Net Taxpayer Cost of WIC Infant Formula

by

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Introduction

Infant formula manufacturers compete for Women, Infant and Children (WIC) sole-source contracts in which the winning manufacturer agrees to pay the local agency a rebate per unit for infant formula obtained by program participants. In exchange the local agency stipulating that the brand of the winning manufacturer is the only brand that participants can obtain free of charge. Nationwide, manufacturers pay nearly $2.0 billion annually in rebate payments. These payments help contain the cost to taxpayer of providing infant formula to WIC participants.

The net cost to taxpayers of WIC infant formula can be expressed as $NC = (P_r - r)W$ where P_r is the retail price of the contract brand of infant formula, *r* is the rebate paid by the contract manufacturer for each unit of infant formula obtained by participants, and *W* is the level of WIC participant demand. Rebate payments equal the product *rW*. WIC policies that increase the rebate can be expected to reduce taxpayer cost whereas policies that increase participant demand can be expected to increase this cost; however, in measuring how changes in r or W affect the net cost to taxpayers a complication occurs because the retail price of the contract brand of infant formula increases with both participant demand and the rebate.

This paper combines elasticities of the net taxpayer cost of WIC infant formula presented by Reed and Levedahl (2012) (hereafter denoted as RL) that incorporate retail price flexibilities of the contract brand with historical data on rebates and participant demand to calculate how the magnitude of net taxpayer costs has been affected by these variables. These results are used to compare the relative impact of rebates and participant demand on the net cost to taxpayers of WIC infant formula and to evaluate how effective sole-source contracts have been at containing taxpayer costs.

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This paper makes use of annual data covering the period from 1990 through 2002. A national weighted average per unit rebate for milk-based infant formula obtained from FNS was used to measure the rebate variable (FNS personal communications). Measures of WIC participant demand were calculated by dividing administrative data on rebate payments by the rebate. Table 1 reports the annual percentage change in rebates and in WIC participant demand grouped into three-year intervals. This table illustrates that both rebates and participant demand grew rapidly in the first years of the 1990's after the widespread adoption of sole-source contracts. Through the middle years of the decade rebates continued to grow rapidly but participant demand grew at a much slower rate. Towards the end of the decade the growth in both rebates and participant declined with participant demand experiencing negative growth in the first years of the 2000's. Overall, the growth in rebates averaged 7.10 percent per year with the annual growth in WIC participant demand averaging 2.10 percent.

Net cost to taxpayers of WIC infant formula can be expected to increase when participant demand increases but decrease when the rebate increases. However, the magnitude of net taxpayer cost is attenuated by the impact of rebates and participant demand on the retail price of the contract brand. As shown in RL the increase in net cost from participant demand will be larger and the decrease in net cost from rebates will be smaller when price effects are accounted for. Further, the divergence between the elasticities of net cost with respect to participant demand and rebates becomes larger the greater the share of total consumer demand for the contract brand consumed by WIC participants. Denote this share by $\gamma = W/Q_r^c$ where Q_r^c equals total consumer demand for the contract brand of infant formula. Formulas for the elasticities of

the net cost with respect to rebates (NC_r, equation 13a) and with respect to participant demand (NC_W, equation 13b) that account for the effect of the retail price of the contract brand are given by RL (p. 693). Estimates of these elasticities are reported in Table 2 using the values of the structural parameters provided by RL and historical values of γ.[1]

Column 2 of Table 2 illustrates that throughout the 1990's WIC participant demand became more important to contract manufacturers increasing from γ = 0.536 in 1991 to γ = 0.791 in 2002. The implication of larger values of γ is that equal percentage increases in rebates and participant demand result in greater net cost to taxpayers of WIC infant formula. This effect is illustrated by the values of the cost containment rebate elasticity (CCR_W) presented in column 5. This elasticity measures for each percentage change in participation, the percent change in rebate necessary to keep taxpayer cost of WIC infant formula unchanged (RL, equation 13c). Column 5 illustrates that to keep taxpayer costs unchanged in 1991 rebates needed to increase by only 1.603 percent for every percentage increase in participant demand but by 2002 a one-percent increase in participant demand required rebates to increase by 3.453 percent to keep taxpayer cost unchanged. These numbers illustrate that as γ increases the ability of rebates to contain taxpayer cost of WIC infant formula diminishes.

Whether or not rebates are able to contain taxpayer costs of providing WIC infant formula depends upon the size of the rebates as well the number of WIC participants. Table 3

[1] Structural parameters used by RL consist of estimates of paying customer own and cross-price elasticities of demand for contract and non-contract brands of infant formula, the manufacturing supply elasticity of infant formula, and the ratio of the rebate to the retail price of the contract brand; and assumed values of the elasticity of substitution between infant formula and retail marketing services and the fraction of industry retail sales paid to manufacturers. The calculation of the historical values of γ is discussed in the appendix.

reports the contributions of rebates and WIC participants to the net cost to taxpayer of WIC infant formula. Contributions were calculated by multiplying the annual growth rate of participant demand or rebates by the corresponding elasticities NC_W or NC_r evaluated at the appropriate value of γ. Column 5 of Table 3 reports the total effect on taxpayer costs from changes in both rebates and participant demand. These results illustrate that except for initial years 1991-92 rebates have been quite effective at containing taxpayer costs of providing WIC infant formula. In most years rebates were sufficient to reduce the taxpayer cost of WIC infant formula. Overall, rebates have been able to reduce the net cost to taxpayers by an average 7.6 percent per year even while WIC participant demand increased by an average of 2.1 percent per year. These numbers suggests that sole-source contracts have been able to generate a surplus of funds that could be used to subsidize WIC participants that were not infant formula recipients.

Conclusion

GAO (2006) and Oliveira et al. (2010) have expressed concerns that a recent downward trend in rebates may affect the ability of sole-source contracts to contain the cost of infant formula. The results in this paper illustrate that even when rebates were growing much more slowly at the end of the 1990's they still were able to contain taxpayer costs of WIC infant formula because the rate of growth of participant demand was much smaller than in earlier years. We can conclude that it is not possible to determine whether rebates are 'too high' or 'too low' without reference to the level of WIC participant demand.

Table 1: Average Annual Percentage Change in Rebates and WIC Participant Demand, 1991-2002

Years	Rebate per can	WIC Participant Demand
1991-1993	10.07	8.30
1994-1996	9.30	1.10
1997-1999	6.10	0.20
2000-2002	2.77	- 1.37
Average	7.10	2.10

Notes: Percent changes in rebate per can are calculated using FNS estimates of the national average rebate for milk-based infant formula. Percent change in WIC participant demand is computed as the difference between the percentage change in WIC rebate payments and the percentage change in rebate per can. Administrative data on WIC rebate payments were obtained from FNS.

Table 2: Net Cost Elasticities, 1991 to 2002

Year	γ	NC_W	NC_r	CCR_W
1991	0.536	3.393	-2.117	1.603
1992	0.554	3.534	-2.104	1.679
1993	0.606	3.985	-2.062	1.932
1994	0.637	4.288	-2.034	2.108
1995	0.691	4.891	-1.978	2.473
1996	0.721	5.277	-1.942	2.717
1997	0.761	5.858	-1.888	3.104
1998	0.776	6.100	-1.865	3.271
1999	0.791	6.356	-1.841	3.453
2000	0.783	6.218	-1.854	3.354
2001	0.778	6.133	-1.862	3.294
2002	0.791	6.356	-1.841	3.453

Notes: $\gamma = W/Q_r^c$, $NC_W = \partial \log NC / \partial \log W$, $NC_r = \partial \log NC / \partial \log r$, $CCR_W = \partial \log r / \partial \log W \,|_{d \log NC = 0}$. The calculation of γ uses estimates of the relative size of WIC in the contract brand industry given by $rW/P_m^c Q_m^c$ where $P_m^c Q_m^c$ equals total revenue of the contract brand industry, see the discussion by RL (p. 694) and in the appendix.

Table 3: The Relative Size of WIC and Annual Percent Change in Net Taxpayer Cost of WIC Infant Formula, 1991-2002

Year	γ	Percent Change Due to *W*	Percent Change Due to *r*	Net Cost
1991	0.536	61.1	- 22.9	38.2
1992	0.554	33.6	- 11.8	21.8
1993	0.606	- 10.4	- 28.5	- 38.8
1994	0.637	15.0	- 19.9	- 4.9
1995	0.691	- 22.5	- 20.7	- 43.2
1996	0.721	23.2	- 14.8	8.5
1997	0.761	13.5	- 14.2	- 0.7
1998	0.776	- 12.8	- 11.4	- 4.2
1999	0.791	2.5	- 8.7	- 6.1
2000	0.783	- 11.2	- 6.1	- 17.3
2001	0.778	7.9	- 2.0	5.9
2002	0.791	- 22.9	- 7.2	- 30.0

Notes: $\gamma = W/Q_r^c$. Net cost due to *W* equals $NC_W(\gamma)\cdot d\log W$; due to *r* equals $NC_r(\gamma)\cdot d\log r$

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Appendix

Historical values of γ were calculated using the relationship that links the retail and manufacturing measures of the relative size of WIC in the contract-brand industry given by $rW/P_m^c Q_m^c = \gamma/\beta k_m^c$ where $\beta = P_r^c/r$ and $k_m^c = P_m^c Q_m^c / P_r^c Q_r^c$ is the fraction of retail sales of the contract brand that is paid to manufacturers. Values of $rW/P_m^c Q_m^c$ were calculated in two steps. A wholesale price for infant formula in the contract markets P_m^c was calculated as a weighted average of the standardized prices of each manufacturer using the 1994 WIC market shares as weights. Values of r/P_m^c were then obtained by dividing rebates given in Table A-1 by these prices. Values of WIC infant formula as the proportion of infant formula supplied to contract markets, W/Q_m^c, were obtained using annual estimates of the proportion of U.S.-born infants enrolled in WIC corrected for differences in breastfeeding rates for newborn and six-month-old infants and for WIC and non-WIC infants, and the assumption that the proportion of a manufacturer's output obtained by paying customers in the contract-brand markets equals the manufacturer's 1994 WIC market share.

Table A-1: Per Unit Rebates and the Annual Percent Change in Rebates, Rebate Payments and WIC Participant Demand from 1990 to 2002

Year	Rebate per can	Percent Change		
		Rebate	Rebate Payments	Participant Demand
1990	$1.30			
1991	1.44	10.8	28.8	18.0
1992	1.52	5.6	15.1	9.5
1993	1.73	13.8	16.5	- 2.6
1994	1.90	9.8	13.3	3.5
1995	2.10	10.5	5.9	- 4.6
1996	2.26	7.6	12.0	4.4
1997	2.43	7.5	9.8	2.3
1998	2.58	6.1	4.0	- 2.1
1999	2.70	4.7	5.1	0.4
2000	2.79	3.3	1.5	- 1.8
2001	2.82	1.1	2.4	1.3
2002	2.93	3.9	0.3	- 3.6

Notes: Percent changes in rebate per can are calculated using FNS estimates of the national average rebate for milk-based infant formula. Percent change in WIC participant demand is computed as the difference between the percentage change in WIC rebate payments and the percentage change in rebate per can. Administrative data on WIC rebate payments were obtained from FNS.