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Trends in Infant Formula Rebate Contracts: Implications for the WIC Program

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Trends in Infant Formula Rebate Contracts: Implications for the WIC Program

Victor Oliveira, Elizabeth Frazão, and David Smallwood

Abstract

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is the major purchaser of infant formula in the United States. To reduce the cost of infant formula to WIC, Federal law requires that WIC State agencies operate a cost-containment system for the purchase of infant formula. Typically, WIC State agencies obtain substantial discounts in the form of rebates from the infant formula manufacturers for each can of formula purchased through the program. Contracts are awarded to the manufacturer offering the WIC State agency the lowest net price (as determined by the manufacturer's wholesale price minus the rebate). A previous Economic Research Service study based on data through 2008 found that net prices were increasing, raising concern that this trend, if it continued, could constrain WIC's ability to serve all eligible applicants in the future. This study, based on data through February 2013, allays that concern. Real net prices for contracts in effect in February 2013 decreased by an average 43 percent (or 23 cents per 26 fluid ounces of reconstituted formula) from the previous contracts. As a result, WIC paid \$107 million less for infant formula over the course of a year, holding retail markup constant.

Keywords: Special Supplemental Nutrition Program for Women, Infants, and Children; WIC; infant formula; rebate; net price; ERS, USDA

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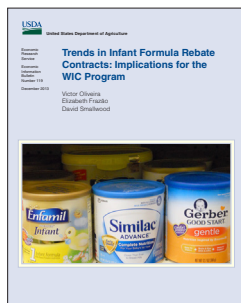
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Errata

This report, originally released in December 2013, was reissued with the following corrections:

On December 24, 2013, a typo was discovered on page 17 of EIB-119, “Trends in Infant Formula Rebate Contracts: Implications for the WIC Program.” In figure 8 on page 17, the vertical axis label was corrected from “Billions” to “Millions.”



Find the full report at www.ers.usda.gov/publications/eib-economic-information-bulletin/eib-119.aspx

Trends in Infant Formula Rebate Contracts: Implications for the WIC Program

Victor Oliveira, Elizabeth Frazão, and David Smallwood

What Is the Issue?

The U.S. Department of Agriculture's (USDA) Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides participating infants with free infant formula. WIC is the major purchaser of infant formula in the United States; well over half of all formula is purchased with WIC benefits. To reduce costs, WIC requires its State agencies to operate a cost-containment system for procuring infant formula. Typically, WIC State agencies obtain substantial discounts in the form of rebates from the infant formula manufacturers for each can of formula purchased through the program. In exchange for the rebate, a manufacturer is given an exclusive right to provide its infant formula to WIC participants in the State. Contracts are competitively awarded to the manufacturer offering the WIC State agency the lowest net price (as determined by the manufacturer's wholesale price minus the rebate).

WIC is a discretionary grant program funded annually by appropriations law. The number of participants who can be served within a fixed budget depends heavily on the program's food package costs, which in turn are significantly affected by rebates and the cost of infant formula. A previous Economic Research Service (ERS) study found that net prices paid by nearly all WIC State agencies were increasing. The report cautioned that if real net prices continued to increase, rising formula costs under newly negotiated contracts could constrain WIC's ability to serve all eligible applicants.

What Did the Study Find?

Among the 46 WIC State agencies that awarded new rebate contracts after December 2008, nearly all paid lower net prices in their current contracts (in effect in February 2013) than in their previous contracts after adjusting for inflation. Across the 46 WIC State agencies, real net price decreased by an average 43 percent (or 23 cents per 26 ounces of reconstituted fluid), allaying concerns about increasing real net prices. With lower net prices, combined with declining WIC purchases of infant formula, WIC State agencies paid \$107 million less for formula in their new contracts over the course of a year.

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The decrease in net prices occurred during a period of fewer births, higher breastfeeding rates, and decreases in the average amount of formula provided in the WIC infant food packages. In the face of a shrinking market for their product, formula manufacturers may compete more aggressively for WIC contracts in order to maintain their sales volume.

How Was the Study Conducted?

To examine trends or changes in net prices over time, this report compared the real net price in a State's contract that was in effect in February 2013 to that of its previous contract. The analysis was based primarily on data on infant formula rebate contracts, compiled by USDA's Food and Nutrition Service and by the Center on Budget and Policy Priorities, and infant formula wholesale prices as reported in the formula manufacturers' price list catalogs. Information on the characteristics of the infant formula market was based on a 2008 proprietary report prepared for ERS by the Nielsen Company.

Trends in Infant Formula Rebate Contracts: Implications for the WIC Program

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Introduction

The mission of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is to safeguard the health of low-income women, infants, and children who are at nutritional risk by providing supplemental foods, nutrition education, and referrals for health care and other social services (see box, “The Special Supplemental Nutrition Assistance Program for Woman, Infants, and Children (WIC)”). Although WIC recognizes and promotes breastfeeding as the optimal source of nutrition for infants, the program provides iron-fortified infant formula for women who do not fully breastfeed. WIC is the major purchaser of infant formula in the United States: the Economic Research Service (ERS) estimated that in 2004-06, between 57 and 68 percent of all infant formula sold in the United States was purchased with WIC benefits (Oliveira et al., 2010). Because of the large volume of formula purchased through the program, even small increases in per-can formula costs can result in large increases in total costs to the program.¹

To reduce the cost of infant formula to WIC, Federal law requires that WIC State agencies operate a cost-containment system for the purchase of infant formula. Typically, WIC State agencies obtain substantial discounts in the form of rebates from the infant formula manufacturers for each can of formula purchased through WIC. In exchange for the rebate, the State agency agrees to issue the manufacturer’s infant formula as the formula of first choice to its infant participants (excluding those that are exclusively breastfed or, due to medical reasons, require exempt or noncontract infant formula).² Contracts are awarded to the manufacturer offering the WIC State agency the lowest net price (as determined by the manufacturer’s wholesale price minus the rebate). As a result, the brand of infant formula provided by WIC varies by State, depending on which company holds the rebate contract.

Rebates are an important source of savings for WIC.³ As the U.S. Department of Agriculture’s (USDA) largest discretionary program, WIC is funded annually by congressional appropriations. As a result, the number of participants who can be served within the program’s budget depends heavily

¹Although infant formula is now available in a variety of containers including tubs, cartons, pouches, and bottles, most formula is still sold in cans and, for simplicity, we use “can” throughout this report to describe all infant formula containers.

²An exempt infant formula is an infant formula intended for commercial or charitable distribution that is represented and labeled for use by infants who have inborn errors of metabolism or low birth weight, or who otherwise have unusual medical or dietary problems (21 CFR 107.3).

³Although not required by law, 18 WIC State agencies have rebate contracts for other infant foods (infant cereal, baby food fruits and vegetables, and baby food meat) (USDA, Office of Budget and Program Analysis, 2013). Rebates from infant formula manufacturers greatly exceed those from all other infant food manufacturers combined.

on the program's food package costs, which in turn are significantly affected by the cost of infant formula.⁴ By negotiating rebates with formula manufacturers, WIC is able to serve more people within its appropriated budget.⁵

Net price is only one component of what WIC pays for infant formula. Participants in all States (except Vermont and Mississippi) "purchase" infant formula from authorized retail vendors using a food instrument (i.e., voucher, check, or electronic benefits transfer (EBT) card) that specifies the brand and amount of formula that can be purchased.⁶ The WIC State agency then reimburses the vendor for the full retail price of the formula purchased by WIC participants. Thus, the final cost to WIC for a can of formula has two components: (1) net price, and (2) retail markup. This report focuses on the net price component; ERS is conducting a separate study that examines the retail price of the formula purchased through WIC.

Trends in net prices are important to monitor because net prices, along with retail markups, are what WIC—and ultimately U.S. taxpayers—pays for the infant formula. A previous ERS study by Oliveira et al. (2010) found that nearly all WIC State agencies paid a higher net price for infant formula in the contract that was in effect in December 2008 than under the previous contract, even after adjusting for inflation. On average, real net prices increased by 73 percent (or 21 cents for 26 fluid ounces of reconstituted formula) between the two contracts.⁷ As a result of the increase in real net prices, WIC paid about \$127 million (2008 dollars) more for infant formula over the course of a year (holding retail markup constant). The 2010 report cautioned that if real net prices continued to increase, it would cost the program even more in the future as current contracts expired and WIC State agencies negotiated new contracts with the formula manufacturers, which could negatively impact WIC's ability to serve all eligible applicants. This report updates the previous ERS study by reexamining trends in net price, as well as in the two factors that affect net price—wholesale prices and rebates—based on data through February 2013.

This study used several different sources of data. The analysis of changes in net price was based primarily on data on rebate contracts compiled by USDA's Food and Nutrition Service (FNS) and by the Center on Budget and Policy Priorities (CBPP). Information on the characteristics of the infant formula market was based on a proprietary report prepared for ERS by the Nielsen Company, and data on infant formula wholesale prices came from the formula manufacturers' price list catalogs provided by the CBPP.

⁴In contrast, the Supplemental Nutrition Assistance Program (SNAP)—USDA's largest nutrition assistance program—is an entitlement program whereby everyone who meets the eligibility criteria may receive benefits if he or she chooses.

⁵In the event that WIC does not have the funds to enroll all eligible applicants, WIC has a priority system to ensure that those most likely to benefit from the program receive benefits. Anecdotal evidence indicates that, since the late 1990s, the program has been able to provide benefits to all eligible people seeking to enroll in it, including those at the lowest priority levels.

⁶Participants in Mississippi pick up their WIC infant formula from storage facilities operated by the State or local agency. In Vermont, WIC infant formula is delivered to the participant's home.

⁷Because both the package sizes and reconstitution factors for formula in powder form differ across the three manufacturers and over time, all wholesale prices cited in both this report and the previous report were converted to a standard unit—26 fluid ounces of reconstituted formula. This volume represents the reconstituted volume of a can of liquid concentrate formula for all three manufacturers during most of the study period. This conversion allows for an easy comparison of prices across different package sizes and product forms.

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

WIC is based on the premise that early intervention during critical times of growth and development can help prevent future medical and developmental problems. To qualify for WIC, a person must be either a pregnant, breastfeeding, or non-breastfeeding postpartum woman; a child up to his/her fifth birthday; or an infant less than 1 year of age. The family income of WIC applicants must be at or below 185 percent of the Federal poverty guidelines (annual income of \$42,643 for a family of four living in the 48 contiguous States between July 1, 2012 and June 30, 2013). Applicants who participate in or who have certain family members who participate in the Supplemental Nutrition Assistance Program (SNAP), Medicaid, or the Temporary Assistance for Needy Families (TANF) are automatically income eligible. Applicants must also be nutritionally at risk, as determined by a health professional (such as a physician, nutritionist, or nurse).

With total expenditures of \$6.8 billion in fiscal 2012—or 6 percent of total USDA expenditures for domestic food and nutrition assistance—WIC is the Nation’s third largest nutrition assistance program, trailing only SNAP and the National School Lunch Program (USDA, 2012). In FY 2012, an average 8.9 million people participated in WIC each month, including 2.1 million infants (23 percent of all WIC participants). Over half of all infants born in the United States participate in WIC.

Administered by USDA’s Food and Nutrition Service, WIC provides grants for food benefits, nutrition services, and administration to 90 WIC State agencies (including the 50 States, the District of Columbia, 5 U.S. territories—America Samoa, the Commonwealth of the Northern Mariana Islands, the Commonwealth of Puerto Rico, Guam, and the U.S. Virgin Islands—and 34 Indian Tribal Organizations). Four States—California, Texas, Florida, and New York—accounted for over one-third (36.5 percent) of all WIC infants in fiscal 2012, and they (along with Illinois, Georgia, Ohio, and North Carolina) accounted for half of all WIC infants.

The Infant Formula Market

This section looks at the characteristics of the U.S. infant formula market and trends in the wholesale prices of infant formula.

Characteristics of the Infant Formula Market⁸

Infant formula accounted for about \$3.5 billion in sales in 2007, up slightly from 2004. The small increase in dollar sales was solely the result of price increases as infant formula sales by volume (in reconstituted ounces) fell by about 5 percent between 2004 and 2007. This decrease in volume sales was a continuation of a trend found in an earlier ERS analysis of 1994-2000 data (Oliveira et al., 2004).

The infant formula market is highly concentrated. In 2008 (the latest available data), three manufacturers accounted for 98 percent of all dollar sales. Abbott, maker of the Similac product line (43 percent), and Mead Johnson, maker of the Enfamil line (40 percent), accounted for the majority of dollar sales, while Nestlé (now Gerber), maker of the Good Start Line, accounted for another 15 percent.⁹

Most infant formula is milk based (comprising some 80 percent of dollar sales in 2008), while soy-based formula accounted for 14 percent of all dollar sales and other formula bases (such as protein hydrolysate) accounted for the remaining 6 percent. Powder is the primary product form for infant formula sold in the United States—in 2008, powder comprised 83 percent of all dollar sales, up from 71 percent in 2004. During the same period, sales of liquid concentrate fell from 20 percent to 10 percent of all formula sales, and ready-to-feed formula fell from 9 percent to 7 percent. The lower price of powder (per reconstituted unit of formula) may be an important economic factor in its growth.

Supermarkets (including mass merchandisers with full supermarkets) accounted for 63 percent of all dollar sales of formula in 2007 (down from 70 percent in 2004). The share of sales in warehouse clubs increased from 10 percent in 2004 to 13 percent in 2007, and the share of sales in “all other” channels (i.e., outlets other than supermarkets, mass merchandisers, drug stores, and warehouse clubs) almost doubled, increasing from less than 5 percent to 9 percent. This trend may reflect an increase in online shopping for infant formula.

One of the most important developments in the infant formula market in the last decade was the introduction of formulas supplemented with the fatty acids docosahexaenoic acid (DHA) and arachidonic acid (ARA), which some studies have linked to improved vision and cognitive development in infants.¹⁰ Abbott first introduced these formulas into its U.S. product lines in 2002, with Mead Johnson and Nestlé following in 2003. Although more expensive than unsupplemented formulas, sales of DHA/ARA-supplemented formulas increased rapidly, and by 2004, they accounted for

⁸The information in this section comes from a proprietary report on national and regional trends in the infant formula market, which was prepared for the Economic Research Service by the Nielsen Company (2008). See Oliveira et al. (2011) for more detailed information on the characteristics of the infant formula market based on the Nielsen report.

⁹In February 2010, the brand name of Nestlé’s line of infant formulas was changed to Gerber.

¹⁰According to the Food and Drug Administration, the scientific evidence that the addition of docosahexaenoic acid and arachidonic acid to infant formulas is beneficial is mixed. “Some studies in infants suggest that including these fatty acids in infant formulas may have positive effects on visual function and neural development over the short term. Other studies in infants do not confirm these benefits. There are no currently available published reports from clinical studies that address whether any long-term beneficial effects exist” (U.S. Department of Health & Human Services, 2012).

69 percent of all dollar sales. By 2008, DHA/ARA-supplemented formulas accounted for nearly all—98 percent—dollar sales.

Trends in Wholesale Prices

Infant formula manufacturers publish a wholesale price list for their products (see box, “Infant Formula Products Used in This Analysis”). The listed prices are set at the national level (i.e., they do not differ across States) and vary only by volume, with larger volume purchases—up to a truckload of formula—receiving a bulk discount. We examine the trends in national wholesale prices for a full truckload of infant formula produced by the three major manufacturers—Mead Johnson, Abbott, and Nestlé/Gerber—that currently hold all of the WIC infant formula rebate contracts.

All three manufacturers raised their wholesale price per 26 reconstituted fluid ounces (for milk-based powder formula) multiple times between 2002 and 2012 (fig. 1). Since 2009, wholesale prices among the three brands have deviated more than in earlier years. As of December 2012, the price per 26 reconstituted ounces was \$4.15 for Abbott, \$4.01 for Mead Johnson, and \$3.81 for Gerber.

We adjust wholesale prices for inflation using the Consumer Price Index for All Items, the most widely used measure of general price changes.¹¹ The inflation-adjusted real wholesale price declines over time as inflation erodes the nominal price until manufacturers raise their national wholesale price, at which point the real wholesale price increases sharply (fig. 2). Note that in recent years, the real price of the three major brands has risen slightly faster than the rate of inflation.

Infant Formula Products Used in This Analysis

Each of the three major manufacturers offers a number of infant formula products. Furthermore, each of the formula manufacturers’ product lines have changed over time as products are reformulated, new formulas introduced, and container sizes change. Fatty acids DHA (docosahexaenoic acid) and ARA (arachidonic acid) were introduced in the last decade as infant formula supplements; all analyses discussed in this report are based on the manufacturers’ primary iron-fortified DHA/ARA-supplemented milk-based powder formula for routine feeding. They are:

Mead Johnson:

- Enfamil LIPIL (12.9 oz can) from 4/2003 to 7/2009
- Enfamil Premium Infant (12.5 oz can) starting in 8/2009

Abbott:

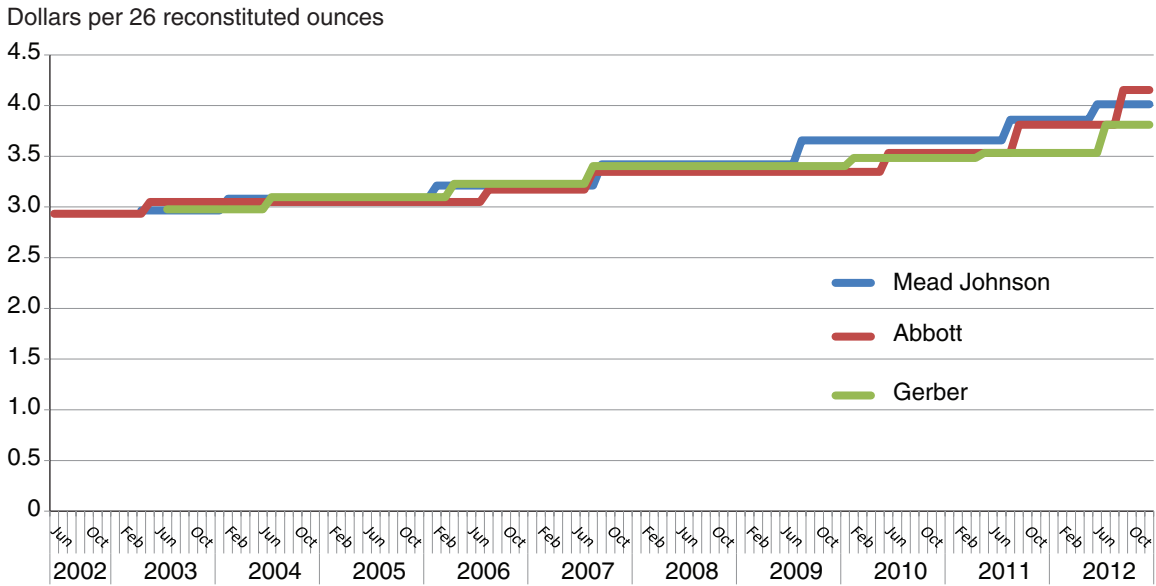
- Similac Advance (12.9 oz can) from 6/2002 to 5/2010
- Similac Advance (12.4 oz can) starting in 6/2010

Nestlé /Gerber:

- Good Start Supreme DHA/ARA (12 oz can) from 6/2003 to 4/2009
- Good Start Gentle Plus (12 oz can) from 5/2009 to 5/2011
- Good Start Gentle Plus (12.7 oz can) starting in 6/2011

¹¹We use the Consumer Price Index for All Items (CPI-U) as the deflator since we are interested in estimating the real cost of formula to taxpayers. Therefore, the relevant comparison is the price of infant formula relative to the price of other consumer goods. Using the general rate of inflation to deflate infant formula prices is consistent with previous studies of WIC and the infant formula market (e.g., Betson, 2009 and Davis, 2012).

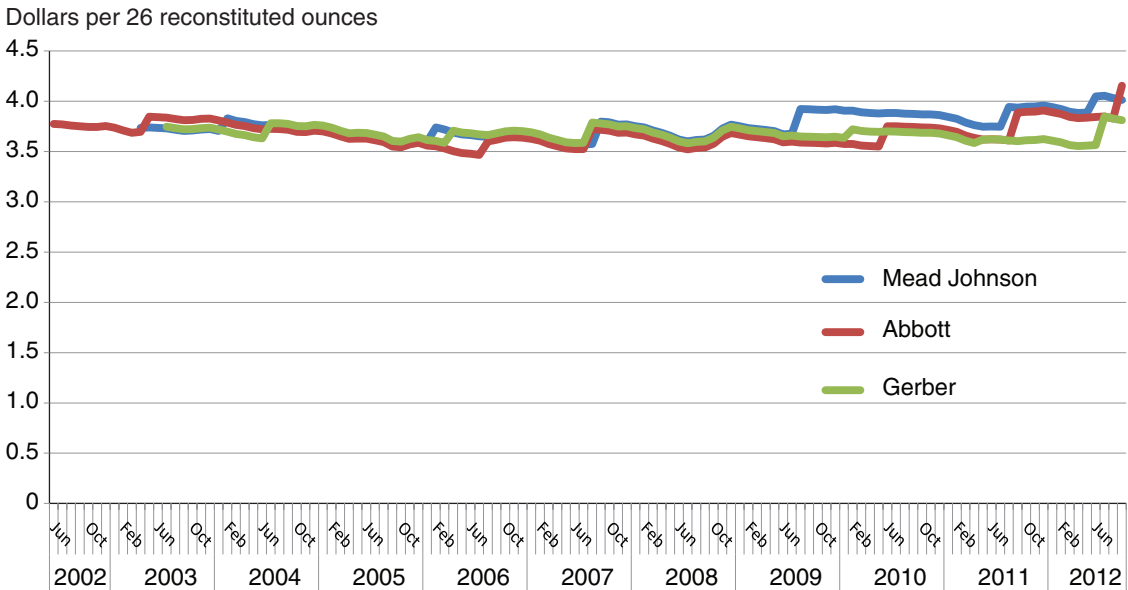
Figure 1
Nominal wholesale price of milk-based powder by brand, 2002-12



Note: Wholesale prices represent the manufacturers' lowest national wholesale price per unit for a full truckload of infant formula as reported in each manufacturer's price list catalog.

Source: USDA, Economic Research Service calculations based on infant formula manufacturers' product list catalogs.

Figure 2
Real wholesale price of milk-based powder by brand, 2002-12



Note: Wholesale prices (in September 2012 dollars) represent the manufacturers' lowest national wholesale price per unit for a full truckload of infant formula as reported in each manufacturer's price list catalog.

Source: USDA, Economic Research Service calculations of real wholesale prices based on infant formula manufacturers' product list catalogs adjusted by the U.S. Department of Labor, Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers for All Items.

WIC's Infant Formula Rebate Program

Current Federal regulations specify that WIC State agencies required to operate a cost-containment system for infant formula must use a single-supplier competitive system unless an alternative system provides equal or greater savings (7 CFR 246.16a).¹² Under the single-supplier competitive system, a WIC State agency (or a group of WIC State agencies—see box, “Multistate Alliances”) uses competitive bidding to award a contract to a single manufacturer of infant formula in exchange for a rebate for each can of infant formula purchased by WIC participants. As a result, the conditions of the contract—including the amount of the rebate and the contract term (i.e., the period during which the infant formula rebate contract is in effect), as well as the manufacturer who holds the contract—will vary across States.¹³ Since the mid-1990s, only the three major infant formula manufacturers have held rebate contracts.

Multistate Alliances

Of the 48 States, the District of Columbia, and the 5 territories operating a single-supplier competitive rebate system in conjunction with a retail food-delivery system as of February 2013, 34 were part of a multistate alliance. In addition, 12 Indian Tribal Organizations (ITOs) were also part of an alliance.

- The Western States Contracting Alliance (WSCA) is comprised of 14 States (Alaska, Arizona, Delaware, Hawaii, Idaho, Kansas, Maryland, Montana, Nevada, Oregon, Utah, Washington, West Virginia, and Wyoming), the District of Columbia, 4 territories (American Samoa, Guam, the Virgin Islands, the Commonwealth of the Northern Mariana Islands), and 3 ITOs.
- The New England and Tribal Organization (NEATO) is comprised of five States (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island), and two ITOs.
- The Mountain Plains Region is comprised of three States (Missouri, Nebraska, and South Dakota).
- The Southwest/Southeast Region is comprised of three States (Arkansas, New Mexico, and North Carolina). (One ITO has an agreement with North Carolina that allows the State to collect rebates on its behalf.)
- The Southwest/Mountain Plains/Midwest Regions is comprised of three States (Iowa, Minnesota, Texas), and one ITO.
- The Southwest Region is comprised of one State (Oklahoma) and five ITOs.

The remaining 19 States and Puerto Rico held contracts that applied solely to their particular State. Eight ITOs were not part of a multistate alliance, and another 14 ITOs had 1,000 or fewer participants and were therefore not required to use cost-containment procedures for infant formula.

¹²WIC State agencies with home delivery or direct distribution food delivery systems, and Indian State agencies with 1,000 or fewer participants, are not required to use cost-containment procedures for infant formula (7 CFR 246.16a).

¹³The average length of the most recently completed rebate contracts, including contract extensions, was 4.8 years (see appendix A for the dates in which each State's current and previous rebate contracts became effective).

Solicitation for bids can take one of two forms—single solicitation or separate solicitations.

- Under **single solicitation**, the request for bids is for a single iron-fortified, milk-based infant formula that is suitable for routine issuance to most generally healthy, full-term infants. Manufacturers designate the specific infant formula product—referred to as the *primary contract brand*—for which they submit a bid.¹⁴ The WIC State agency must use the primary contract infant formula as the first choice of issuance to the WIC participants in that State. However, winning infant formula bidders are required to supply and provide a rebate on all infant formulas they produce that the WIC State agency chooses to issue, except exempt infant formulas.¹⁵ Bidders that do not produce a soy-based infant formula are required to subcontract with another manufacturer to supply a soy-based infant formula. All infant formulas (except exempt infant formula) produced by the manufacturer awarded the rebate contract are referred to as *contract-brand infant formulas*.
- Under **separate solicitations**, bids are issued separately for milk-based and soy-based infant formulas. All relevant infant formulas issued under each contract are considered contract-brand infant formulas. The primary contract brand is the milk-based infant formula (for the milk-based contract) or the soy-based infant formula (for the soy-based contract) for which the rebate is being specified. Therefore, under separate solicitations, there could be two different contract brands in a State—one for milk-based formulas and a different one for soy-based formulas. All State agencies and multistate alliances that served a monthly average of more than 100,000 infants during the preceding 12-month period are required to issue separate bid solicitations for milk-based and soy-based infant formula (7 CFR 246.16a).

In their submission of sealed bids, manufacturers specify the rebates for a pre-specified amount of the primary contract-brand infant formula in each of the three forms—powder, liquid concentrate, and ready-to-feed. The amount of the rebate on these other contract-brand infant formulas is based on the same percentage discount (i.e., the amount of the rebate as a percentage of the wholesale price) for the particular physical form of the primary contract-brand infant formula (see box, “Percentage Discounts”). For example, if the rebate offered for the primary contract brand of powdered infant formula was 85 percent of the manufacturer’s wholesale price, then the rebate for all other powdered forms of the contract-brand infant formula (including soy-based powder under single solicitation) would also be 85 percent of their wholesale price.

The contract is awarded to the bidder offering the lowest total monthly net price (as determined by the wholesale price minus the rebate). For the purpose of estimating the net price used in awarding contracts, WIC State agencies calculate the rebate, wholesale price, and percentage discount as of the date of the bid opening. The contracts contain inflationary provisions so that, in the event of

¹⁴The primary contract brand must be offered in all physical forms—liquid concentrate, powder, and ready-to-feed. Although WIC usually issues formula in powdered or liquid-concentrate forms, formula may be issued in the ready-to-feed form in special situations, such as when the participant’s household has an unsanitary or restricted water supply or poor refrigeration, or if the person caring for the infant may have difficulty in correctly diluting concentrated forms or reconstituting powdered forms (7 CFR 246.10).

¹⁵Under special circumstances, WIC may issue formula not manufactured by the WIC contract manufacturer. Such formula (referred to as noncontract infant formula) may be issued only with medical documentation (provided by a licensed health care professional authorized to write medical prescriptions under State law) that an infant has a condition that dictates the formula’s use. The only exception to this rule is that local WIC agencies may issue noncontract-brand infant formula without medical documentation in order to accommodate religious eating patterns (65 Federal Register 51213-51229). WIC State agencies do not receive rebates from noncontract-brand infant formula, and some States have disallowed any use of noncontract formula.

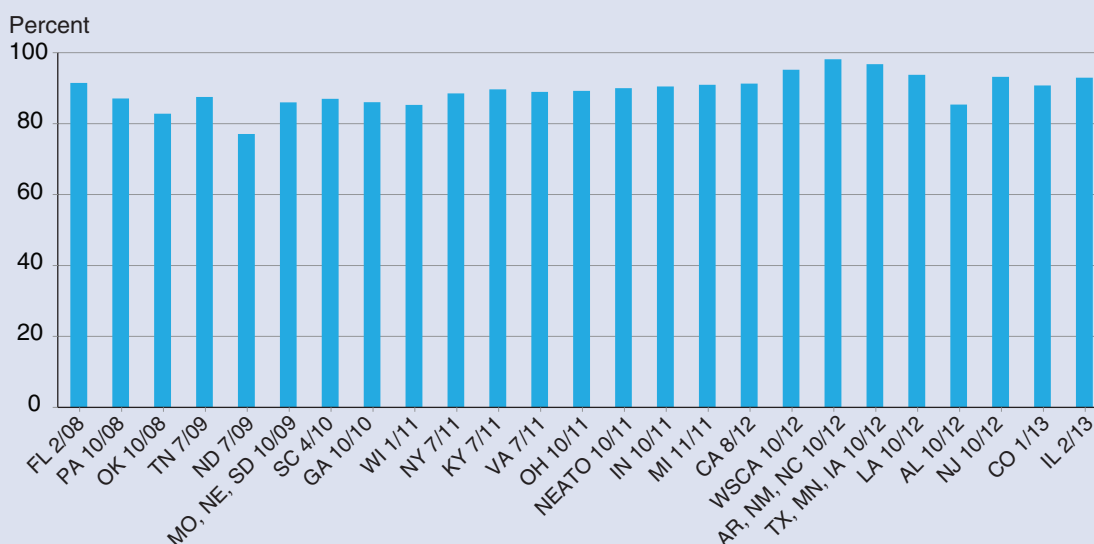
Percentage Discounts

Manufacturers' rebates are generally large. For example, among current contracts, the average percentage discount (i.e., the amount of the rebate as a percentage of the wholesale price) for milk-based powder—the predominant type of formula used in the WIC Program—was 92 percent. The percentage discount ranged from 77 percent in North Dakota to 98 percent in Arkansas, New Mexico, and North Carolina. In other words, the infant formula purchased through WIC cost those latter three States' WIC programs only 2 percent of its wholesale price (plus the amount of the retail markup). In total, 21 States (including Washington, D.C.) received discounts of 95 percent or more.

The supply-side and demand-side characteristics of the infant formula market provide possible explanations about how infant formula manufacturers can afford to offer such high percentage discounts. For example, on the supply side, the formula market is highly concentrated with only three major manufacturers—a factor which is often associated with higher profit margins (U.S. General Accounting Office, 1998). This gives manufacturers a cushion to offer high rebates.

On the demand side, over half of all infant formula is purchased through WIC, ensuring large sales for the contract-winning manufacturer. In addition, manufacturers may realize spillover benefits from winning a WIC contract. For example, retailers generally devote more shelf space and better product placement to the WIC contract brand. This results in greater product visibility, which in turn may spur sales to non-WIC consumers. See Oliveira et al. (2011) p. 18 for a more detailed discussion of the possible mechanisms by which formula manufacturers may realize spillover effects.

Infant formula rebates as a percentage of the wholesale price for current milk-based powder contracts, by State



Note: Rebate plus net price sums to 100 percent of the wholesale price. Current contracts refers to contracts in effect in February 2013. NEATO (New England and Tribal Organization) and WSCA (Western States Contracting Alliance) are multistate alliances. For a list of members of each alliance, see box, "Multistate Alliances."

Source: USDA, Economic Research Service calculations based on data from USDA, Food and Nutrition Service and the Center on Budget and Policy Priorities.

an increase/decrease in the wholesale price after the bid opening, there is a cent-for-cent increase/decrease in the rebate amounts. Thus, the nominal net price of formula to a WIC State agency remains fixed over the entire contract term despite increases (or decreases) in the wholesale price after the contract is initiated. Although the nominal net price remains constant over time, the real (i.e., inflation adjusted) net price will decrease over time due to general price inflation.

Trends in Infant Formula Rebate Contracts

This section looks at recent trends in net price for milk-based infant formula in powdered form—the predominant type of formula provided through WIC. Because net price is determined by the wholesale price and the rebate, trends in these two factors are also examined. The analysis updates a previous study by the authors that was based on data through 2008 (see box, “Previous ERS Study on Infant Formula Rebates”).

Net Price

The methodology used in the current study is similar to that of the previous study: the real net price in each State’s contract that was in effect in February 2013 (i.e., the “current” contract) was compared to that of its previous contract. Net prices are set as of the time of the bid opening and do not change in nominal terms over the length of the contract. However, the *real* (i.e., adjusted for inflation) net price decreases over time due to inflation. To control for the erosion in the real net price over the length of the contract, we compared the real net price (in February 2013 dollars) for the two contracts at the time each contract became effective (when the WIC State agency began to reimburse the retailers for the contract-brand formula purchased with the WIC food instrument (see appendix A for the start date in each State)). The unit of analysis for this study was the geographic State and the District of Columbia. We excluded five States from the analyses—Mississippi and Vermont (which do not use retail food-delivery systems), as well as Florida, Oklahoma, and Pennsylvania, which have not awarded any new contracts since the previous report was released.¹⁶ As a result, the following analyses were based on 46 WIC State agencies (45 States and the District of Columbia).¹⁷

Real net price decreased in 20 of the 22 contracts awarded after 2008, or in 44 of the 46 WIC State agencies (fig. 3). This means that nearly all of the WIC State agencies that awarded new contracts after 2008 are *paying less per unit of formula* in the current contract than under the previous one (after adjusting for inflation and holding retail markup constant). On average, real net prices decreased by 23 cents (for 26 fluid ounces of reconstituted formula) between the States’ last two contracts (see box, “Weighted Averages”).¹⁸ This represented a 43-percent decrease in real net prices.

Components of Net Price

Examination of the two components of real net price—wholesale price and rebates—indicates that they had opposing impacts. Real wholesale price increased in 17 of the 22 contracts (or in 39 of the 46 WIC State agencies) (fig. 4). The increase in real wholesale prices was usually greatest for the more recent contracts (i.e., contracts that became effective in 2012 and 2013), reflecting the recent increase in real wholesale prices across all three manufacturers as illustrated in figure 2. On average, real wholesale prices increased by 21 cents (or 6 percent) per 26 reconstituted fluid ounces of formula between the previous contract and the current one.

¹⁶Florida, Oklahoma, and Pennsylvania each last awarded a contract in 2008. Although Puerto Rico was included in the previous study, it was excluded from this analysis because we were not able to obtain data on its most recent rebate contract.

¹⁷The number of infants residing in territories and Indian Tribal Organizations that were part of a multistate alliance included in the study were used in deriving our weighted averages (see box “Weighted Averages”).

¹⁸In nominal terms (i.e., not adjusting for inflation), the average decrease in net price was 17 cents per 26 ounces of reconstituted formula.

Previous ERS Study on Infant Formula Rebates

In an Economic Research Service (ERS) report released in 2010, the authors compared the net price in each State's contract that was in effect in December 2008 to that of its previous contract (Oliveira et al., 2010). The analysis excluded Mississippi and Vermont, which do not use retail food-delivery systems, as well as all Indian Tribal Organizations.

Results from that study indicated that nearly all WIC State agencies paid a higher real net price for milk-based powdered formula in their rebate contracts that were in effect in December 2008 than in their previous contracts. Forty-five of the 48 geographic States, along with the District of Columbia, and all 5 U.S. territories saw an increase in their real net price. Across the WIC State agencies, real net prices increased by an average 21 cents for 26 fluid ounces of reconstituted formula between States' previous contract and the rebate contracts in effect in December 2008. As a result of the increase in real net prices, WIC State agencies paid about \$127 million more for infant formula over the course of a year, holding retail markup constant.

Most (72 percent) of the increase in real net price was due to an increase in the real wholesale price of infant formula that, in turn, was due in large part to a switch to formulas supplemented with fatty acids DHA (docosahexaenoic acid) and ARA (arachidonic acid)—introduced in the last decade as infant formula supplements. All rebate contracts in effect in December 2008 were based on DHA/ARA-supplemented formulas, whereas most of the previous contracts were based on unsupplemented formulas. Because the wholesale prices of DHA/ARA-supplemented formulas were significantly higher than wholesale prices of unsupplemented formulas, wholesale prices of infant formula increased more in States that switched to the DHA/ARA-supplemented formula in their contracts that were in effect in December 2008. The remaining 28 percent of the increase in real net price was due to a decrease in real rebates. The average percentage discount in the previous contracts was 91 percent. The average percentage discount in the contracts in effect in December 2008 fell to 85 percent. Thus, WIC State agencies were paying a greater percentage of a higher wholesale price, on average, than in their previous contracts.

Change in real net price between contracts in effect in December 2008 and previous contracts, by State

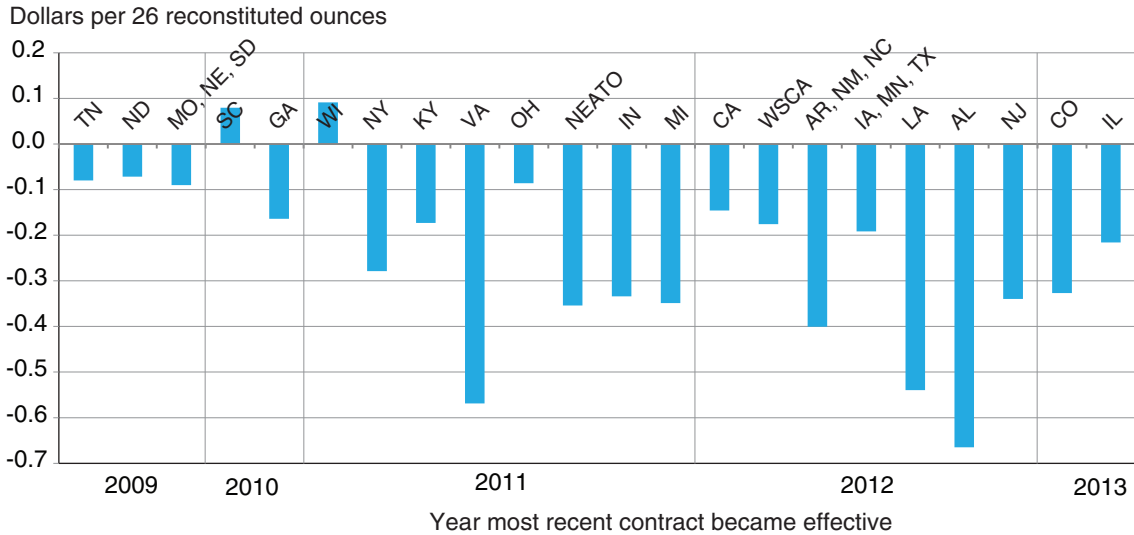


Note: December 2008 dollars. Previous contracts refers to contracts that were in effect immediately prior to the December 2008 contract. NEATO (New England and Tribal Organization) and WSCA (Western States Contracting Alliance) are multistate alliances. For a list of members of each alliance, see box, "Multistate Alliances."

Source: Oliveira et al., 2010.

Figure 3

Change in real net price between current and previous contracts, by State

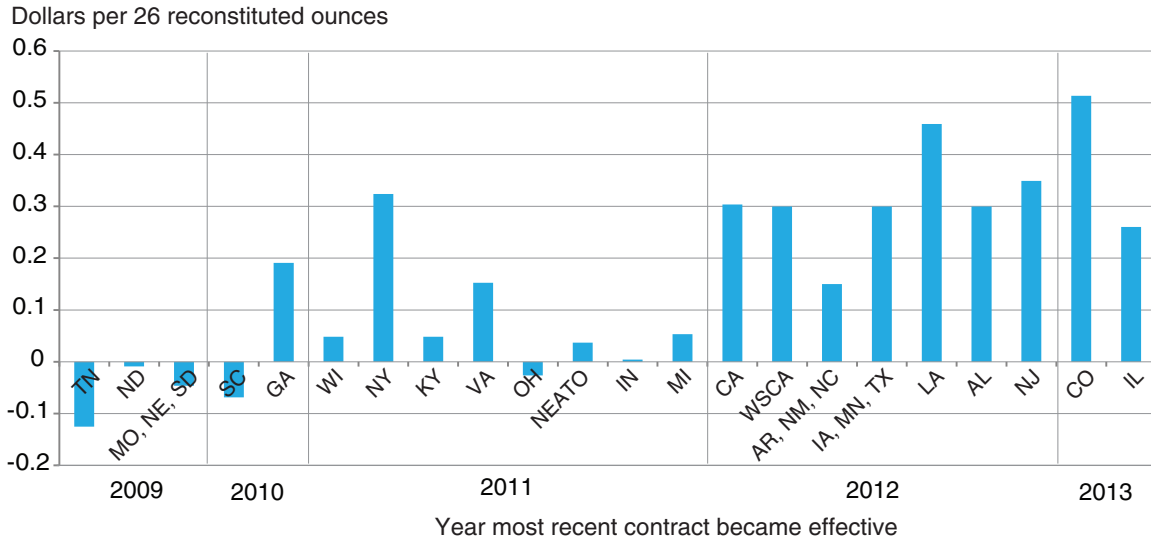


Note: February 2013 dollars. Current contracts refers to contracts in effect in February 2013. Previous contracts refers to contracts that were in effect immediately prior to the current contract. NEATO (New England and Tribal Organization) and WSCA (Western States Contracting Alliance) are multistate alliances. For a list of members of each alliance, see box, "Multistate Alliances."

Source: USDA, Economic Research Service calculations based on USDA, Food and Nutrition Service data and data from the Center on Budget and Policy Priorities adjusted by U.S. Department of Labor, Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers for All Items.

Figure 4

Change in real wholesale price between current and previous contracts, by State



Note: February 2013 dollars. Current contracts refers to contracts in effect in February 2013. Previous contracts refers to contracts that were in effect immediately prior to the current contract. NEATO (New England and Tribal Organization) and WSCA (Western States Contracting Alliance) are multistate alliances. For a list of members of each alliance, see box, "Multistate Alliances."

Source: USDA, Economic Research Service calculations based on USDA, Food and Nutrition Service data and data from the Center on Budget and Policy Priorities adjusted by U.S. Department of Labor, Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers for All Items.

Weighted Averages

In all of the analyses conducted specifically for this report, averages refer to weighted averages where the weights are based on each State agency's 2012 average monthly caseload of infants receiving formula through WIC. The average monthly caseload of infants includes infants residing in the State (or States if a multistate alliance), as well as infants in the U.S. territories and Indian Tribal Organizations covered under the contract (see appendix B). Under current WIC regulations, the maximum monthly allowance of formula for partially breastfed infants is about half of the maximum monthly allowance for fully formula-fed infants. In order to account for the smaller amounts of formula that partially breastfed infants receive, State weights were calculated as the sum of the number of fully formula-fed infants and half the number of partially breastfed infants. As a result, if one State has an average monthly caseload of infants receiving formula through WIC (adjusted by breastfeeding status) that was twice as large as another State, that State received a weight that was twice that of the smaller State. These weights are slightly different from the weights used in the previous study (which used total infant caseload in each State) and take advantage of the data available as of 2010 on the number of formula-fed and partially breastfed infants.

The use of average monthly caseloads in FY 2012 for all calculations related to both the current and previous contracts assumes that there was no change in the distribution of caseloads across the WIC State agencies between FY 2012 and the time when the States' previous infant formula contract became effective. As a result, any change in the variable of interest (e.g., real net price) represents a change in the value of the variable and not a change in the weights used in the calculations.

The impact on net price of the increase in real wholesale prices was more than offset by an increase in real rebates. Real rebates increased in 19 of the 22 contracts (or in 43 of the 46 WIC State agencies) (fig. 5). On average, real rebates increased by about 44 cents (or 14 percent) per 26 reconstituted fluid ounces of formula between the previous and current contracts.

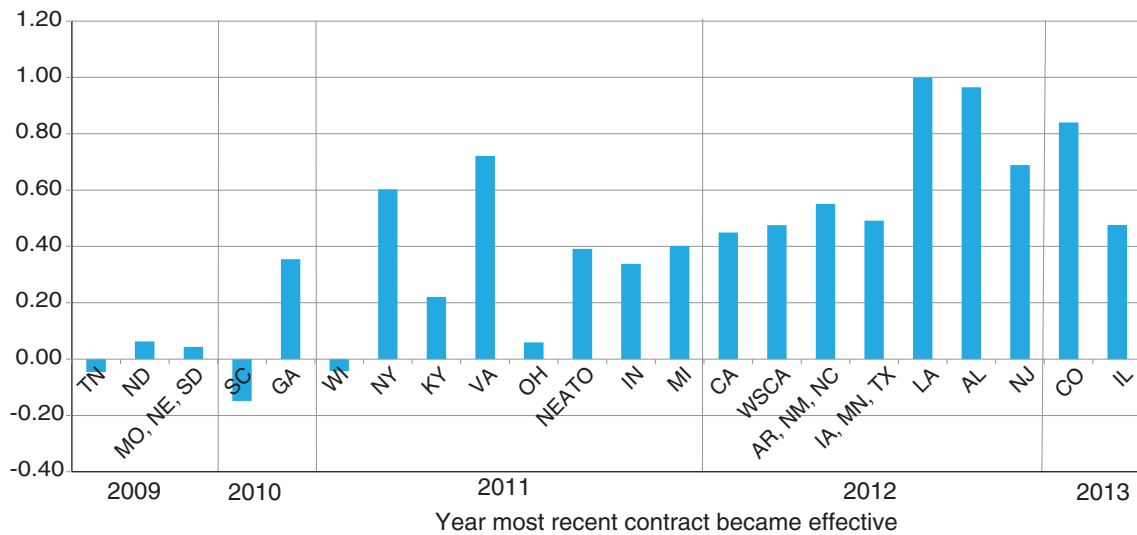
We also examined rebates in terms of the percentage discount (i.e., the rebate of the primary contract brand as a percentage of the wholesale price) which is used to calculate the amount of the rebate for all of the other formula products produced by the manufacturer awarded the rebate contract. The average percentage discount in the 22 previous contracts was 85 percent. In other words, on average, WIC paid 15 percent of the wholesale price for formula (plus the retail markup). The average percentage discount in the 22 current contracts increased by an average of 7 percentage points to 92 percent, indicating that, as a whole, WIC State agencies are now paying a smaller percentage of the wholesale price than previously.¹⁹ For 20 of the 22 contracts (representing 44 of the 46 WIC State agencies), the percentage discount increased between the previous contract and the current one (fig. 6). Thus, in both absolute terms (real rebates) and relative terms (percentage discounts), the vast majority of States experienced an increase in the size of the rebate in their current contract relative to their previous one.

¹⁹Although the 92-percent average percentage discount for current contracts was higher than the 85-percent average percentage discount for the contracts in effect in December 2008, it was similar to the 91-percent average percentage discount observed among contracts prior to that time (Oliveira et al., 2010).

Figure 5

Change in real rebates between current and previous contracts, by State

Dollars per 26 reconstituted ounces



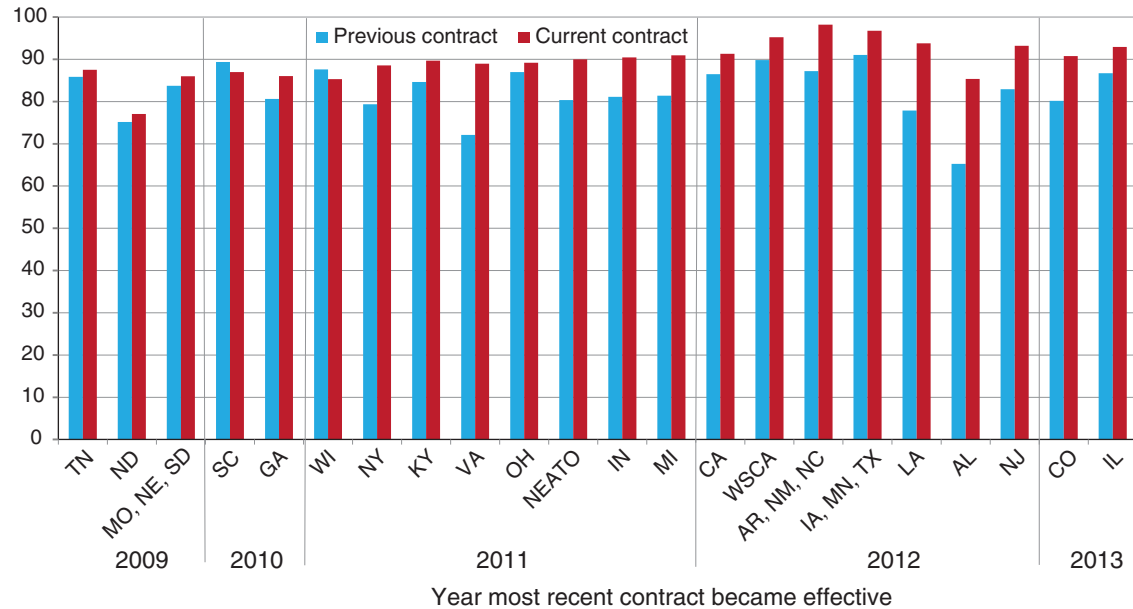
Note: February 2013 dollars. Current contracts refers to contracts in effect in February 2013. Previous contracts refers to contracts that were in effect immediately prior to the current contract. NEATO (New England and Tribal Organization) and WSCA (Western States Contracting Alliance) are multistate alliances. For a list of members of each alliance, see box, "Multistate Alliances."

Source: USDA, Economic Research Service calculations based on USDA, Food and Nutrition Service data and data from the Center on Budget and Policy Priorities adjusted by U.S. Department of Labor, Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers for All Items.

Figure 6

Percentage discount rates for current and previous contracts, by State

Rebates as percent of wholesale price



Note: Current contracts refers to contracts in effect in February 2013. Previous contracts refers to contracts that were in effect immediately prior to the current contract. NEATO (New England and Tribal Organization) and WSCA (Western States Contracting Alliance) are multistate alliances. For a list of members of each alliance, see box, "Multistate Alliances."

Source: USDA, Economic Research Service calculations based on data from USDA, Food and Nutrition Service and the Center on Budget and Policy Priorities.

Discussion

This study of infant formula rebate contracts found that real net prices for current contracts decreased by an average 43 percent (or 23 cents per 26 fluid ounces of reconstituted formula) from the previous contracts. Although real wholesale prices increased on average between the two contracts (by 21 cents per 26 fluid reconstituted ounces), the real rebates provided by the manufacturers increased even more (by 44 cents per 26 fluid reconstituted ounces) (fig. 7).

Factors Behind the Decrease in Real Net Price

The 43-percent decrease in real net prices raises an important question: Why are formula manufacturers offering infant formula to WIC at lower prices than before? Although the manufacturers do not make the reasons behind their bidding decisions public, one of the major factors behind the decrease in net price may be the decline in the demand for formula in the United States, brought about by demographic changes, changes in infant feeding practices, and revisions to the WIC food packages.

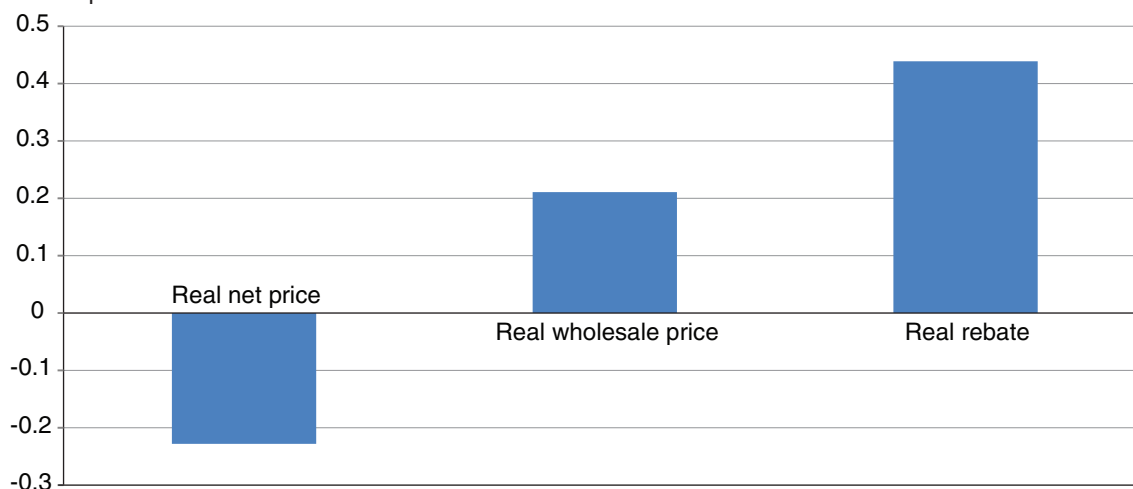
Decrease in the number of births. The number of births in the United States declined each year from 2007 to 2011, and preliminary data suggest that the decline in births continued in 2012 (Hamilton and Sutton, 2012) (fig. 8).

Increase in breastfeeding rates. While births are decreasing, breastfeeding rates for U.S. infants across all ages are continuing to rise (fig. 9).

Figure 7

Average change in real net price, wholesale price, and rebate between current and previous contracts

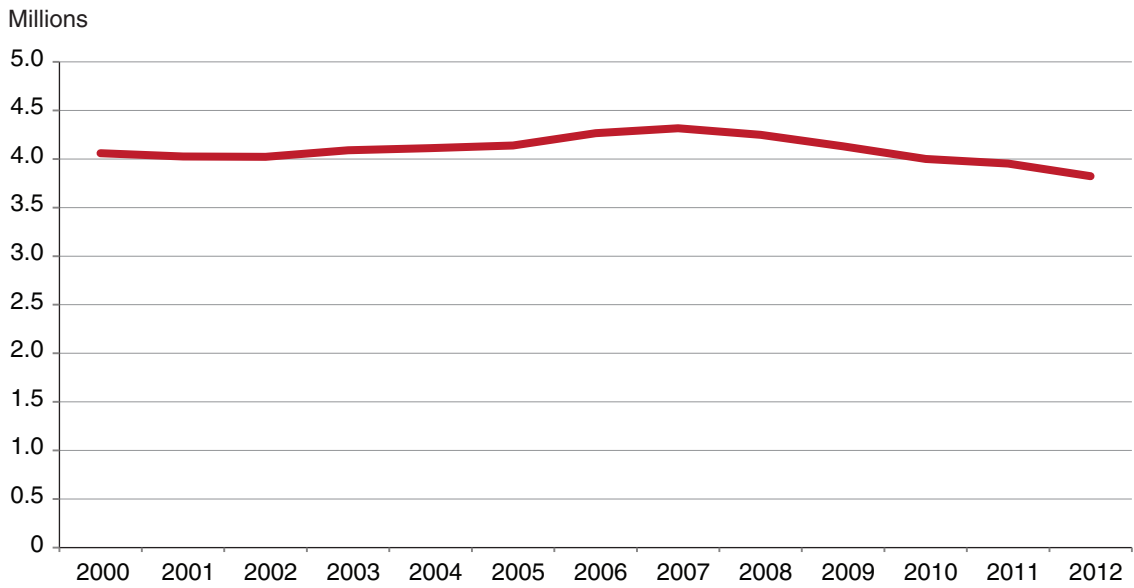
Dollars per 26 reconstituted ounces



Note: Current contracts refers to contracts in effect in February 2013. Previous contracts refers to contracts that were in effect immediately prior to the current contract. Analysis limited to those States whose most recent contract went into effect after 2008. Averages were estimated using weighted data.

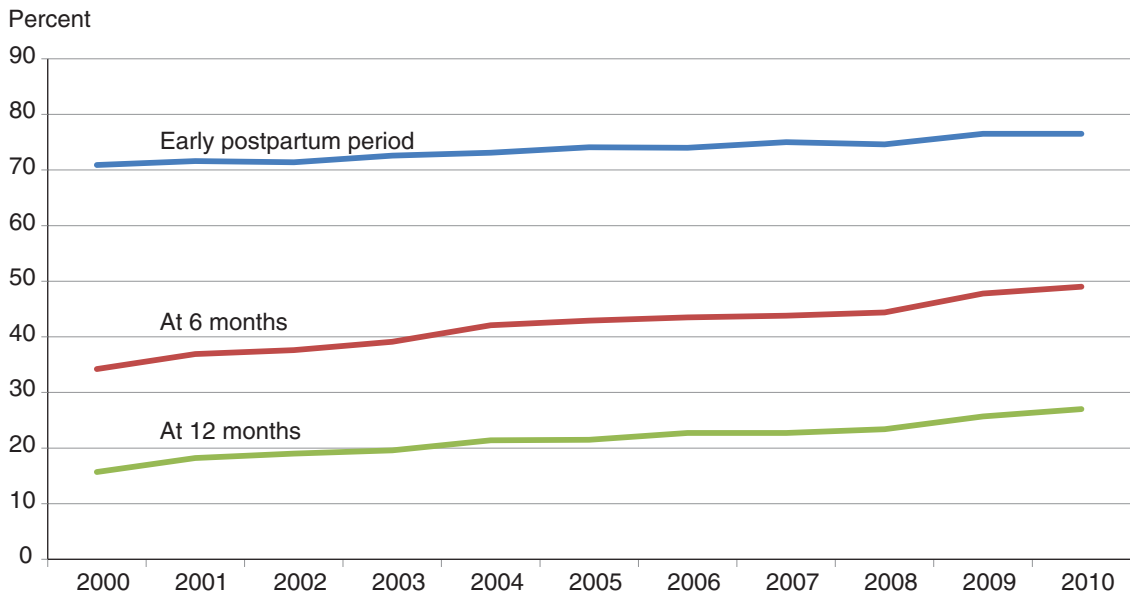
Source: USDA, Economic Research Service calculations based on USDA, Food and Nutrition Service data and data from the Center on Budget and Policy Priorities adjusted by U.S. Department of Labor, Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers for All Items.

Figure 8
Number of U.S. births, 2000-12



Note: Data for 2012 are based on provisional data through June 2012.
 Source: Hamilton and Sutton, 2012, and Martin et al., 2012.

Figure 9
Breastfeeding among U.S. children born 2000-10



Source: Data from the Centers for Disease Control and Prevention's National Immunization Survey.

Revisions to the WIC food packages. In December 2007, program regulations governing the WIC food packages were revised to reflect advances in nutrition science and dietary recommendations and to address current supplemental nutritional needs of WIC participants (72 Federal Register 68965-69032). WIC State agencies were required to implement the new provisions by October 1, 2009. In an effort to promote and increase duration of breastfeeding, the new WIC food packages provide different amounts of infant formula depending on the infant's age and feeding method. ERS estimated that, given the same number of fully formula feeding, partially breastfeeding, and fully breastfeeding infants, the new food packages would result in a considerable reduction in the amount of infant formula purchased through the WIC program (Oliveira et al., 2010). To the degree that WIC recipients do not purchase more formula with their own funds to make up for the reduction in WIC-provided formula, the revisions to the WIC food packages might contribute to a decreased demand for formula.

Fewer births, higher breastfeeding rates, and reduced formula purchases through WIC all contribute to the decreased demand for formula and lower total sales of formula. Infant formula manufacturers have large fixed costs associated with their manufacturing plants and low (and perhaps declining) marginal costs of production. Operating plants at less than their optimal level may be inefficient and lead to higher per unit costs.

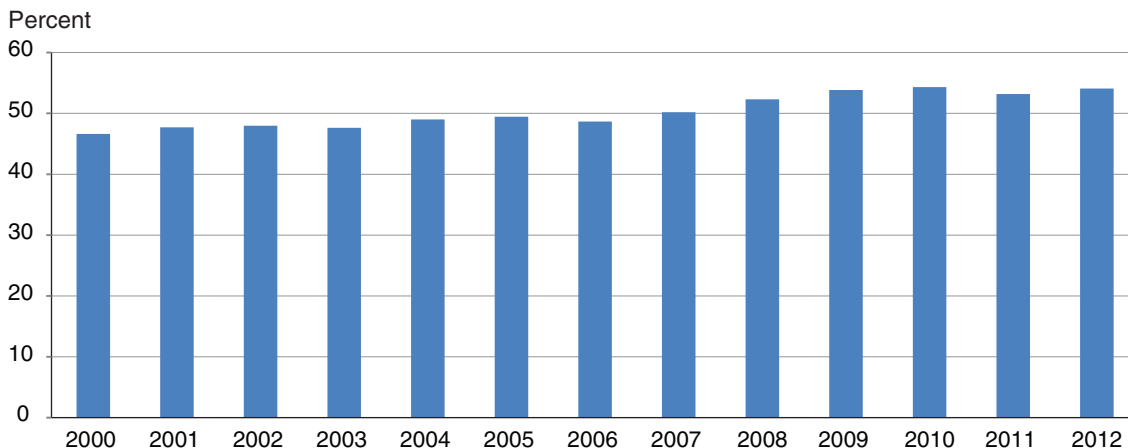
Since WIC sales account for such a large share of total sales of formula, winning or losing WIC infant formula rebate contracts can have a significant effect on a manufacturer's sales levels. A previous ERS study based on over 7,000 retail stores in 30 States found that WIC contract brands accounted for 84 percent of all formula sold in supermarkets (Oliveira et al., 2011). The impact of a switch in the manufacturer holding the WIC contract was considerable. The market share of the manufacturer of the new WIC contract brand increased by an average 74 percentage points after winning the contract. Although most of this increase was the direct effect of WIC recipients switching to the new WIC contract brand, manufacturers also realized a spillover effect from winning the WIC contract whereby sales of their formula purchased outside of WIC also increased. These spillover effects are very important to the formula manufacturers since, unlike formula purchased through WIC, manufacturers do not pay a rebate on formula that is purchased outside the program. For example, since the average percentage discount of current contracts was 92 percent, this means that the revenue received by formula manufacturers for each can of non-rebated formula was over 12 times greater than the revenue for each can of formula purchased through WIC.

Thus, in the face of a shrinking market for their product, manufacturers may compete more aggressively for WIC contracts in order to maintain their sales volume. This strategy may be even more important given that WIC infants account for an increasing share of all infants in the United States (fig. 10).²⁰ In other words, as the overall formula market is shrinking, the non-WIC market is shrinking faster. Therefore, winning WIC infant formula contracts becomes an even more important strategy than in previous years for formula manufacturers trying to maintain production levels, resulting in manufacturers bidding more aggressively to win WIC contracts.

In addition to the decreased demand for formula, FNS efforts to strengthen the bid solicitation and contracting process for infant formula rebate systems may have played a role in the decrease in real net price. For example, in 2005, FNS noted that WIC State agencies were requiring increased

²⁰Part of this trend is likely due to the economic downturn in the United States in recent years. As economic conditions worsen, the number of unemployed persons increase, average household income falls, and a greater percentage of infants meet WIC's income eligibility guidelines.

Figure 10
WIC infants as a percent of all U.S. infants, 2000-12



Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. WIC infants as a percent of all U.S. infants from 2000 to 2011 was estimated by dividing the average monthly number of WIC infants in a given fiscal year (October–September) by the total number of live births in the United States during the corresponding calendar year (January–December). Because the number of live U.S. births in 2012 was only available for the first 6 months of the year, when this report was being prepared, WIC infants as a percent of all U.S. infants for that year was estimated by dividing the average monthly number of WIC infants in fiscal 2012 by twice the total number of live births in the United States during the first 6 months of 2012. Data on the number of live births in 2011 was preliminary; data on the number of live births in 2012 was provisional.

Source: USDA, Economic Research Service calculations based on data from USDA, Food and Nutrition Service; Hamilton and Sutton, 2012; and Martin et al., 2012.

quantities of free infant formula and other free items such as educational materials, conference support, and supplies and that this had the potential effect of reducing rebate savings (70 Federal Register 43332-43335). In 2008, FNS issued a final rule that prohibited WIC State agencies from requiring that infant formula manufacturers provide free infant formula or other items in their infant formula rebate bid solicitations (73 Federal Register 21807-21811).

Other factors may have also had an effect on manufacturers' bidding decisions. For example, whereas all rebate contracts in effect in December 2008 were based on the more expensive DHA/ARA-supplemented formulas, most of the previous contracts were based on unsupplemented formulas. The higher net prices associated with the contracts in effect in December 2008 may reflect an adjustment period during which the infant formula manufacturers were modifying their WIC contract bidding strategies based on these new formulas. Also, in recent years, a number of organizations (including the California WIC Association (2009), the Center on Budget and Policy Priorities (Neuberger, 2010), and the National WIC Association (2011)) have raised questions about the effectiveness of new additives in infant formula (e.g., DHA/ARA, prebiotics, and probiotics) and new product lines (e.g., special formulas for fussiness, spitting up, and gas) and their impacts on WIC food costs. This negative attention may have encouraged infant formula manufacturers to offer higher rebates and lower net prices in their new contracts.

Trends in Total Rebates

Data from FNS indicate that total rebates to WIC have declined substantially in recent years, from \$2 billion in FY 2008, to \$1.7 billion in FY 2012—a decrease in nominal terms of 16 percent. (In real terms, i.e., after accounting for inflation, the decrease was even greater at 21 percent.) At first glance, the *decrease* in total rebates appears to contradict this study's finding that real rebates per

26 reconstituted fluid ounces *increased* 14 percent between current contracts and States' previous contracts. However, while rebates per 26 reconstituted fluid ounces of formula have increased, the number of infants participating in WIC has declined (fig. 11), breastfeeding rates among WIC infants have increased (fig. 12), and the average amount of formula provided in the WIC infant food packages has declined, all of which results in less total formula being purchased through WIC. This smaller volume of formula purchased has led to a decrease in the total amount of rebates provided to WIC, even as rebates per unit have increased.

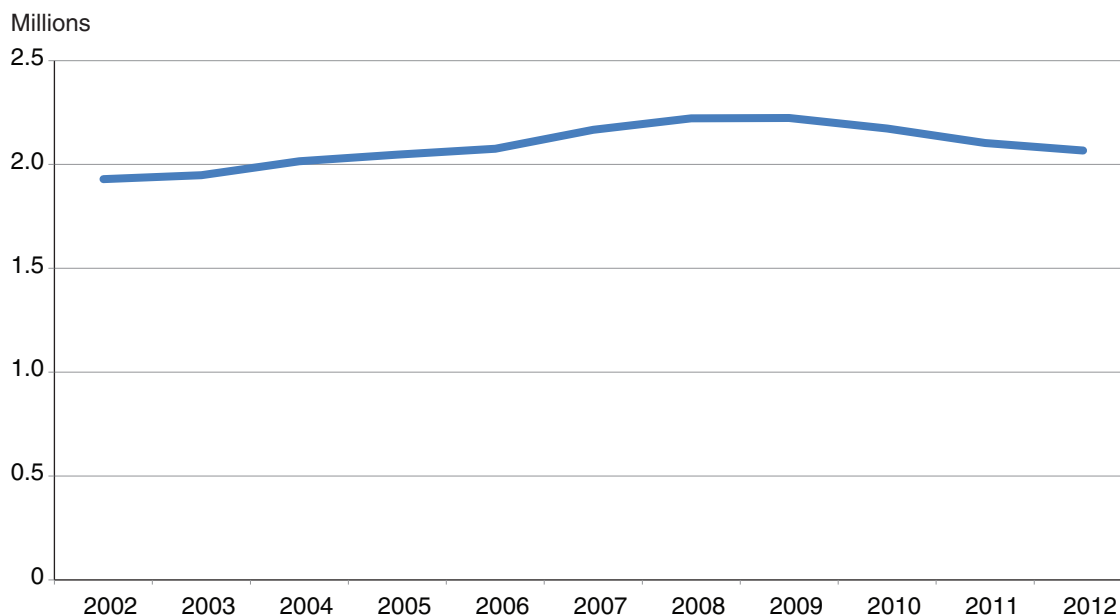
Impact of Lower Net Price on Infant Formula Costs

Estimating the impact of the decrease in real net prices on total infant formula costs to WIC involved a number of steps:

Average monthly number of WIC infants. We held the number of WIC infants constant at FY 2012 levels in order to eliminate the effect of changes in caseload size on formula cost estimates. Furthermore, we included only WIC infants who resided in an area covered under a contract examined in this report. Therefore, the count excludes infants residing in 5 States (Florida, Mississippi, Oklahoma, Pennsylvania, and Vermont), Puerto Rico, and 27 Indian Tribal Organizations not part of a multistate alliance covered in this study. This resulted in an average monthly total of 1,790,813 infants in covered States in FY 2012 (or about 87 percent of all WIC infants).

Total amount of WIC formula issued per month. The average number of WIC infants per month (derived in step 1) was multiplied by 618.8 (ounces)—the estimated average monthly amount of

Figure 11
Infants in WIC, FY 2002-12

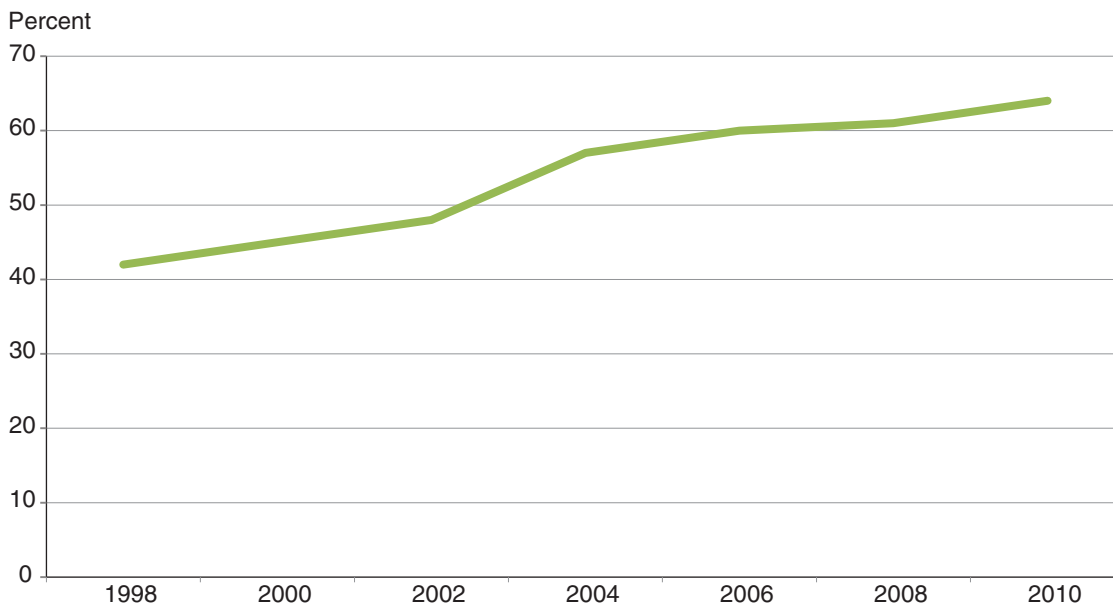


Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.

Source: USDA, Food and Nutrition Service, Budget Division's *Program Information Report (Keydata), U.S. Summary, September*, various years.

Figure 12

Proportion of 7- to 11-month-old WIC infants ever breastfed, 1998-2010



Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.

Source: USDA, Food and Nutrition Service, *WIC Participant and Program Characteristics Report*, various years.

reconstituted formula prescribed per WIC infant.²¹ This resulted in an estimate of 1.108 billion reconstituted fluid ounces of WIC formula issued to WIC infants each month.²²

Adjustment for use of noncontract formula. We account for the fact that some WIC infants are issued noncontract formula, which is not eligible for rebates. The most recent data on noncontract formula use in WIC are from a 2006 report by the U.S. Government Accountability Office (GAO), which estimated that 8 percent of all WIC infant formula was noncontract. Although anecdotal evidence suggests that the issuance of noncontract formula in WIC has decreased since the GAO report was released, we used the GAO estimate and reduced the estimate of total amount of WIC formula consumed per month (derived in step 2) by 8 percent. This resulted in an adjusted estimate of about 1.020 billion reconstituted ounces of rebated formula per month.

Average change in net price. We divided the estimated reconstituted fluid ounces of rebated formula per month derived in the previous step by 26 in order to derive an estimate per 26 reconstituted ounces. We multiplied this by the estimated average real change in net price (\$0.228) per 26 reconstituted fluid ounces between WIC State agencies' current and previous contracts. This resulted in an estimated total decrease in real net price of \$8.940 million per month.

²¹This was based on Economic Research Service calculations using unpublished Food and Nutrition Service 2010 *WIC Participant and Program Characteristics* data on the total amount of formula issued during the month of April to all infants (regardless of age or breastfeeding status) in the State agencies that provided the data, and total number of infants.

²²We assumed that all prescribed formula was redeemed.

Annualized cost estimate. We multiplied the monthly estimate of the decrease in net price from the previous step by 12 (the number of months in a year) to derive the estimated total reduction in real net price to WIC over a year (\$107.3 million).²³

This estimated reduction of \$107 million in real net price paid by WIC State agencies between the current and previous contracts is based on the assumption that all the WIC formula-fed infants in the covered areas who received contract-brand formula received milk-based powdered formula.²⁴ This estimated reduction does not take into account any potential savings associated with Florida, Oklahoma, and Pennsylvania (which have not awarded any new contracts since 2008) and Puerto Rico (due to lack of data).²⁵ The current contracts for Oklahoma and Pennsylvania are scheduled to expire in September 2013, and the current contract for Florida is scheduled to expire in January 2014. Given the trends identified in this study, these States may also realize a decrease in their net prices in their next contract, which would result in even greater total savings to WIC.

Conclusions

Concerns raised in Oliveira et al. (2010) regarding a continuation of the trend of decreasing infant formula rebates and higher net prices have not been realized. Instead of continuing to increase, net prices decreased markedly between the contracts in effect in February 2013 and the previous contracts. This study estimates that the lower net prices resulted in WIC paying \$107 million less for infant formula over the course of a year, holding both the amount of formula and the retail markup constant. Thus, the increase in net price observed in the prior report seemingly was not the beginning of a longrun trend. However, it is too soon to know if the decrease in net prices is a return to historic levels or a short-term anomaly. The infant formula market is dynamic and constantly evolving, and multiple factors (including product innovations, demographics, economic conditions, and changes in the WIC program) could affect the amount of rebates WIC receives from formula manufacturers in the next round of contracts. Future research will address patterns in bidding by all three infant formula manufacturers—the losers as well as the winning WIC contract manufacturers.

²³The estimated aggregate annual savings of \$107 million in formula costs associated with the current contracts are lower than the estimated aggregate annual increase of \$127 million in formula costs associated with the previous study based on contracts in effect in December 2008 (even though the magnitude of the per unit change in net price was greater for the current contracts). The reason for this counterintuitive result is that the amount of formula provided through WIC decreased between 2008 and 2013.

²⁴While the majority of formula-fed infants receive milk-based powdered formula, some also consume other types of formula such as milk-based liquid concentrate and soy-based formulas. WIC receives a rebate on these other types of formula as well, although the rebates on these other types of formula may differ from the rebate for milk-based powder formula. The percentage of infants in WIC receiving these other types of formula is unknown.

²⁵No savings were estimated for Mississippi and Vermont, which do not use retail food-delivery systems.

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Appendix A—Start Dates of Current and Previous Rebate Contracts by State

| State | Start date of current contract | Start date of previous contract |
|--------------------------------------|--------------------------------|---------------------------------|
| Alabama | 10/1/2012 | 10/1/2007 |
| Arkansas, New Mexico, North Carolina | 10/1/2012 | 10/1/2009 |
| California | 8/1/2012 | 8/1/2007 |
| Colorado | 1/1/2013 | 1/1/2008 |
| Florida | 2/1/2008 | 2/1/2002 |
| Georgia | 10/1/2010 | 10/1/2006 |
| Illinois | 2/1/2013 | 2/1/2008 |
| Indiana | 10/1/2011 | 10/1/2007 |
| Kentucky | 7/1/2011 | 7/1/2006 |
| Louisiana | 10/1/2012 | 10/1/2007 |
| Michigan | 11/1/2011 | 11/1/2006 |
| Missouri, Nebraska, South Dakota | 10/1/2009 | 10/1/2003 |
| NEATO | 10/1/2011 | 10/1/2006 |
| New Jersey | 10/1/2012 | 10/1/2007 |
| New York | 7/1/2011 | 7/1/2006 |
| North Dakota | 7/1/2009 | 7/1/2005 |
| Ohio | 10/1/2011 | 10/1/2006 |
| Oklahoma | 10/1/2008 | 10/1/2005 |
| Pennsylvania | 10/1/2008 | 10/1/2003 |
| South Carolina | 4/1/2010 | 4/7/2005 |
| Tennessee | 7/1/2009 | 7/1/2004 |
| Texas, Minnesota, Iowa | 10/1/2012 | 10/1/2007 |
| Virginia | 7/1/2011 | 7/1/2006 |
| Wisconsin | 1/1/2011 | 1/1/2006 |
| WSCA | 10/1/2012 | 10/1/2007 |

Note: Current contracts are those in effect in February 2013. Previous contracts are those that were in effect immediately prior to the current contract. NEATO (New England and Tribal Organization) and WSCA (Western States Contracting Alliance) are multistate alliances. For a list of members of each alliance, see box, "Multistate Alliances."

Source: USDA, Economic Research Service calculations based on USDA, Food and Nutrition Service data.

Appendix B—Average monthly number of infants in FY 2012 participating in WIC in areas included in study, by breastfeeding status

| Geographic State agencies and multistate alliances | U.S. Territories and Indian Tribal Organizations (ITO) included in multistate alliances | Total infants | Fully formula fed | Partially formula fed | Weighted average of formula-fed infants |
|--|---|---------------|-------------------|-----------------------|---|
| AL | | 35,531 | 30,169 | 3,533 | 31,935 |
| AR, NM, NC (total) | | 103,352 | 81,755 | 11,266 | 87,388 |
| AR | | 24,500 | 21,713 | 919 | 22,173 |
| NM | | 14,271 | 10,869 | 1,070 | 11,404 |
| NC | | 64,447 | 49,079 | 9,258 | 53,708 |
| | Eastern Cherokee, NC (ITO) | 134 | 94 | 19 | 103 |
| CA | | 289,604 | 178,805 | 50,223 | 203,916 |
| CO | | 23,254 | 16,817 | 2,303 | 17,968 |
| GA | | 70,786 | 53,356 | 13,088 | 59,900 |
| IA, MN, TX (total) | | 272,967 | 160,454 | 85,536 | 203,223 |
| IA | | 16,606 | 12,713 | 1,866 | 13,646 |
| MN | | 27,814 | 18,513 | 5,123 | 21,075 |
| TX | | 227,473 | 128,285 | 78,506 | 167,538 |
| | Choctaw Nation, OK (ITO) | 1,074 | 943 | 43 | 964 |
| IL | | 76,159 | 58,338 | 12,507 | 64,591 |
| IN | | 40,689 | 33,860 | 3,452 | 35,586 |
| KY | | 35,221 | 25,230 | 6,941 | 28,700 |
| LA | | 38,643 | 35,278 | 1,985 | 36,271 |
| MI | | 63,707 | 50,635 | 5,713 | 53,492 |
| MO, NE, SD (total) | | 52,022 | 40,560 | 4,750 | 42,935 |
| MO | | 37,635 | 29,792 | 2,816 | 31,200 |
| NE | | 9,708 | 7,151 | 1,492 | 7,897 |
| SD | | 4,679 | 3,617 | 443 | 3,838 |
| NEATO (total) | | 59,383 | 42,361 | 10,158 | 47,441 |
| CT | | 14,125 | 10,167 | 3,009 | 11,671 |
| ME | | 5,658 | 4,328 | 197 | 4,426 |
| MA | | 27,932 | 18,358 | 6,042 | 21,379 |
| NH | | 4,124 | 3,169 | 274 | 3,306 |
| RI | | 5,561 | 4,561 | 571 | 4,846 |
| | Cherokee Nation, OK (ITO) | 1,941 | 1,743 | 59 | 1,772 |
| | Seneca Nation, NY (ITO) | 42 | 36 | 6 | 39 |
| NJ | | 38,524 | 24,011 | 10,394 | 29,208 |
| NY | | 119,293 | 69,910 | 40,493 | 90,157 |
| ND | | 3,101 | 2,213 | 342 | 2,384 |
| OH | | 69,004 | 60,622 | 2,044 | 61,643 |
| SC | | 34,826 | 29,723 | 2,708 | 31,076 |

continued—

| Geographic State agencies and multistate alliances | U.S. Territories and Indian Tribal Organizations (ITO) included in multistate alliances | Total infants | Fully formula fed | Partially formula fed | Weighted average of formula-fed infants |
|--|---|---------------|-------------------|-----------------------|---|
| TN | | 43,750 | 35,621 | 4,620 | 37,930 |
| VA | | 39,094 | 30,605 | 5,202 | 33,206 |
| WI | | 27,593 | 21,602 | 2,310 | 22,757 |
| WSCA (total) | | 254,310 | 172,468 | 37,534 | 191,235 |
| AK | | 5,952 | 3,532 | 869 | 3,966 |
| AZ | | 42,196 | 29,576 | 7,587 | 33,369 |
| DE | | 5,570 | 4,838 | 378 | 5,027 |
| HI | | 8,591 | 5,830 | 968 | 6,314 |
| ID | | 9,925 | 6,020 | 808 | 6,424 |
| KS | | 18,146 | 13,742 | 2,104 | 14,794 |
| MD | | 35,372 | 23,691 | 8,182 | 27,782 |
| MT | | 4,679 | 3,218 | 360 | 3,398 |
| NV | | 17,654 | 12,856 | 3,067 | 14,390 |
| OR | | 23,595 | 14,535 | 2,201 | 15,636 |
| UT | | 15,229 | 9,412 | 1,811 | 10,317 |
| WA | | 38,163 | 23,495 | 5,109 | 26,050 |
| DC | | 4,783 | 3,582 | 938 | 4,051 |
| WV | | 11,536 | 9,901 | 451 | 10,127 |
| WY | | 2,898 | 2,076 | 182 | 2,167 |
| | American Samoa | 1,116 | 408 | 639 | 727 |
| | Northern Marianas | 721 | 461 | 185 | 554 |
| | Guam | 1,863 | 1,280 | 282 | 1,421 |
| | Virgin Islands | 1,161 | 439 | 658 | 768 |
| | Inter-Tribal Council, NV (ITO) | 286 | 214 | 30 | 229 |
| | Inter-Tribal Council, AZ (ITO) | 2,441 | 1,916 | 185 | 2,008 |
| | Navajo Nation, AZ (ITO) | 2,433 | 1,447 | 538 | 1,716 |
| Total infants in States covered in study | | 1,709,813 | 1,254,391 | 317,102 | 1,412,942 |

Note: Weighted average of formula-fed infants is equal to the sum of the number of fully formula-fed infants and half of the number of partially formula-fed infants. NEATO (New England and Tribal Organization) and WSCA (Western States Contracting Alliance) are multistate alliances. For a list of members of each alliance, see box, "Multistate Alliances."

Source: Preliminary data on monthly number of partially breastfed infants, fully formula-fed infants, and total infants in FY 2012 from USDA, Food and Nutrition Service data available at <http://www.fns.usda.gov/pd/wicmain.htm> (accessed 2/13/2013).