group, the number of large farms is growing while small farms are disappearing at a rapid pace, as shown in TABLE 1. There were 554,000 working farms in the U.S. in 1993.[17] More than 42,000 farms with revenues of less than $250,000 per year disappeared between 1994 and 1997, a decline of about 10 percent. Nearly 20,000 farms with revenues in excess of $250,000 per year were added in this three-year period, an increase of about 17 percent. Thus, the U.S. experienced a net loss of about 22,000 farms between 1994 and 1997 alone.[18]

Corporate influence is growing throughout the U.S. food supply system.[19] While the share of farms owned by individuals and families (operating as sole proprietors) was roughly constant between 1978 and 1992, at about 85 percent of all farms, the output share of such farms declined during this period from about 62 percent to 54 percent.[20] Corporations absorbed most of this production lost by sole proprietors between 1978 and 1992. Moreover, an increasing number of family farmers are raising crops under contract from big purchasers.[21]

Corporate control is becoming much more concentrated both upstream and downstream from farmers.[22] On the input side, considerable consolidation is taking place among firms that supply farmers with seeds and chemical inputs. A small number of companies are assuming control of the seed production business, including Monsanto, Dupont, and Novartis.[23] The story is similar on the distributional side. Grain distribution, for example, which has been tightly controlled by a handful of companies since the 19th century, is becoming even more concentrated.[24] Recently, Cargill has proposed to purchase Continental's grain

17. *See* U.S. Dep't of Agric., *A Close-up Of Changes in Farm Organization* (visited Oct. 14, 1999) <http://www.econ.ag.gov/briefing/FarmStructure/qa/Text.closeup.html>.

18. *See id.*

19. *See id.*

20. *See id.*

21. *See* Richard A. Melcher and John Carey, *More bitter harvests ahead: trouble abroad and at home are squeezing family farms*, BUSINESS WEEK, June 28, 1999 at 32-3. *See also* Robert Scott, *The U.S. Trade Deficit: Are We Trading Away Our Future?* Testimony given before the Subcommittee on International Economic Policy and Trade of the House Committee on International Relations (July 22, 1999) (analyzing "The Corporate Role in Globalization," which has adversely affected the U.S. economy as a whole).

22. *See* Melcher and Carey, *supra* note 21, at 32.

23. *See id.*

24. *See id.*

storage unit, which would result in a single firm that would control more than one-third of U.S. grain exports.[25]

II. INTERNATIONAL TRADE: THE SIREN'S SONG

The growth in agricultural exports, especially in the first half of 1990s, suggested to small farmers that sales to foreign markets were the key to solving their problems.[26] However, export markets have proven to be more volatile than domestic ones, and globalization has increased the vulnerability of farmers to sudden price swings.[27]

The U.S. agricultural trade balance with the rest of the world increased by almost $11 billion between 1990 and 1996 (TABLE 2), then declined by nearly $12 billion between 1996 and 1998.[28] This drop in the volume of net exports, which was equal

TABLE 2. U.S. TRADE BALANCE WITH INDIVIDUAL COUNTRIES, 1990-98 ($ MILLIONS)*

Country/Region	1990	1996	1998*	Changes: 1990 to 1996	Changes: 1996 to 1998
WORLD	17,292	27,994	16,264	10,702	-13,238
EUROPE	5,228	4,835	2,199	-393	-4,229
Canada	1,587	133	42	-1,454	-914
Mexico	-98	1,654	1,516	1,752	-182
NAFTA	1,488	1,787	1,558	299	-1,096
ASIA	14,147	22,249	14,737	8,102	-7,594
REST OF THE WORLD	-3,572	-877	-3,788	2,695	-319

*Census Basis; Foreign and Domestic Exports, F.a.s.
**Estimated—incomplete data for all countries.

Source: U.S. Department of Commerce, *Foreign Trade Highlights (http://www.ita.doc.gov/cgi-bin/otea_ctr?task=r)* and U.S. Department of Agriculture, Foreign Agricultural Trade of the U.S. *(http://www.econ.ag.gov/db/F)*.

25. *See id.* *See* Jon Lauck, *Toward an Agrarian Antitrust: A New Direction for Agricultural Law*, 75 N.D.L. REV. 449 (urging courts to reject agribusiness mergers such as Cargill-Continental).

26. *See* U.S. Dep't of Agric., *Total Value of U.S. Agricultural Trade—historical series 1935-present* (visited Sept. 26, 1999) <http://www.econ.ag.gov/briefing/AgTrade/#Data>.

27. *See* USDA National Agricultural Statistics Service, *supra* note 4, at 1996-1998.

28. *See* U.S. Department of Commerce, *supra* note 3, at Table 20.

to a 6% decline in farm revenues, was compounded by a sharp decline in domestic commodity prices (discussed below).[29] These two factors combined in 1997 and 1998 to severely depress farm incomes.

Closer examination of regional trends in U.S. farm trade shows that only a limited number of markets were open to U.S. farm products. The U.S. trade balance with Europe declined sharply between 1990 and 1998, as shown in Table 2.[30] During that time exports to Europe fell by about $2 billion while U.S. imports increased by $3 billion.[31] U.S. trade problems with Europe result from continued high subsidies to European farms and European resistance to certain U.S. farm products, such as hormone-treated beef.[32] The Uruguay Round trade agreements were designed, in part, to reduce agricultural subsidies, but European farm spending actually increased from $46.0 billion in 1995 (the year before the agreements went into effect) to $55 billion in 1997.[33] During the same period, U.S. government payments to farmers held steady at $7 billion, less than 13% of the European level.[34]

Under NAFTA and the earlier U.S.-Canada Free Trade Agreement (which went into effect in 1989), the *volume* of farm trade has significantly increased throughout the region.[35] However, the net result has been a small but significant *decline* in the U.S. farm trade surplus with Mexico and Canada,[36] contra-

29. *See* U.S. Dep't of Agric., *Farm Cash Receipts Data homepage* (visited Sept. 23, 1999). *See also* U.S. Dep't of Agric., *Agricultural Income and Finance Situation and Outlook* (visited Sept. 23, 1999) <http://usda.mannlib.cornell.edu/reports/erssor/economics/ais-bb/1998/agricultural_income_and_finance_12.18.98.> (indicating 1998 estimates).

30. U.S. Department of Commerce, "U.S. Foreign Trade Highlights," *supra* note 3, at Table 20.

31. *See id.*

32. *See* Lawrence Speer, *Anti-American, Anti-Global Forces Unite In Backlash Against Tariffs on French Foods*, 172 DAILY REPORT FOR EXECUTIVES A-6 (1999).

33. *See* USDA, Mann Library Homepage, *European Agricultural Statistics (98001)(Table sb13)* (visited Oct. 8, 1999) <http://usda.mannlib.cornell.edu/data-sets/international/98001>.

34. *See* USDA, Mann Library Homepage, *Government Payments Data* (visited Oct. 8, 1999) <http://usda.mannlib.cornell.edu/re. . .ncome_and_finance_summary>.

35. *See* U.S. Department of Commerce, *supra* note 3, at Tables 18-19. (Note that volume is defined as sum of exports plus imports).

36. *See id.* at Table 20.

dicting the U.S. Trade Representative's statement that "NAFTA has been a tremendous success for American agriculture."[37]

NAFTA has also resulted in a massive shift in the structure of trade and production within North America. U.S. exports of corn and other feed grains (such as sorghum) have increased, but U.S. imports of fruits, vegetables, wheat, barley, and cattle have all increased much more.[38] For example, U.S. grain exports to Canada (primarily corn and other feed grains) increased by 127% between 1990 and 1998, but at the same time U.S. imports of wheat from Canada increased by 249%, from $79 million in 1990 to $278 million in 1998.[39] Similarly, U.S. corn exports to Mexico increased by 47% during that period, while cattle and calf imports from Mexico soared by 1,280%.[40]

Since the trade balance with Europe and North America was relatively flat from 1990 to 1996, what was the source of strongly growing demand for U.S. farm products in the 1990s? Answer: the trade balance with Asia increased by $8 billion (Table 2).[41] Unfortunately for U.S. farmers, though, the demand that pulled in U.S. farm exports to Asia was driven by the same inflationary bubble that ultimately caused the world financial crisis. An unprecedented inflow of short-term capital into Asia stimulated a huge growth in consumption. When this capital flowed out even more quickly in the wake of the Thai financial crisis in July 1997, the U.S. agricultural trade balance with Asia collapsed back to its 1990 level.[42]

Thus, the boom in U.S. agriculture in the early 1990s, which convinced farmers that trade liberalization was the solution to their problems, was built on the false foundation of a speculative bubble. Increased trade has certainly increased the volatility of farm incomes, but it has yet to improve their average level.

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37. JOHN HUENNEMANN, DEPUTY U.S. TRADE REPRESENTATIVE FOR NORTH AMERICAN AFFAIRS, REMARKS FROM A SEMINAR ON "GOVERNING IN THE GLOBAL AGE," WASHINGTON, D.C., GEORGE WASHINGTON U., (June 18, 1998). *See also* ROBERT E. SCOTT ET AL., TRADING AWAY GOOD JOBS: AN EXAMINATION OF EMPLOYMENT AND WAGES IN THE U.S., 1979-1994 (indicating many free-traders cite only the job and growth possibilities created by exports, while ignoring the job loss created by increased imports.

38. *See* USDA, Mann Library Homepage, *Foreign Agricultural Trade of the United States (FATUS)* (visited Oct. 8, 1999).

39. *See id.*

40. *See id.*

41. U.S. Department of Commerce, *supra* note 3, at Table 20.

42. *See* ROBERT A. BLECKER, TAMING GLOBAL FINANCE: A BETTER ARCHITECTURE FOR GROWTH AND EQUITY, (Economic Policy Institute, 1999) (analyzing the causes of the Asian financial crisis). *See also* U.S. Department of Commerce, *supra* note 3, at Table 2 and Table 20.

Globalization has also stacked the deck against family farmers, since they tend to be under-capitalized and more vulnerable to financial cycles in comparison to large and diversified corporate farms.[43]

The U.S. Department of Agriculture has fueled expectations that the global demand for U.S. agricultural products will increase in the future. Its most recent baseline forecasts predicts that commodity prices, net farm income, and U.S. exports will all recover rapidly in 2000 and climb steadily thereafter.[44] The USDA has also forecast that U.S. agriculture would benefit from further trade liberalization. For example, it estimated that the proposed Free Trade Agreement of the Americas (FTAA) "would cause annual U.S. farm income (in 1992 dollars) to be $180 million higher than it otherwise would be."[45]

This forecast is particularly surprising because the same report also predicts that the FTAA will reduce the U.S. trade balance.[46] Specifically, it predicts that the FTAA will have a larger impact on U.S. farm imports than on exports, thus increasing the current U.S. agricultural trade deficit with Latin America.[47] The reported income effects include only efficiency gains from the shift of resources from one crop to another, and exclude the losses from declining demand for U.S. farm products and from rising imports resulting from deregulated trade.[48] The report does acknowledge that the reported gains "are very small changes in U.S. farm income"[49] and that:

> The short-run adjustment costs for some farm households could be large. Hence, the debate on the acceptability of an FTAA may hinge on

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43. *See* Ray, *supra* note 7.

44. *See* USDA, *USDA baseline presentation* (visited Oct. 8, 1999) (*Introduction, Contents and Overview* at 2, *U.S. Crop Highlights* at 4 and 7, and *Farm Income and Financial Conditions* at 2).

45. *See* USDA, Mann Library Homepage, Terri Raney et al., *Free Trade in the Americas: International Agriculture and Trade*, (Nov. 1998) wrs984s.asc>.

46. *See id.* at 1-2 (estimating that U.S. exports would be "$580 million higher (1percent) and imports $830 million higher (3 percent)," thus decreasing the U.S. agricultural trade balance).

47. *See id.*

48. *See id.* at 37. *See also* DARYLL E. RAY & ROY FREDRICK, FOOD, AGRICULTURE, AND RURAL POLICY INTO THE TWENTY-FIRST CENTURY: ISSUES AND TRADE-OFFS (THE ECONOMIC SETTING FOR U.S. FOOD AND AGRICULTURE) (Milton C. Hallberg et al., eds., Westview Press) (indicating the relatively "fixed nature of agricultural resources," the inability of many farmers to "quickly move resources out of and into agricultural production," casts further doubt upon the "efficiency" claims espoused by the USDA).

49. *See* Raney, *supra* note 45, at 2.

> its distributional consequences rather than on the gains to the entire economy or to the agricultural sector as a whole.[50]

The FTAA report further assumes that the economy will be at full employment and that there are no adjustment costs due to changes in trade.[51] Moreover, as the authors note, the impacts of agricultural trade deficits and structural change on the farm sector are excluded from the study.

Similar predictions were made about the benefits of NAFTA and the Uruguay Round trade agreements that created the WTO.[52] U.S. farmers were supposed to benefit because they are the world's low-cost producers of many types of grain and livestock. As we have seen, it did not turn out that way. Are the USDA's predictions that rising exports will cause farm prices to increase in the future likely to be any more accurate now? An economic analysis (see the Appendix for methodological details) of the various forces that influence U.S. commodity prices – namely, (1) U.S. income (in terms of gross domestic product, or GDP), (2) the real (inflation adjusted) U.S. exchange rate, and (3) worldwide average crop yields (which reflect the influence of technology on crop supplies) — shows that U.S. farm prices are unlikely to rise in the future unless U.S. agricultural policies are substantially revised.[53]

Data from the corn and wheat sector indicate that the U.S. income has a small effect on price.[54] Similiarly, the changes in U.S. income associated with the Asian crisis have not reduced grain prices, but this result is not strong, statistically speaking.[55]

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50. *Id.* at 38.

51. *Id.* at 37.

52. *See* Thea Lee, *False Prophets: The Selling of NAFTA*, Briefing paper (Washington, D.C., Economic Policy Institute, July 1995).

53. *See* Ray, *supra* note 13 (Generally speaking, agriculture cannot raise itself "by its own bootstraps." Reduced prices alone do not engender significant modifications in worldwide export demand). *See also* Ray, *supra* note 7 (for extended agricultural price forecasts).

54. The analysis in the remainder of this section summarized the results of the economic model which is described and estimated in the Appendix. *See supra* Appendix, Table A1, and Table A2.

55. The coefficients in the Appendix measure the effects of a percentage change in the variable listed on corn and wheat prices. Thus, for example, the positive coefficient for real U.S. GDP in the corn price regression suggests that a 1% decline in U.S. income would reduce corn prices by 2%. Since U.S. income was not reduced by the Asian crisis in 1997 or 1998, this factor does not explain the decline in U.S. grain prices in this period.

Exchange rates, on the other hand, have large and statistically significant effects on farm prices.[56] Each one percent increase in the value of the dollar generates a 1.1 percent decline in the price of corn and a 1.5 percent decline in the price of wheat. Thus, the 16 percent appreciation in the value of the U.S. dollar that occurred between 1995 and 1997 is responsible for 17 to 24 percentage points of the decline in U.S. corn and wheat prices, respectively.[57] World commodity yields also have a large and significant effect on prices.[58] As yields per acre rise, prices fall. The expansion in world supplies of each commodity depresses its price. While the growth in income has only a weak effect on prices, technology and the growth in world agricultural productivity has a strong, negative impact on prices over time.[59]

These results show why farmers have been misled about the benefits of trade liberalization. Previous rounds of trade negotiations have failed to generate sustained, reliable growth in demand for U.S. farm products. In addition, the diffusion of advanced agricultural technologies (the "green revolution") around the globe has had a depressing effect on U.S. farm prices because it increased global crop yields. This price depression has occurred despite, or perhaps because of, the benefits that advance technologies have generated for farmers and consumers throughout the developing world.

III. TIME FOR A NEW FARM POLICY

There is nothing wrong with expanding trade in agriculture as long as it can be accomplished in ways that benefit U.S. farmers. However, because the U.S. government is unwilling to address such fundamental problems as global excess crop supplies and rising currency values, pushing for more free trade in agriculture is counterproductive. It is time to stop artificially expanding trade without regard for the consequences.

The Omnibus 1996 Farm Bill was a complete failure. It failed to generate export-led growth, and it transferred substantial risks to farmers with no visible benefits. Given the diffusion of technology to the rest of the world, and because other coun-

56. *See supra* note 54.

57. *See id.* The model developed in the Appendix uses commodity-specific export price indices for corn and wheat that are developed by the USDA. The negative sign on the coefficient reported in the Appendix shows that an increase in the value of the dollar has a depressing effect on corn and wheat prices.

58. *See id.*

59. *See id.* The effect of yields is statistically significant at the 0.0001 level for corn, but it is not significant for wheat.

tries seek to maintain their own food security, agriculture will never be a substantial growth industry for the U.S. However, for the same reason, the U.S. needs a viable farm sector, one that can deliver a high and rising standard of living for family farmers and consumers.

In the short-term, the U.S. government should stabilize farm incomes and reduce excess supplies. This could be achieved by: (1) Carefully managed reductions in the value of the dollar; (2) The shift of agricultural subsidies away from large farms and corporate farmers to small farms; (3) a renewal of set-aside and other land-conservation programs. For the long-term, the U.S should establish regulatory mechanisms to restore supply-demand balance and accelerate shifts to high-value products. These goals could be accomplished by: (1) An increase in expenditures for research and development, and the construction of infrastructure and distribution systems for new, higher-valued products that can be produced with sustainable (e.g., organic) technologies and that meet consumer demand for high-quality, niche, and specialty foods; (2) The exploration of other possibilities for stimulating agricultural consumption (such as the conversion of biomass to energy) to build domestic demand for agricultural products.

APPENDIX
THE CAUSES OF FALLING COMMODITY PRICES

This section develops a reduced form analysis of the causes of variation in real corn and wheat prices in the United States between 1972 and 1997. It assumes that the market is competitively structured. Demand and supply in each market are specified as follows (using the corn market as an example), in functional form:

corn demand = f(corn prices, real U.S. GDP, real exchange rate),
corn supply = g(corn prices, world corn yields, real oil prices).

Equating supply and demand, and solving for corn prices, yields a reduced form model for the equilibrium price of corn:

corn prices = h(real U.S. GDP, real exchange rate, world corn yields, real oil prices)[60]

Data

This equation is estimated for corn and wheat prices using annual data, in log-first differences form, in order to control for serial correlation in the errors.[61] Real GDP in the U.S. is used as a proxy for the broader effects of income on demand.[62] Exchange rates use commodity specific weights developed by the USDA.[63] Export market weights are used for the corn exchange rate because half of all U.S. corn supplies are exported. Import weights are used for the wheat exchange rate because wheat imports have gained in importance, particularly since the implementation of the U.S.-Canada Free Trade Agreement in 1989. A one period lag is used on the exchange rate to capture the full long-run impact of exchange rates on prices. Average world yields per hectare are as reported by the World Food and Agriculture Organization for each commodity.[64] Real oil prices are used as a

60. *See* Robert E. Scott & Robert A. Blecker, *Labour rents, adjustment costs, and the cost of U.S. steel trade restraints in the 1980s*, 11 Int'l Rev. of Applied Economics 399, 399-419 (1997) (giving a more detailed exposition of a similar market structure).

61. *See* USDA, *Prices Rec'd by Farmers: Historic Prices & Indexes*, and *Agricultural Prices- Annual*, *supra* note 15. *See also Economic Indicators*, *supra* note 4, at Table 23.

62. *See Economic Indicators*, *supra* note 4, at Table 2.

63. *See* USDA, *Agricultural Based Exchange Rates (88021)* (visited Oct. 8, 1999) <http://usda2.mannlibb.cornell.edu//. . .ets/international/88021/README.TXT>.

64. *See* FAOSTAT, *Agricultural Data, World Yields* (visited Oct. 8. 1999).

proxy for the impact of all energy prices on the costs (and supply) of agricultural products.[65]

Results

The equations were estimated using ordinary least squares. Results for the corn equation (TABLE A1) show that corn yields have a strong negative effect on corn prices, as expected. Since corn yields have increased by about 50% in the study period, this variable explains most of the long-run decline in real corn prices between 1972 and 1997. The coefficient for corn yields is significantly different from 0 at the 0.0001 level.

The exchange rate also has a negative sign and is significant at the .05 level. Since the equations are estimated in log-difference form, the coefficients can be interpreted as giving the percent change in prices for each 1% change in the independent variable. Thus, a 1% appreciation of the dollar would reduce corn prices by 1.095% within one year, according to the results in Table A1.

TABLE A1.
US CORN PRICES

Dependent Variable: US Corn Prices (Real)
Method: Least Squares on Log First Differences
Sample (adjusted): 1972 1997
Included observations: 26 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	–0.073909	0.051363	–1.438955	0.1649
World Corn Yields	–1.792539	0.375427	–4.774663	0.0001
Exchange Rate Corn(–1))	–1.095672	0.504607	–2.171334	0.0415
Real US GDP	2.201256	1.481215	1.486115	0.1521
Real Oil Prices	0.183161	0.143716	1.274459	0.2164
R-squared	0.563241			
Adjusted R-squared	0.480049			
F-statistic	6.770370			
Prob(F-statistic)	0.001154			
Log likelihood	13.93022			
Durbin-Watson statistic	1.442770			

None of the other coefficients in Table A1 are significant at the .10 level, as shown there. However, real GDP has the expected positive sign. The coefficient estimate suggests that a 1% increase in GDP would increase corn prices by about 2.2%. Over-

65. *See* U.S. Department of Energy, Energy Info. Admin., *Historical Data and Analysis Homepage* (visited Oct. 8, 1999).

all, this equation explains over half of the variation in U.S. corn prices in this period. The whole equation is significant at the .001 level, as indicated by the f statistic.

Results for the wheat equation (TABLE A2) show that wheat yields have a strong, negative effect on wheat prices, as expected. However, the coefficient on wheat yields is not significant. The exchange rate also has a negative sign, and is significant at the .10 level. A 1% appreciation of the dollar would reduce wheat prices by 1.50% within one year, according to the results in Table A2.

TABLE A2.
US WHEAT PRICES

Dependent Variable: US Wheat Prices (Real)
Method: Least Squares on Log First Differences
Sample (adjusted): 1972 1997
Included observations: 26 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	–0.111280	0.073772	–1.508428	0.1463
World Wheat Yields	–0.356295	0.964636	–0.369357	0.7156
Exchange Rate Wheat(–1)	–1.500124	0.802243	–1.869914	0.0755
Real US GDP	3.300456	2.172691	1.519064	0.1437
Real Oil Prices	–0.123811	0.212935	–0.581453	0.5671
R-squared	0.242674			
Adjusted R-squared	0.098421			
F-statistic	1.682285			
Prob (F-statistic)	0.191630			
Log likelihood	4.478358			
Durbin-Watson statistic	1.557117			

None of the other coefficients in Table A2 are significant at the 0.10 level, as shown there. However, real GDP once again has the expected positive sign. The coefficient estimate suggests that a 1% percent increase in GDP would increase wheat prices by about 3.3%.

Overall, the results for this equation are less satisfactory than for corn. Less than one-quarter of the variation in U.S. wheat prices in this period is explained in this analysis. The whole equation is insignificant at the 0.10 level, as indicated by the F statistic, although the coefficient for the exchange rate itself is weakly significant. These results suggest that there are variables missing from the wheat model. A likely candidate is the implementation of the U.S.-Canada Free Trade Agreement. U.S. wheat imports surged after 1990, as noted above, and U.S. farmers have complained frequently about unfair trade prac-

tices, including price manipulation by the Canadian Wheat Board and currency manipulation by the Canadian Treasury. These are important issues for future research.