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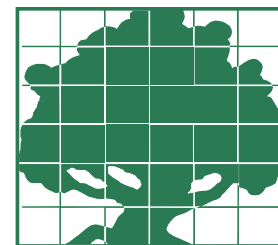
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# Agricultural and Resource Economics UPDATE



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## Immigration Reform: What Does It Mean for Agriculture?

*Philip Martin*

Immigration, along with health care, energy, and financial regulation, are the four major domestic issues targeted for reform by President Obama. However, the immigration status quo is likely to persist because it is the second-best option for advocates who cannot achieve the immigration reforms they want.

President Obama met with 30 Congressional leaders June 25, 2009 to begin “an honest discussion about the issues” involved in immigration reform. The major issue is what to do about unauthorized foreigners. According to Passel and Cohn, about 5% of U.S. residents and 7% of California residents were foreigners believed to be illegally in the United States in 2008.

About two-thirds of the 12 million unauthorized foreigners are in the U.S. labor force, meaning that 5% of U.S. workers are not legally authorized to work here. Most of the eight million unauthorized workers are in nonfarm jobs in sectors that include construction, manufacturing sectors such as meat packing, and services such as food preparation and cleaning. However, the estimated one million unauthorized foreigners employed in agriculture are over half of the hired farm work force, and the share of unauthorized workers may be climbing as they spread from seasonal jobs on crop farms to year-round jobs in dairies and other livestock operations.

This article reviews immigration patterns, foreign-born workers in agriculture, and the major reform proposals. The concluding section assesses the possible impacts of the status quo, which is likely to persist.

### Immigration Trends

In 1970, the 10 million immigrants (foreign-born residents) in the United States were less than 5% of U.S. residents; by

2010, the 40 million immigrants are likely to be 13% of U.S. residents. The largest single source of immigrants is Mexico—a third of foreign-born U.S. residents were born in Mexico. Most Mexican-born U.S. residents arrived since 1990, and a few numbers highlight the dramatic growth. In 1970, when Mexico’s population was about 50 million, there were less than 750,000 Mexican-born U.S. residents. By 2010, when Mexico expects 110 million residents, there are likely to be 13 million Mexican-born U.S. residents, meaning that more than 10% of those born in Mexico will have moved to the United States.

There are three major subgroups among the foreign born. About 14 million are naturalized U.S. citizens. Another 14 million are legal immigrants who have not yet become naturalized U.S. and temporary visitors—such as foreign students and guest workers—many of whom stay in the United States several years and some of whom become immigrants. Finally, there are 12 million unauthorized foreigners, including seven million or 60% Mexicans. Unauthorized foreigners, almost all of whom were born in Mexico, are over half of the hired workers on U.S. crop farms.

Between 2003 and 2007, when the U.S. unemployment rate was mostly below 5%, the number of unauthorized foreigners in the United States increased by about 500,000 a year, including 300,000 Mexicans a year. Mexican and other unauthorized foreigners spread

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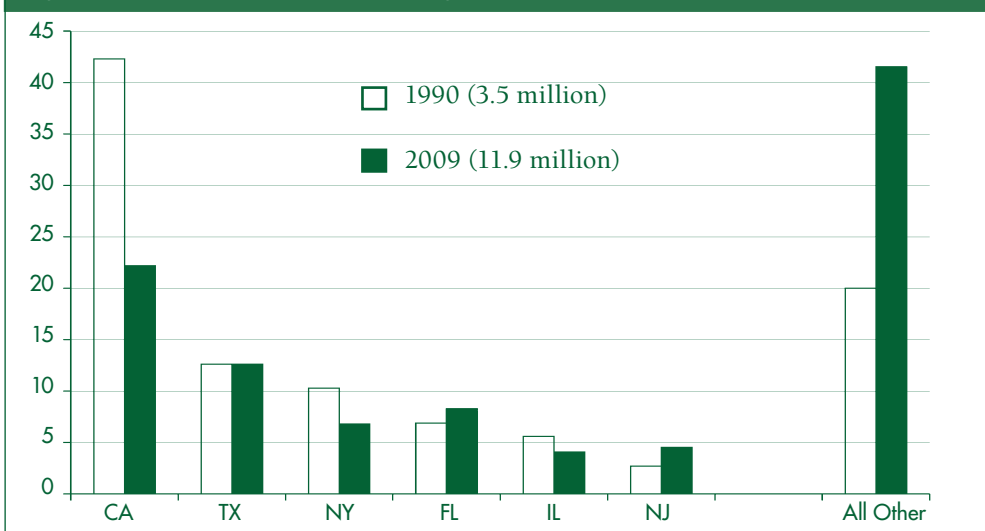
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Figure 1. Share of Unauthorized Foreigners, Selected States, 1990 and 2008



from California and other traditional migrant destinations throughout the United States. In 1990 California had 42% of the estimated 3.5 million unauthorized foreigners in the United States, and the six states with the most unauthorized foreigners had 80% of the total. By 2008 California's share had fallen to 22% of 12 million unauthorized foreigners, and the same six states had only 60% of the total (Figure 1).

Many of the "new growth states" for unauthorized foreigners are in the Midwest and Southeast. Unauthorized workers, but relatively few legal immigrants, were attracted to these states by jobs in farming, meat packing and construction, and often lower living costs. By 2008, over half of the foreign-born residents in states such as Colorado, Indiana, and North Carolina were unauthorized (Figure 2).

## Farm Labor

There are two major types of labor employed on farms: farmers and family members, and hired workers paid on hourly, piece rate or other bases. Both types of farm labor have declined over the past half-century due to labor-saving changes in farm production, but the decline in family labor has been most pronounced. In 1950, there were an average three farmers and family members for each hired worker across

the United States; today, there are two farmers and family members for each hired worker; the shift from farmer and family labor to hired workers was even more pronounced in California.

Most U.S. and California farms do not hire any labor—less than a quarter of the 2.2 million U.S. farms enumerated in the 2007 Census of Agriculture reported expenditures for hired workers; 35% of California farms reported hiring labor. Farms producing fruits and nuts, vegetables and melons, and horticultural specialties such as greenhouse and nursery crops (FVH crops), accounted for over half of U.S. and California farm labor expenditures in 2007.

Most hired farm workers are immigrants, and almost all new farm workers are immigrants. The supply of farm workers depends on U.S. farm wages remaining significantly above wages in workers' countries of origin, primarily Mexico. However, most foreign-born workers do not stay in the seasonal farm work force, so that the U.S. farm labor market resembles a revolving door, absorbing newcomers from abroad and retaining them for less than a decade.

The National Agricultural Worker Survey (NAWS) found that a sixth of farm workers are newcomers, or living in the United States less than a year, equivalent to 100% turnover every six years. The NAWS paints a picture of

a Spanish-speaking farm work force, with little education, employed about two-thirds of the year on FVH farms. These hired workers earned an average \$8 an hour in 2006, half the \$16 average hourly earnings of U.S. production workers. Earning half as much for two-thirds as many weeks of work means that farm workers had annual earnings that averaged only a third of the \$34,000 of nonfarm production workers. Most crop workers rented housing away from the farm where they worked and reported receiving no employment-related benefits from farm employers, such as health insurance or pensions.

The combination of relatively low wages and seasonal work reduces the appeal of farm work to most U.S. workers. This means that those attracted to the farm work force are workers whose alternative U.S. job options are limited by lack of English, education, and other factors. The reliance on newcomers to be seasonal workers is not new. The commercial farms that evolved in the western United States in the late 19th century depended on newcomers with few alternatives to fill seasonal farm jobs. In California, Chinese migrants were followed by Japanese and Filipino newcomers, Dust Bowl refugees in the 1930s, and Mexicans since the Bracero Program began in 1942. The children of these workers, educated in the United States, rarely follow their parents into the fields, which may explain the keen interest of farm employers in immigration policy.

## Immigration Reform

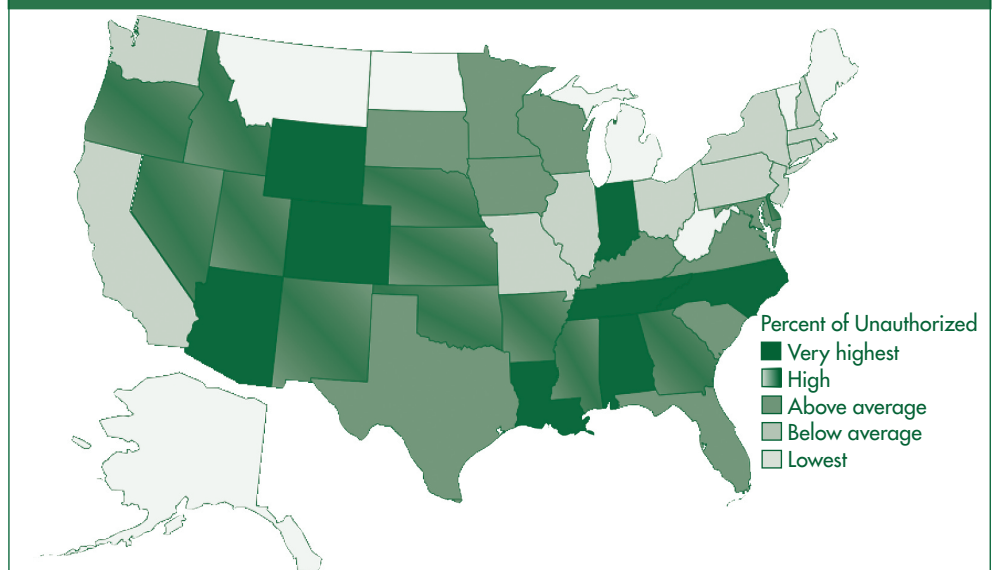
The United States has been debating what to do about the growing number of unauthorized foreigners for almost two decades, a period in which the number of unauthorized foreigners almost quadrupled and illegal migrants spread throughout the country. There are two contending approaches: enforcement-and-attribution, and comprehensive immigration reform.

The House, under Republican leadership in December 2005, approved the Border Protection, Antiterrorism, and Illegal Immigration Control Act. It called for: mandatory screening of newly hired, as well as existing employees, to ensure that all workers are legally authorized; more fencing along the Mexico-U.S. border; and, legal and policy changes to make life more difficult for unauthorized foreigners, such as making “illegal presence” in the United States a felony and encouraging state and local police to be trained to check the immigration status of persons they encounter. The House bill, considered an enforcement-and-attrition approach to illegal migration, did not include a guest worker or legalization program. These provisions were included under the theory that enforcement should be proven effective before additional migrant workers arrive legally, and before the government perhaps legalizes some of the unauthorized foreigners in the United States.

The Senate took a “comprehensive approach” to immigration reform in May 2006, approving the Comprehensive Immigration Reform Act (CIRA) on a 62–36 vote. The CIRA included many of the same enforcement provisions that were in the House bill, such as a requirement that employers use an Internet-based system to check the legal status of newly hired and current employees, and more fencing on the Mexico-U.S. border. However, CIRA also offered a path to legal immigrant status for unauthorized foreigners living in the United States at least two years, and a new guest worker program with a “market mechanism” to adjust the number of visas available.

In May–June 2007, the Senate again considered comprehensive immigration reform. However, the Senate’s 2007 bill was “tougher” on illegal migration by, for example, not allowing the entry of additional guest workers until the President certified that stepped-up enforcement had reduced unauthorized migration. One provision would

Figure 2. Share of Unauthorized Foreign-Born Residents by State, 2008



have required unauthorized foreigners seeking legalization to leave the United States and re-enter legally, a “touchback” requirement that migrant advocates said would deter migrants fearful of not being allowed back into the United States. The bill stalled when majority Democrats could not secure the 60 votes needed to stop debate.

Both Senate bills included a special legalization and guest worker program for agriculture, the Agricultural Job Opportunity Benefits and Security Act (AgJOBS). The major provisions of AgJOBS, including legalization for unauthorized farm workers and employer-friendly changes to the H-2A guest worker program, were negotiated by farm employers and farm worker advocates in December 2000, just before President Bush took office.

AgJOBS echoes the agricultural provisions of IRCA in 1986, which legalized then illegal farm workers and gave farmers easy access to guest workers in the event of farm labor shortages. However, only the agricultural legalization provisions of IRCA took effect; a flood of unauthorized foreigners in the late 1980s made it unnecessary to implement the new guest worker provisions.

The current version of AgJOBS, introduced in May 2009 by Senator Dianne Feinstein (D-CA), would allow up to

1.35 million unauthorized farm workers, who did at least 150 days of farm work in the 24-month period ending December 31, 2008, to apply for Blue Card probationary status. Unauthorized farm workers would present evidence of their qualifying farm work and pay application fees and \$100 fines to obtain Blue Card visas with personal biometric data, which would allow them to live and work legally in the United States. The unauthorized family members of Blue Card holders in the United States could obtain a “derivative” probationary legal status that would allow them remain in the United States and obtain work permits.

Legalization, the major goal of farm worker advocates, is balanced in AgJOBS by changes to the H-2A guest worker program, the major goal of farm employers. The H-2A program allows farm employers to request certification from the U.S. Department of Labor (DOL) to have foreign workers admitted “temporarily to the United States to perform agricultural labor...of a temporary or seasonal nature.” DOL certified 94,000 farm jobs to be filled with foreign workers in FY08, up from 77,000 in FY07.

AgJOBS would make three major employer-friendly changes to the H-2A program. First, attestation would replace certification, effectively

shifting control of the border gate from the DOL to employers. After making assurances to DOL that they have vacant jobs, are paying at least the minimum or prevailing wage, and will comply with other H-2A requirements, employer job offers would be reviewed for “completeness and obvious inaccuracies” and normally approved within seven days. Foreign H-2A workers would arrive and go to work, and DOL enforcement of employer assurances would respond to complaints of violations of H-2A regulations.

Second, rather than provide the free housing to H-2A and out-of-area U.S. workers as is currently required, AgJOBS would allow farm employers to pay a housing allowance of \$1 to \$2 an hour, depending on local costs to rent two-bedroom units that are assumed to house four workers. Third, the Adverse Effect Wage Rate (AEWR), the minimum wage that must be paid to legal guest workers, would be frozen at 2008 levels and studied. If Congress failed to enact a new AEWR within three years, the AEWR would be adjusted on the basis of the three-year change in the Consumer Price Index, eventually rising with the CPI up to 4% a year.

If AgJOBS is enacted, the H-2A program would change to allow dairies to hire legal guest workers. Currently, only employers offering seasonal farm jobs may hire H-2A workers. Some H-2A program requirements would not change, including a requirement that employers reimburse H-2A workers for their transportation and subsistence costs if they complete their work contracts, that employers continue to hire U.S. workers who request jobs until half of the work period is completed, and employers guarantee work to H-2A workers for at least three-quarters of the contract period they specify.

## Implications for California

The immigration status quo means uncertainty for farm employers, farm

workers, and the communities they share. Despite risk-absorbing labor intermediaries that shield many farm employers from the risk of fines in the event of enforcement, employers may have to raise wages if enforcement removes unauthorized workers, as in meat packing. Farm workers unsure of their future in the United States minimize investments in human capital, meaning that several hundred thousand newcomers who have not finished high school move into agricultural areas each year. Finally, the cities in which most settle must grapple with integrating some of the neediest newcomers arriving in the United States at a time of recession and budget uncertainties.

These risks and challenges should make immigration reform relatively straightforward. However, the federal government has little credibility on immigration reforms, especially because 1986 reforms increased rather than reduced unauthorized migration and spread unauthorized workers throughout agriculture and the United States. AgJOBS, endorsed by most farm employer and worker groups, has been unable to overcome opposition from those who favor enforcement-and-attribution rather than legalization.

There is general agreement that the current immigration system is “broken” and that reform is urgently needed. However, the status quo persists because it is the second-best solution for advocates who cannot achieve their first-best option. Advocates may prefer legalization, but the status quo allows unauthorized foreigners to establish “equities” and “roots” in the United States, including via U.S.-born children, that they hope will lead to eventual legalization. Advocates who oppose legalization prefer the status quo in the hope that current enforcement efforts will eventually lead to “self deportation.”

In the meantime, those at the core of illegal migration, unauthorized migrants themselves and their employers, may

prefer the status quo to some elements of reform. Most migrants are able to get the higher-wage jobs they seek, and most U.S. employers find workers to fill their vacant jobs. Unless immigration reform “legalizes the status quo,” both employers and migrants have little incentive to offer support.

These considerations mean that immigration reform is likely to remain a distant dream, especially during the recession. Meanwhile, newcomers will continue to arrive in rural and agricultural areas, filling seasonal farm jobs and giving immigrants their first experience in the U.S. labor market. The farm labor market is likely to remain a revolving door, admitting newcomers and later sending them on to non-farm labor markets. The status quo represents a large-scale experiment for rural America, testing whether the famed engine of economic mobility will be able to fill farm jobs and assure that ex-farm workers and their children find the economic opportunity that drew them to the United States.

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### For additional information, the author recommends:

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# Supply Management for the U.S. Dairy Industry? Opportunities and Challenges

Tina L. Saitone and Richard J. Sexton

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The U.S. dairy industry is considering a proposal to support federal legislation to implement supply management in the form of production quotas with “market-access fees” charged to those who exceed their production quota. We describe the proposed program, examine its potential to address low and unstable producer prices, and identify some key limitations and likely unintended consequences of the program.

The U.S. dairy industry has been buffeted by severe price fluctuations in recent years and, most recently, by extremely low prices that have caused milk producers across the country to exit the industry. Some in the industry are now looking to supply-management tools to help stabilize producer prices and insure profitable production. Supporters of supply management have coalesced behind a plan to establish production quotas for each producer, based upon historical production, and assess penalties in the form of “market access fees” (MAF) to producers who expand production beyond their eligible base.

Supply management (SM) has a potential to address the problem of low prices, but successful implementation of such a program faces many challenges. The most significant is the impact of such a program on dairy exports from the United States and dairy imports into the country. We also foresee various practical difficulties associated with controlling domestic supplies that will impede the effectiveness of a program. We elaborate on these points in the remainder of this article.

## The Proposed Supply-Management Program

Our evaluation is based upon the plan proposed by the Holstein Association. A summary is available at its Web site: [http://holsteinusa.com/pdf/DSPS/DSPS\\_plan\\_v14\\_072209.pdf](http://holsteinusa.com/pdf/DSPS/DSPS_plan_v14_072209.pdf). In brief, the proposal would be enacted by federal legislation, with administration by the U.S. Department of Agriculture (USDA). The plan would assign a base to each producer equal to her milk sales in a preceding 12-month period. Bases are transferable with sale of a dairy, but otherwise are not transferable. An appointed board would advise the Secretary of Agriculture as to milk production required on a quarterly basis “to fulfill the market needs” and allow “for a producer raw milk price that is positive over operating costs.” Producers who expanded production in a quarter beyond their allotment would be charged a MAF on their *total* milk marketing for a 12-month period. The volume of sales during this period of paying the MAF would then become the new historical base moving forward. New dairy producers would pay the MAF on their entire production for the first 12 months to establish a base moving forward.

Production levels would be monitored and reported to the USDA by milk processors, who would deduct the MAF from the milk checks of producers who exceeded their base, upon notification by the USDA. Money collected from the program would be redistributed back to producers who maintained their production within their base allotment.

## The Economics of Supply Management in the Dairy Industry

Both demand and supply at the farm level for raw milk are price inelastic in

the short run. A reasonable estimate for the price elasticity of demand is in the range of  $-0.5$  to  $-0.6$ . This means that the market price changes substantially in response to small, unanticipated shifts in demand or supply. Supply shocks to the domestic market have been due to a rapid run-up in feed costs, and diversion of some U.S. production into the export market based upon conditions in the global market. More recently, negative demand shocks have resulted from the worldwide economic downturn. As the United States becomes more integrated into a world dairy market, the U.S. industry is exposed to a broader set of shocks.

Individual decisions made by a large group of competitive producers inevitably causes production to be expanded in excess of the amount that would maximize industry profits. The “overproduction problem” is especially severe for industries, such as the dairy industry, which face an inelastic demand, and thus the nominal potential for a successful SM program is greatest in such industries. However, the historical track record of success for supply management is not good. Most successes have been international cartels for nonrenewable resources or industrial cartels (usually illegal) involving relatively few players.

To be successful, a SM program must satisfy four criteria:

- An agreement must be reached
- Because there are always incentives to cheat on a successful agreement, cheating must be detectable
- Cheating, once detected, must be punished
- Outside entry must be deterred.

*Reaching an agreement.* Voluntary SM programs are vulnerable to “free riding” because outsiders do not bear any of

**Table 1. U.S. Milk Imports and Exports (billions of pounds)**

	2007	2008
Milk production	184.5	188.8
Fat basis imports	4.6	3.9
Skim-solids basis imports	4.4	3.8
Fat basis exports	5.7	8.8
Skim-solids basis exports	24.5	26.6

*Source: USDA World Supply and Demand Estimates, May 12, 2009*

the costs of the plan, in terms of providing financial support or restricting their production, but do capture the benefits in terms of higher prices caused by reduced supplies. The proposed MAF program addresses this problem for domestic producers by making participation mandatory through federal legislation. However, it is likely that in the legislative process various types of producers (e.g., organic) would seek and obtain exemption from the program, thereby creating a class of free riders.

**Detecting cheating.** Incentives to cheat exist for any successful SM program because such programs raise market price above producers' marginal cost of production, meaning any individual has

incentive to expand production beyond his allocation. Such cheating can lead quickly to the demise of the program.

The MAF program's requirement that individual production levels be reported to the USDA by processors is a good way to control cheating. There, of course, is no guarantee that such reporting will be done faithfully, but insertion into the legislation of stringent penalties for untruthful reporting would act as a strong deterrent. However, cheating could occur before milk ever reaches the processors. One way to circumvent the reporting requirement would be to transship milk from a producer who is above quota to a producer who is below quota. Black markets could also emerge, with producers selling milk outside of normal marketing channels.

**Punishment of cheating.** Any legislation authorizing the MAF program should have stringent provisions in place to punish dairies or processors who cheat on the mandatory reporting requirements. However, it is very difficult to write legislation that anticipates all of the ways a SM program can be circumvented, and it may be difficult to successfully prosecute suspected cheating. Cheating will occur if businesses perceive a positive risk-reward tradeoff.

**Prevention of outside entry.** Entry probably constitutes the single greatest challenge for SM programs generally, and in our view it is the most significant challenge facing SM in the U.S. dairy industry. Entry into the U.S. market for dairy products may come either from new domestic producers or from imports. The MAF program proposes to handle domestic entry by charging the MAF to new entrants on their entire sales for their first year of milk production. This regulation would represent a significant barrier to new domestic entry and a rather unprecedented attempt by an industry to tax entrants and redistribute those tax revenues among industry incumbents.

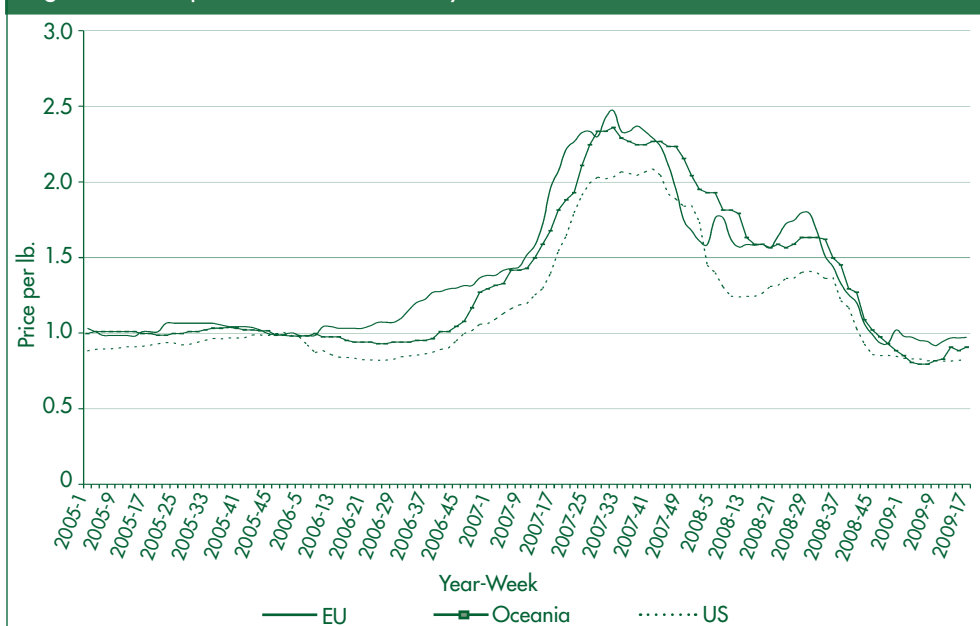
Given the barriers in place in the proposed program to handle domestic entry, we look next at the potential of increased imports and reduced exports in response to the program. Imports are not covered under the proposed program, nor, due to WTO considerations, is it likely that additional controls on imports could be enacted.

### Impacts of Supply Management on Imports and Exports

If a SM program succeeds in increasing the U.S. price above the world price for various dairy products, it is certain that world trade flows will be directed towards the United States to the extent possible and U.S. exports would be curtailed. Reduced exports mean that more of the domestic production must be sold at home.

Imports of dairy products into the United States are regulated by a tariff rate quota (TRQ) system whereby some imports are allowed subject to what is usually a nominal tariff, and then imports beyond the quota level are subject to a higher tariff. There is presently no mechanism to sustain U.S. exports if U.S. prices became noncompetitive. Export subsidies could possibly play such a role, but they would have to be sufficient in magnitude to make up for

**Figure 1: Price per Pound of Nonfat Dry Milk**



the decrease in the world price relative to the domestic price. The USDA presently operates a small Dairy Export Incentive Program designed to counteract subsidized exports from other countries. The scale of this program is severely limited by U.S. commitments under the World Trade Organization.

Table 1 reports total production, imports, and exports of milk for the United States, for 2007 and 2008, on both a fats basis and skim-solids basis. On a fats basis, imports constituted on average 2.1% of the total U.S. supply. Imports on a skim-solids basis were 2.0%. Export has only recently become a rather important outlet for U.S. dairy products. For the same two-year period, U.S. commercial exports were 3.6% on a fat basis and 12.7% on a skim-solids basis.

Despite substantial regulation of the dairy industry by individual countries, the relevant geographic market for various key dairy products is worldwide, meaning that prices for the same product move in relative lockstep regardless of the origin of the production. Figure 1 illustrates this point for prices for nonfat dry milk for the United States, European Union, and Oceania (Australia and New Zealand), from 2005 to the present.

Thus, a U.S. SM program that caused U.S. prices to deviate from those in the rest of the world would certainly trigger responses from traders in dairy products to exploit such a price differential. The impact of such international arbitrage would be to reduce or eliminate differences in price between the United States and the rest of the world. The most obvious form of arbitrage is for importers to sell more dairy products into the United States and for less domestic production to be exported. Existing quotas on dairy imports are not binding for most products and most importers, meaning that imports could be expanded from their current volumes at the lower tariff levels. Table 2 includes volume of imports into the United States for

Table 2. Tariff Rate Quota (TRQ) by Country and Commodity

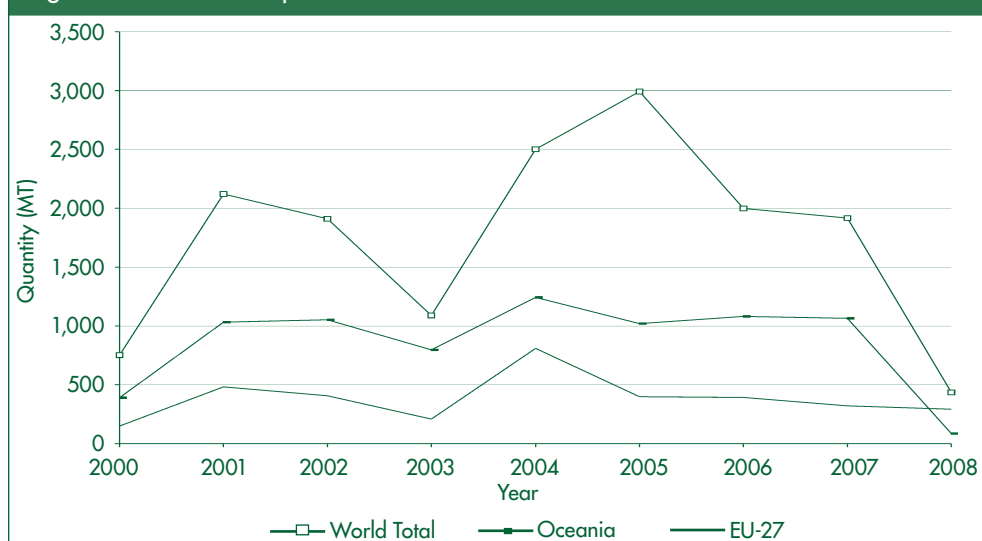
Butter				
Country	TRQ (KG)	2006 Imports	2007 Imports	2008 Imports
New Zealand	150,593	150,510	121,541	48,845
EU-25	96,161	95,391	87,728	81,492
Other countries	73,935	72,777	63,209	20,179
Any country	6,656,311	6,594,418	6,137,907	4,842,353
Dried Skim Milk				
Country	TRQ (KG)	2006 Imports	2007 Imports	2008 Imports
Australia	600,076	3,120	0	544
Canada	219,565	0	0	0
Any country	4,441,359	410,450	316,470	30,250
Dried Whole Milk				
Country	TRQ (KG)	2006 Imports	2007 Imports	2008 Imports
New Zealand	3,175	<b>3,175</b>	<b>3,175</b>	425
Any country	3,318,125	3,309,965	1,935,907	421,904
Dried Buttermilk/Whey				
Country	TRQ (KG)	2006 Imports	2007 Imports	2008 Imports
Canada	161,161	0	0	0
New Zealand	63,820	0	0	0

2006–2008, and the level of the TRQ for key importing countries for butter, dried skim milk, dry whole milk, and dry buttermilk/whey. The values highlighted in bold face are (the relatively few) instances when the TRQ was binding. Moreover, the dual facts that (a) dairy products can be manufactured and shipped in various forms, and (b) the TRQ structure varies widely by country and product, give arbitrageurs

considerable incentive and opportunity to find creative ways to bring more dairy products into the United States in response to higher U.S. prices, despite the barriers created by the TRQ.

Indeed, imports of dairy products into the United States are highly variable over time and responsive to changing market conditions, illustrating that they can be ratcheted up or down as conditions in the U.S. market

Figure 2. U.S. Butter Imports





change. This point is illustrated in Figure 2 which plots total imports to the United States and imports from key regions from 2000 through 2008 for butter. Butter imports fluctuated by over 600% during this period.

U.S. exports of dairy products are also highly variable and responsive to market conditions. For example, exports of milk powder were in the range of 100,000 MT in 2005 and 2008, but only about 60,000 MT in 2006 and 2007. The United States is a “small country” exporter of dairy products, in the sense that its exports constitute a small share of the traded volume and, accordingly, its volume of exports has little or no impact on prices in the world market. This means that the United States can expect to sell little or nothing abroad if its prices are above world levels. Thus, most or all domestic production under a SM program that raised U.S. prices relative to the world would have to be sold in the domestic market, increasing the domestic supply and reducing domestic prices. The arguments that more stable U.S. prices might make U.S. marketers more desirable trading partners on the world market, or that the United States will be able to market “value added” products despite higher prices, are unpersuasive. For the most part trade is conducted for intermediate products, which are pure commodities where price competition is intense.

Increases in imports and decreases in exports caused by a SM program will reduce the U.S. producer price, based upon the price elasticity of the domestic demand. Since the domestic demand is price inelastic, a given percentage increase in total supply from an increase in imports and/or decrease in exports causes a greater percent decrease in the farm price of milk. A rule of thumb is that each additional percentage point increase in total domestic supply due to higher imports or reduced exports will cause the U.S. producer price to fall by two percentage points. Thus, if the administrators of a SM program

were going to attain price objectives, they would have to impose increasingly stringent controls on the portion of the supply they controlled.

### Issues, Challenges, and Unintended Consequences

The suggested amount of the MAF is substantial—in the range of \$2-3 per hundred weight. Applying the MAF to a producer’s entire production creates various perverse incentives. First, it creates

***A rule of thumb is that each additional percentage point increase in total domestic supply due to higher imports or reduced exports will cause the U.S. producer price to fall by two percentage points.***

an incentive for large expansions in herd size. This point is a simple consequence of the average cost per hundredweight of expansion declining in the amount of expansion because the MAF must be paid on the entire production, not just the amount in excess of the base. Thus, a producer would never intentionally exceed his base by only a percentage point or two. Producers contemplating expansion will either not expand at all or expand substantially to spread the fixed cost of paying the MAF on their entire base. Thus, paradoxically, the program could cause *more* supply expansion than would otherwise take place. Second, for a producer who was on the verge of succeeding his base in the final days of a period, a rational response would be to dump milk. Opponents of the program could choose to publicize such incidents, leading to unfavorable publicity, especially for a basic food item such as milk.

The plan also creates incentives for producers to expand production to the maximum amount allowed in every period. This result is a consequence of base being a moving average of *actual* past production, not *allowable* past production. Thus, suppose a 2% expansion in base is permitted during a given year. A producer who does not expand

by the allowable 2% forfeits that base. If the SM program succeeds in the short run, then base will have a value and producers will rationally want to maximize the amount they control.

Making the base nontransferable creates inefficient production. Again, assuming the program is successful, base has economic value, and producers are unlikely to sacrifice it. Inefficient operations will stay in business, and efficient operations will be impeded from expanding. Under a scenario where base was transferable, inefficient operations would sell base to efficient operations that sought to expand.

### Conclusion

Although a supply-management program in the U.S. dairy industry has the potential to improve farm prices, there are many barriers to successful implementation of a program. For the most part, these barriers have not been considered adequately in the discussions to date regarding the proposed programs. The cumulative impact of the various considerations discussed here is that the supply of milk and dairy products to the U.S. market may be considerably greater than projected, either through increased imports, reduced exports, and/or greater domestic production than the plans envision. Each additional percent of supply will reduce the producer price by about 2%, meaning that either price goals will be unmet, or producer bases will be reduced relative to what is envisioned in order meet price objectives.

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# Four Proposals for the Next Climate Agreement

Larry Karp

Four proposals will increase the chance of success of current climate negotiations, and the likelihood that the resulting treaty will be effective. The treaty should: (i) include an escape clause that puts a ceiling on membership costs, (ii) constitute a Carbon Bank that has the tools to maintain carbon prices above a floor and below a ceiling, (iii) include modest trade provisions, and (iv) promote the participation of developing countries, while recognizing that they are entitled to special status at least during the next decade.



The design of the next international climate agreement can increase countries' incentive to join the treaty and increase the likelihood that the treaty will be effective. Four proposals contribute to these goals. The first of these involves an "escape clause" that permits a country to discharge its treaty obligations by paying a "fine" as an alternative to reducing emissions. The second creates a mechanism that defends an internationally agreed carbon price ceiling and a price floor. The third proposal

accepts a limited role for trade policy, and the fourth recognizes that developed and developing countries have different types of responsibilities.

The next climate agreement should require that developed country signatories agree to a succession of two-year emissions quotas. Under the escape clause proposal, a signatory that decides not to meet its agreed quota remains in compliance by paying a fine. All signatories in compliance, including any nation that exercises the escape clause, receive a share of revenue from fines. The proposal caps the total economic cost to a signatory, and thus eliminates one reason that the United States remained outside the Kyoto Protocol. There is considerable uncertainty about the actual cost of reducing emissions; the concern that compliance costs could be excessive might keep some nations from joining the next agreement. The escape clause puts a ceiling on the compliance cost.

The escape clause also eases the enforcement problem. It transforms the esoteric obligation of reducing emissions, for which there is currently no international enforcement authority, into the familiar obligation of paying sovereign debt. The agreement can make the fine almost automatic, by requiring signatories to issue options to the international authority overseeing the treaty. If the signatory exceeds its emissions quota, the option entitles the holder to acquire at zero price a number of the signatory's national bonds equal to the value of the fine.

The escape clause also has a more subtle benefit, because it increases a potential signatory's incentive to join the agreement. The treaty sets the nominal fine, but the effective fine equals the nominal fine minus the reimbursement that the escaper receives. Since

all compliant signatories share the fine revenue, an increase in the number of signatories reduces the reimbursement and thereby increases the effective fine. In other words, by joining the agreement, the new signatory increases the effective fine facing all signatories. The resulting increase in the effective fine lowers each signatory's incentive to "escape," i.e., it increases their incentive to make the agreed emissions reductions. In this manner, the escape clause provides a direct link between a potential signatory's decision to join and the actions of all other signatories. This added channel of influence increases the incentive to sign the treaty.

This proposal does create the risk of undermining the environmental objective if, for example, several small or one large signatory exercises the escape clause. The agreement must set the level of the fine at a high enough level to keep this risk small. The benefits of the proposal outlined above more than offset this risk.

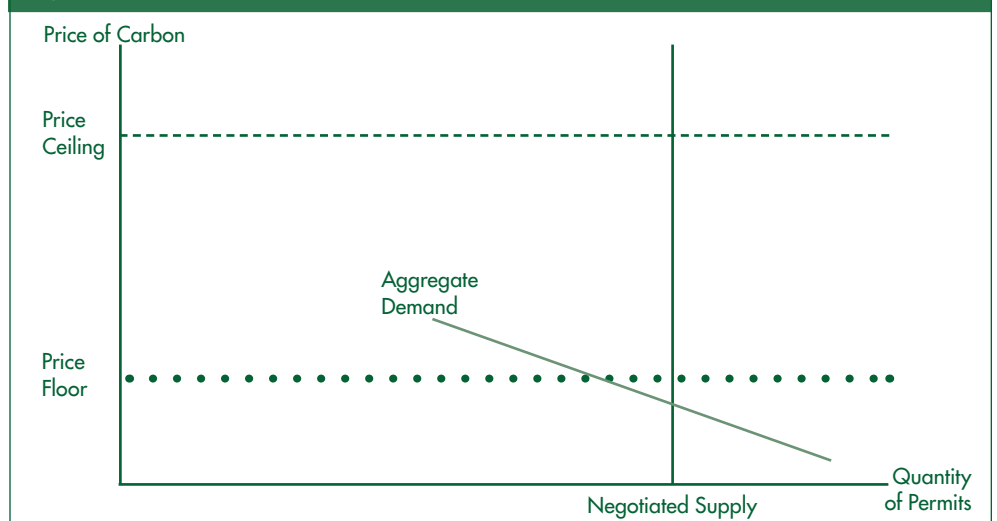
The encouragement of international trade in permits leads to an international price of carbon. The agreement should allow signatories to bank emissions permits across the two-year sub-periods of the treaty, but not to borrow against their quota in future periods. If nations and individuals expect that the price of carbon will increase sufficiently fast, they will want to bank the permits in order to use them when they become more valuable. The prohibition against borrowing prevents signatories from borrowing permits in order to remain in nominal compliance until the last sub-period, thus receiving the benefit of membership without actually reducing emissions. Absent the prohibition against borrowing, a nation could withdraw from the agreement in the last period, leaving with a negative balance.

The second proposal is that the treaty creates a Carbon Bank, whose sole objective is to maintain the international carbon price between a ceiling and a floor set by the treaty. Signatories capitalize the bank by giving it “American style put options” with a “strike price” equal to the price floor. These options entitle the owner (the Carbon Bank) to sell to the contracting party (the signatory), at a price equal to the strike price, a permit to emit a tonne of carbon. The owner of the option can exercise it at any point during the life of the contract, which equals the length of the climate agreement. Each signatory contributes put options to capitalize the Carbon Bank; these contributions are proportional to the signatories’ emissions quota over the life of the treaty. The bank has two types of policy instruments, the ability to raise or lower emissions ceilings in future sub-periods, and the ability to intervene in the spot market.

Aggregate demand for permits is the sum of demand for permits in the spot market and demand for permits to bank (“banked permits”). The spot demand allows permit holders to emit carbon in the current period, and the banked permits allow future emissions. If aggregate demand intersects the vertical supply (previously chosen by the negotiation) at a price between the floor and the ceiling, the bank does not enter the market.

Figure 1 shows a situation where the aggregate demand intersects the supply below the price floor, requiring bank intervention. The Bank’s first line of defense of the price floor is to reduce emissions quotas (“negotiated supply”) in future sub-periods. This reduction in the future supply increases the expected future price of permits, and increases nations’ and individuals’ incentive to save permits for future use. This increase in the demand for banked permits shifts out the aggregate demand in the current period, until the new price equals the

Figure 1. The Bank Needs to Defend the Price Floor

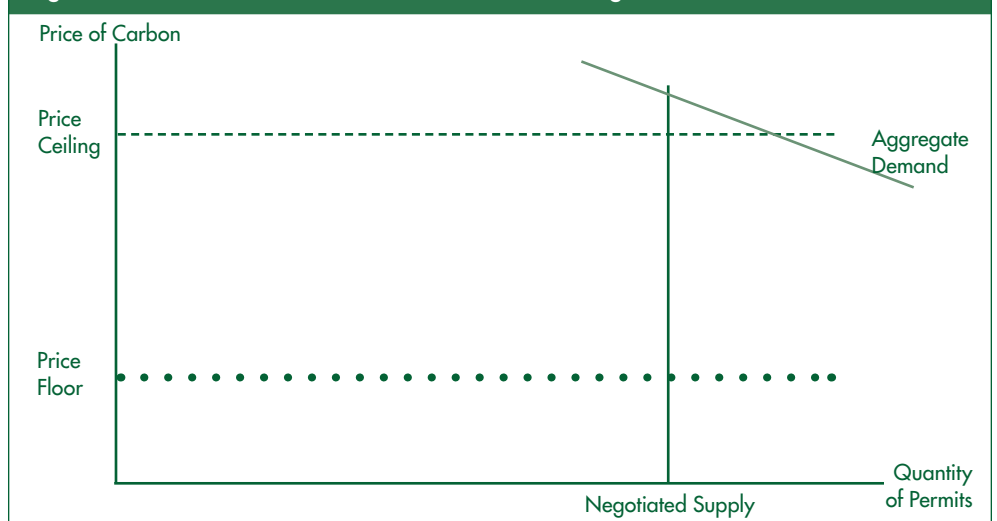


price floor. However, there is a point beyond which the bank cannot credibly reduce future emissions quotas. Once the bank has reduced future quotas to a threshold, specified in the agreement, the bank begins to defend the price floor by purchasing permits in the spot market, thereby increasing spot (and aggregate) demand in the current period. It finances these purchases by exercising the put options it acquired from signatories at the beginning of the agreement. That is, the bank supports the spot price by buying permits; it pays for these by exercising its put options. As long as the treaty maintains credibility, the market price never falls below the floor, the bank never needs to exercise the put options, and

the cost to signatories of capitalizing the bank is approximately zero.

Figure 2 shows a situation where the aggregate demand is so high that the free market price exceeds the price ceiling. The bank’s first line of defense is to increase future emissions quotas, thereby lowering the expected future price and reducing nations’ and individuals’ incentive to save permits for future use. The lower demand for banked permits shifts in the aggregate demand curve until the market price equals the ceiling. This defense works only if initially the demand for banked permits is substantial. If, instead, the stock of banked permits is small, the bank intervenes in the spot market by selling permits at the price ceiling,

Figure 2. The Bank Needs to Defend the Price Ceiling



i.e. it increases the current emissions quota, the level labeled “Negotiated Supply” in the figure. The bank’s primary use of revenue is to replenish put options in the event that it previously had to exercise its initial endowment of these options. The bank disburses any remaining revenue to a distinct international authority, possibly one that finances climate-related expenditures.

The price ceiling appeals to business interests and the floor appeals to environmental interests. The former protects businesses and consumers against unexpectedly high costs of reducing emissions. The latter maintains the incentive to invest in green technology, and ensures that society does not ignore low-cost abatement activities. Signatories have an incentive to set a reasonably high price ceiling, because any revenue that the bank obtains from defense of this ceiling goes to the international community. In contrast, if individual nations rather than the Carbon Bank were responsible for defending the ceiling, revenues from the sale of additional permits would flow into national treasuries. This addition to national treasuries would create the incentive to set a low price ceiling. That is, investing authority to defend the price ceiling in an international rather than in a national agency, causes signatories to be more willing to accept a high price ceiling. The higher price ceiling promotes environmental objectives.

The price ceiling and the escape clause provide different kinds of insurance against unexpectedly high costs. The price ceiling operates automatically, while the escape clause requires a political decision. The price ceiling protects against high marginal costs of reducing emissions, while the escape clause protects against high aggregate costs.

There are superficial similarities between the Carbon Bank and the largely unsuccessful “commodity price stabilization agreements”

that were common in the 1960s and 1970s. The latter were vulnerable to speculative attack, and the higher prices that they generated induced increases in supply that undermined the agreement. The Carbon Bank does not have these weaknesses.

The third proposal is to adopt modest trade disciplines and the fourth proposal is to continue to treat developed and developing countries differently. In particular, the next agreement should not require developing countries to accept mandatory emissions quotas. This group of developing countries likely includes Brazil, China, and India—the major developing country emitters.

Trade disciplines under the agreement should serve as an umbrella that provides shelter from a light rain, not a stick to bludgeon recalcitrant countries. There is concern that signatories’ reduced emissions will “leak,” as carbon-intensive production shifts to countries that do not adopt strict climate policies. This “carbon leakage” would undermine the environmental objective of the treaty, and would endanger political support for the agreement if it causes the loss of domestic jobs and profits. The empirical support for the importance of carbon leakage is not strong, but leakage sounds plausible to both politicians and the public, and it might in fact be significant.

Multilateral trade measures that promote environmental objectives have a better chance of being consistent with World Trade Organization (WTO) law and are more likely to be effective, compared to unilateral measures. The next agreement should require developing country signatories—those without mandatory emissions quotas—and any developed country signatory not in compliance, to purchase carbon permits when they export any of a small number of carbon-intensive commodities to a signatory that has accepted an emissions quota and is in

compliance. The number of permits equals the estimated amount of carbon used in production of the commodity. Only the basic carbon-intensive commodities, not the products that embody them, are subject to this discipline. The treaty cannot apply this discipline to non-signatories. This proposal defuses a common objection to a climate agreement, and it does so in a manner that enhances rather than undermines the world trade order.

Developing countries should accept the principle that they will face emissions quotas in the future, perhaps after a decade. Future, not current, negotiations will determine the level of quotas after the next decade—for both developing and developed signatories. By that time, we will have more experience with the institutions that support the treaty, and we will have better information about abatement costs and climate science. It is essential that developing countries achieve substantial emissions reductions before that time, however. These reductions should be on a voluntary basis, financed by the sale of offsets on the international carbon market. This method of financing means that we do not need to rely on developed-country contributions to a climate fund. It would be politically difficult to obtain the level of contributions needed to support the reductions required from developing countries.

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### For additional information, the author recommends:

This article is based on “Suggestions for the Road to Copenhagen” by Larry Karp and Jinhua Zhao, Report to the Expert Group on Environmental Studies, Ministry of Finance, Sweden, June 2009, available at <http://are.berkeley.edu/~karp/SuggestionsCopenhagen-June09.html>.



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