

**Memorandum**

To: Honorable Jerome E. Horton, Chairman  
Honorable Michelle Steel, Vice Chair  
Honorable Betty T. Yee, First District  
Senator George Runner (Ret.), Second District  
Honorable John Chiang, State Controller

Date: October 15, 2013

From: Joe Fitz, Chief  
Research and Statistics Section

Subject: **EFFECTS OF PROPOSITION 10 ON CIGARETTE AND TOBACCO PRODUCTS  
CONSUMPTION**

**JANUARY 2014 BOARD MEETING**

Background. Prior to 1989, California had a \$0.10 per pack excise tax on cigarettes. Proposition 99 increased the cigarette tax by \$0.25 per pack, effective January 1, 1989. A tax of \$0.02 per pack was added to fund breast cancer research and education programs in 1994, bringing the total tax to \$0.37 per pack. Proposition 10 increased the cigarette tax from \$0.37 per pack to \$0.87 per pack, effective January 1, 1999.

California tax-paid cigarette distributions have decreased dramatically over the past 30 years, both before and after Proposition 10. As a result, revenues for all funds supported by cigarette taxes have declined as well. Based on outcomes from similar tax increases, there is strong evidence that the Proposition 10 tax increase results in greater declines in annual cigarette and tobacco sales than would have been the case had the Proposition not passed.

Section 130105(c) of the Health and Safety Code, as added by Proposition 10, requires the Board to determine the effect of Proposition 10 on the consumption of cigarettes and tobacco products and directs that a transfer of funds to Proposition 99 and Breast Cancer programs be made to backfill for revenue losses to those programs resulting from consumption changes triggered by Proposition 10. The intent of the backfill is to keep the funding levels of certain Proposition 99 and breast cancer programs from declining any more than they would have decreased without the Proposition 10 tax increase.

These determinations do not affect the amount of taxes paid by taxpayers. The Proposition 10 backfill determination is strictly an issue of the magnitude of funds allocation from one set of funds to another. The determination increases funds specified by statute to be spent on health education, health research, breast cancer education, and breast cancer research and decreases funds that would have gone to the California Children and Families First Trust Fund without the determination. (See Attachment 1 for a detailed breakout of the cigarette taxes.)

Recommended Determination. We recommend that a backfill determination of \$13.6 million for fiscal year 2012-13 be approved by the Board as an item at the January 2014 Board Meeting. The transfer would be made from revenues received in fiscal year 2013-14 to backfill funds affected by changes in consumption during fiscal year 2012-13.

Last year, the Board approved, on consent, a total backfill figure of \$15.0 million for fiscal year 2011-12. This year's proposed backfill figure of \$13.6 million for fiscal year 2012-13 is \$1.4 million less. The difference between this year's proposed backfill determination and last year's is typical when compared to historical year-to-year differences.

Yearly variation is to be expected because determinations are not simply linear trends. As discussed in Attachment 2, backfill determinations are the results of multiple calculations involving population, tax-paid distributions, cigarette prices, federal and state excise taxes, and the California consumer price index.

The \$13.6 million total backfill figure is approximately 3.0 percent of the \$449.5 million in total 2012-13 California Children and Families First Commission spending.

Table 1 of Attachment 2 summarizes the calculations necessary to derive the proposed backfill figure. Breaking down this \$13.6 million quantity, the proposed transfer to breast cancer programs is \$3.0 million, and the proposed transfer to targeted Proposition 99 programs is \$10.6 million.

JF:jm

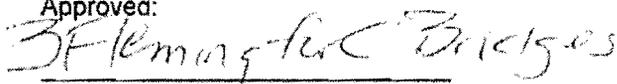
Attachments

- cc. Mr. Michael Cohen, Director, Department of Finance
- Mr. Peter Ng, Department of Finance
- Ms. Cynthia Bridges, Executive Director
- Mr. Randy Ferris, Chief Counsel
- Mr. Robert Lambert
- Ms. Michele Pielsticker
- Ms. Joann Richmond

Recommendation by:

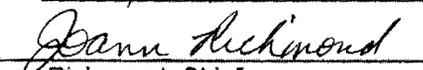
  
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 Joe Fitz, Chief  
 Research and Statistics Section  
 Legislative and Research Division

Approved:

  
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 Ms. Cynthia Bridges  
 Executive Director

BOARD APPROVED

at the 1/16/14 Board Meeting

  
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 Joann Richmond, Chief  
 Board Proceedings Division

**Breakdown of Cigarette Taxes**  
Tax of 87 Cents on a 20-Count Pack of Cigarettes

Pack	Initial Fund	Target Fund or Agency	Account		Program	Purpose	
87¢	Cigarette Tax Fund	100%	General Fund	Breast Cancer Research Account 1/	10%	Cancer Surveillance Section	Conduct epidemiological research on the rate of breast cancer occurrence in the population.
				Breast Cancer Control Account 1/	90%	Breast Cancer Research Program	Research the cause, cure, treatment, and earlier detection of breast cancer.
2¢	Cigarette Tax Fund	100%	Breast Cancer Fund	50%			Provide screening, referral, advocacy, outreach, and education services for uninsured and underinsured women.
				50%			Prevent and reduce tobacco use, primarily among children.
25¢	Cigarette and Tobacco Products Surtax Fund	100%	Cigarette and Tobacco Products Surtax Fund	20%			Treat people who cannot afford to pay for hospital services and are not covered by insurance or a federal program.
				35%			Treat people who cannot afford to pay for hospital services and are not covered by insurance or a federal program.
				10%			Research tobacco-related diseases.
				5%			Restore, protect, enhance, or maintain fish, waterfowl, and wildlife habitat.
				25%			Enhance state and local park and recreation resources.
				Unallocated			Provide monies for any of the purposes to which money is allocated from the surtax fund.

1/ Programs to receive transfers from Proposition 10 funds.

**Breakdown of Cigarette Taxes**  
Tax of 87 Cents on a 20-Count Pack of Cigarettes

Pack 87¢	Initial Fund	Target Fund or Agency	Account		Program	Purpose
50¢	California Children and Families First Trust Fund	20% CC&FF State Commission	30%	Mass Media Communications Account		Communicate to general public on childhood development, child care, and health and social services; prevention of tobacco, alcohol, and drug use by pregnant women; detrimental effect of second-hand smoke on children.
			25%	Education Account		Develop educational materials; provide professional and parental education and training; provide technical support to CC&FF county commissions.
			15%	Child Care Account		Educate and train child care providers; develop educational materials and guidelines for childcare workers.
			15%	Research and Development Account		Determine best practices of and assess early childhood development programs and services.
			5%	Administration Account		Cover administrative expenditures of the CC&FF State Commission.
			10%	Unallocated Account		Provide monies for any of the purposes of the CC&FF Act except administrative expenditures.
			80%	CC&FF County Commissions		Provide, sponsor, or facilitate programs relating to early childhood development; measure outcomes; integrate childhood development programs, services, and projects into a consumer-oriented and easily accessible system.

## Attachment 2

### Proposition 10 Backfill Methodology and Documentation of Calculations

#### I. Methodology

Cigarette Consumption Impacts. We continue to estimate California cigarette consumption with an econometric equation that is similar to those used in other studies found in the literature. The model isolates California excise taxes from other relevant factors affecting consumption.<sup>1</sup> As in previous years, we updated the data and used our econometric model to estimate the cigarette consumption impacts of Proposition 10.<sup>2</sup>

Using the same methodology we used last year, we calculated the difference in consumption with and without Proposition 10 using model-generated estimates of actual consumption in both cases. The model is run twice, with two different tax rates, \$0.37 per pack before Proposition 10 and \$0.87 per pack after Proposition 10. Since the only difference in the model calculations is from the difference in the two tax rates, all other factors which affect tax-paid distributions in the model are the same, including federal taxes.

In the model percentage changes in cigarette consumption per capita are related to percentage changes in cigarette prices, federal excise taxes, and California excise taxes. All dollar figures are converted to constant dollars using the California consumer price index. Our model for estimating cigarette consumption is specified in terms of packs of cigarettes per capita. To calculate total consumption, we multiply the model-projected per capita consumption estimate by California civilian population.<sup>3</sup>

Tobacco Products Consumption Impacts. To estimate the impacts of Proposition 10 on tobacco products<sup>4</sup>, we assumed a typical relationship between price and consumption based on our review of studies of such relationships for cigarettes and tobacco products. Specifically, BOE staff assumed a price elasticity of demand of -0.50. We then applied this relationship to the increase in tax rates caused by Proposition 10 (as reflected in the price of the product to the consumer) to estimate the resulting decline in consumption of tobacco products. We assumed the entire tax increase was passed on to consumers in the form of higher prices, again based on our review of the literature.

The -0.5 price elasticity figure means that every 10 percent increase in the price of tobacco products would result in a 5 percent decline in quantity consumed or dollar volume sales. We have the data to calculate the percentage price increase resulting from additional taxes due to Proposition 10. Knowing this percentage price increase and

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<sup>1</sup> Copies of the documentation of the model are available upon request from Joe Fitz, Chief, Research and Statistics Section, (916) 323-3802.

<sup>2</sup> As used throughout this discussion, the term "consumption" refers to tax paid distributions.

<sup>3</sup> The model uses California civilian population, beginning fiscal year July 1, to scale mathematically total California tax-paid cigarette distributions. Including minors in these calculations has no significant effect on model results since model results are multiplied by the same scaling factor.

<sup>4</sup> As defined in statute, "tobacco products" exclude cigarettes.

assuming a price elasticity figure enabled us to determine an expected sales decline through an algebraic solution. Then we applied the Proposition 99 tax rate to the predicted amount by which these dollar sales declined to estimate the Proposition 99 revenues that would have been expected without the Proposition 10 tax increase.

## II. Documentation and Explanation of Backfill Calculations for Proposition 99 and Breast Cancer Programs

### Cigarette Consumption Impacts

Sections 1 and 2 of Table 1 show the calculations necessary for estimating the backfill amount resulting from changes in cigarette consumption.

July 1, 2012 civilian population of California is estimated by the California Department of Finance to have been approximately 37.674 million people.<sup>5</sup> The statistical model shows that per capita consumption of cigarettes would have been 28.7 packs per person without Proposition 10. Multiplying these two figures yields an estimate of 1,081.2 million packs of cigarettes (far right column of Section 1 of Table 1). The statistical model estimates per capita consumption of cigarettes of 24.7 packs per person using the current tax rate of \$0.87 per pack. When multiplied by civilian population, the model estimates tax paid distributions of 930.5 million packs. The difference in these two estimates is 150.7 million fewer packs of cigarettes sold with Proposition 10 in effect than without Proposition 10. Some of this decline in consumption may have been caused by increased cigarette tax evasion. However, based on previous studies, most of the decline probably results from reduced cigarette consumption.

Section 2 of Table 1 shows the calculations necessary to derive revenue losses associated with 150.7 million fewer packs of cigarettes incurred by backfill-targeted programs. The Breast Cancer programs are funded by a tax rate of two cents per pack. Multiplying \$0.02 by 150.7 million packs yields a result of approximately \$3.0 million. The tax rate funding all Proposition 99 programs is twenty-five cents per pack, of which 25 percent is to be backfilled. Therefore, the backfill amount for Proposition 99 programs is \$0.0625 per pack ( $\$0.25 \times .25 = \$0.0625$ ). Multiplying \$0.0625 times 150.7 million packs yields a result of approximately \$9.4 million. The total backfill amount related to decreased cigarette sales for the Breast Cancer programs and the targeted Proposition 99 programs combined is \$12.4 million ( $\$3.0 + \$9.4 = \$12.4$ ).

### Tobacco Products Consumption Impacts

Section 3 of Table 1 summarizes the result of calculations made to derive estimates of revenues from sales of tobacco products that would have funded Proposition 99 programs in the absence of the Proposition 10 tax.<sup>6</sup> Our backfill estimate for tobacco products is \$1.2 million. The calculations are shown in Table 2A.

Table 2A shows how we algebraically solved for the predicted sales change using the price elasticity of demand formula shown at the top of Table 2A. The table has four

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<sup>5</sup> The model is specified using July 1 California civilian population for the beginning day of the fiscal year. Therefore, to calculate total cigarette consumption for fiscal year 2012-13, we need to use July 1, 2012 California civilian population. The source of the July 1, 2012 population figure is from an e-mail from staff at the California Department of Finance Demographic Research Unit.

<sup>6</sup> The Breast Cancer programs do not receive revenues from sales of tobacco products, only from sales of cigarettes.

components in addition to the formula, which are marked off by horizontal lines. The first column of the table shows the row letters of each line. Lines (a) through (e) show the steps involved in determining the percentage increase in price caused by Proposition 10. As shown in line (e) of the table, Proposition 10 increased the price of tobacco products in fiscal year 2012-13 by 18.73 percent. Lines (f) and (g) show the calculations made to determine the resulting decrease in sales of 9.36 percent. Lines (h) through (l) display calculations made to apply the tax to the decline in sales. BOE tax return data show fiscal year sales of \$254.65 million in 2012-13 (line h). Line (i) shows the \$279.66 million result of solving the price elasticity of demand formula (details shown in Table 2B). Line (j) shows that these figures imply a sales decline of \$25.01 million. Multiplying this figure by the Proposition 99 tax rate of 19.46 percent results in a total Proposition 99 revenue loss of \$4.87 million (line l). Multiplying this figure by 0.25 (since Proposition 99 programs to be backfilled receive 25 percent of Proposition 99 revenues collected) results in a figure of \$1.22 million (line m). Mathematically rounding off this figure produces a result of \$1.2 million less in revenues from sales of tobacco products that would have funded Proposition 99 programs, as shown in Table 1.

#### Summary of Total Backfill Changes

Cigarette tax revenues comprise about 91 percent of the entire backfill estimate amount. (Of the \$13.6 million backfill total, \$12.4 million is related to cigarette consumption changes. The rest, \$1.2 million, is related to changes in tax paid consumption of tobacco products.) Section 4 of Table 1 summarizes the figures computed for the backfill amounts from Sections 1 through 3. The total backfill amount is \$13.6 million, with \$3.0 million going to Breast Cancer programs and \$10.6 million going to the specified Proposition 99 programs. Of the \$10.6 million going to Proposition 99 programs, \$8.5 million will go to the Health Education Account (which receives 20 percent of Proposition 99 revenues) and \$2.1 million will go to the Research Account (which receives 5 percent of Proposition 99 revenues).

#### Historical Consumption and Sales

Table 3 provides some additional background information on tax-paid cigarette and tobacco products consumption. The table shows tax-paid cigarette distributions from fiscal years 1987-88 through 2012-13 (preliminary data). It also shows tax-paid wholesale sales of tobacco products from fiscal years 1990-91 through 2012-13 (preliminary data).

**Table 1**  
**Summary of Backfill Calculations for Proposition 99 and Breast Cancer Programs**  
**Fiscal Year 2012-13**

**(1) Change in California Cigarette Consumption a/**

	Estimated July 1, 2012 Civilian California Population (Millions) b/	Estimated Per Capita Consumption (Packs/Person) c/	California Cigarette Consumption (Million Packs)
Model Estimated Cigarette Consumption:	37.674		
Without Proposition 10		28.7	1,081.2
With Proposition 10		24.7	930.5
Difference			-150.7

**(2) Changes in Cigarette Revenue**

	Backfill Tax Rate (Dollars Per Pack)	Estimated Change in Consumption (Million Packs) d/	Estimated Change in Revenue (\$ Millions)
Breast Cancer Programs	0.0200	-150.7	-\$3.0
Proposition 99 Programs e/	0.0625	-150.7	-\$9.4
Total	0.0825		-\$12.4

**(3) Change in Tobacco Products Revenue**  
**(See Tables 2A and 2B for Calculations)**

	Estimated Change in Revenue (\$ Millions)
Proposition 99 Programs f/	-\$1.2

**(4) Summary of Total Fund Backfill Changes**

	Accounts (Millions of Dollars)	Programs (Millions of Dollars)
Breast Cancer Programs		-\$3.0
Proposition 99 Programs		-\$10.6
Health Education Account (20% of Proposition 99 Funds)	-\$8.49	
Research Account (5% of Proposition 99 Funds)	-\$2.12	
Total Backfill Amount, All Programs		-\$13.6

Note: All numbers are rounded off from original spreadsheet figures in order for them to sum to the specified totals.

a/ Consumption here and throughout the rest of this table refers to tax-paid consumption.

b/ Source: California Department of Finance.

c/ Source: BOE Research and Statistics Section econometric cigarette consumption estimation model.

d/ Source: Total change in consumption calculated above.

e/ As specified in Proposition 10, 25 percent of the Proposition 99 tax rate of \$0.25 per pack tax is to be backfilled. This percentage is \$0.0625 per pack (\$0.25 x 0.25).

f/ This figure is 25% of the revenue loss due to decreased sales caused by the Proposition 10 tax increase.

Table 2A

**Revenue Change in Tobacco Products, Proposition 10 Backfill  
Fiscal Year 2012-13**

Price Elasticity of Demand Formula:  $e_p = (Q_1 - Q_2) / ((Q_1 + Q_2) / 2) / (P_1 - P_2) / ((P_1 + P_2) / 2)$

Where (generally): P = price, and Q = sales of tobacco products

Alternatively stated,  $e_p$  = average % change in sales / average % change in price

Assume  $e_p = -0.50$ , based on review of the literature

Line #	Data Description or Calculations	Result
<b>Solving for the percentage change in tobacco products price:</b>		
a	Average wholesale cost per pack of 20 cigarettes	A/ \$4.47
b	Proposition 10 tobacco products equivalent per pack rate	\$1.00
c	Other per pack taxes	\$0.37
d	Estimated per pack cost, including taxes (line a + line b + line c)	\$5.84
e	Estimated change in per pack cost due to Proposition 10, % [(line a + line c + line d) / 2 ]	18.73%
<b>Solving for the percentage change in tobacco products sales:</b>		
f	Assumed price elasticity of demand = -0.50	-0.50
g	Estimated percent change in sales of tobacco products, % (line e x line f)	-9.36%
<b>Applying Proposition 99-only portion of 2012-13 tax to predicted change in sales:</b>		
h	California wholesale sales of tobacco products (excluding taxes), FY 2012-13, millions of dollars	B/ \$254.65
i	Estimated wholesale sales of tobacco products without Proposition 10, million \$ (Table 2B, line 5)	\$279.66
j	Estimated decline in wholesale sales of tobacco products due to Proposition 10, million \$ (line h - line i)	-\$25.01
k	Tobacco products tax rate, excluding Prop. 10, % [\$0.87 / wholesale cigarette cost (line a)]	C/ 19.46%
l	Estimated taxes lost due to the decline in sales caused by Proposition 10, million \$ (line j x line k)	-\$4.87
<b>Applying proportion of Proposition 99 revenue loss to backfill Proposition 99 target accounts:</b>		
m	Estimated 2012-13 backfill, million \$, line l * 0.25 (25% of all Proposition 99 programs are backfilled)	-\$1.22
<p>A/ Source of wholesale price (Line a): State Board of Equalization Meeting Agenda, Item N1, "2012/13 Tobacco Products Tax Rate," April 26, 2012.                      Additional note: Substituting the equivalent per-pack rate of \$1.00 for the tobacco products tax change caused by Proposition 10 and using the sum of wholesale cost per pack and total per-pack taxes to calculate change in price isolates the change in price of tobacco products caused by Proposition 10. This is because the tax rate on tobacco products is the sum of the combined rate of tax on cigarettes imposed by Proposition 99 and the rate of tax on cigarettes imposed by Proposition 10 divided by the wholesale price of cigarettes. The change in the numerator of the tobacco products tax rate formula brought about by Proposition 10 is \$1.00 per pack--50 cents from the Proposition 99 combined rate of tax on cigarettes and 50 cents from the Proposition 10 tax on cigarettes. An increase in cigarette taxes will increase the tobacco products tax rate if wholesale cost is held constant. Conversely, an increase in wholesale cost will decrease the tobacco products tax rate if cigarette taxes are held constant.</p> <p>B/ Source: Board of Equalization Excise Taxes Division, "Big Return Report Annual Summary," line number 7, run 9/6/13.</p> <p>C/ Note: The tobacco products tax rate excluding Proposition 10 is comprised of the original tobacco products rate (\$0.25), the general fund rate (\$0.10), the Breast Cancer rate (\$0.02) and the rate associated with Proposition 10 (\$0.50), for a total rate excluding Proposition 10 of \$0.87. There are no separate non-Proposition 99 rates on tobacco products. Tobacco products are only taxed by Propositions 99 and 10; general fund and Breast Cancer excise taxes only apply to cigarettes.</p>		

Source: BOE Research and Statistics Section, September 23, 2013.

**Table 2B**

**Arc Elasticity Calculations, Tobacco Products, Solving for Q<sub>2</sub> With Known P<sub>1</sub>, P<sub>2</sub>, Q<sub>1</sub>, and Elasticity**

	Line Number	
P <sub>1</sub>	1	[Retail price per pack equivalent (includes excise taxes) Current Law, Table 2A, line d] \$5.84
P <sub>2</sub>	2	[Retail price per pack equivalent (Without Proposition 10), line 1 - Table 2A, line b] \$4.84
Q <sub>1</sub>	3	[Wholesale Sales (Million Dollars, Current Law), Table 2A, line h] \$254.65
Elasticity	4	[Table 2A, line f] -0.50
Q <sub>2</sub>	5	[Estimated Wholesale Sales Without Proposition 10 (Million Dollars), see equation below] \$279.66

Arc elasticity of demand formula, solving for Q<sub>2</sub>:

$$Q_2 = (-P_1 * Q_1) - (Q_1 * P_2) - (E * P_2 * Q_1) + (E * P_1 * Q_1) / ((E * P_2) - P_2 - (E * P_1) - P_1)$$

Where:

E = price elasticity of demand;

Q<sub>1</sub> is quantity demanded in time period 1;

Q<sub>2</sub> is quantity demanded in time period 2;

P<sub>1</sub> is the price in time period 1;

P<sub>2</sub> is the price in time period 2.

Source: BOE Research and Statistics Section, September 23, 2013.

**Table 3**  
**Historical California Tax-Paid Cigarette Distributions and Sales of Tobacco Products**

<b>Fiscal Year</b>	<b>Tax Paid Cigarette Distributions (Millions of Packs) a/</b>	<b>Percent Change</b>	<b>Wholesale Sales of Tobacco Products (Millions of Dollars) b/</b>	<b>Percent Change</b>
1987-88	2,570	-1.0%	n.a.	n.a.
1988-89	2,353	-8.4%	n.a.	n.a.
1989-90	2,219	-5.7%	n.a.	n.a.
1990-91	2,102	-5.3%	67.9	n.a.
1991-92	2,050	-2.5%	74.0	9.0%
1992-93	1,923	-6.2%	77.0	4.1%
1993-94	1,824	-5.1%	83.9	9.0%
1994-95	1,791	-1.8%	92.4	10.1%
1995-96	1,742	-2.7%	109.4	18.3%
1996-97	1,716	-1.5%	178.0	62.7%
1997-98 c/	1,668	-2.8%	130.7	-26.5%
1998-99	1,523	-8.7%	113.9	-12.9%
1999-00	1,353	-11.2%	95.9	-15.8%
2000-01	1,288	-4.8%	90.9	-5.2%
2001-02	1,237	-4.0%	77.1	-15.2%
2002-03	1,196	-3.3%	80.8	4.8%
2003-04	1,184	-1.0%	94.7	17.3%
2004-05	1,187	0.3%	114.8	21.2%
2005-06	1,190	0.3%	123.6	7.7%
2006-07	1,158	-2.7%	151.4	22.5%
2007-08	1,107	-4.4%	162.6	7.4%
2008-09	1,058	-4.4%	174.5	7.4%
2009-10	972	-8.1%	194.0	11.2%
2010-11	961	-1.2%	212.2	9.4%
2011-12	951	-1.0%	225.5	6.3%
2012-13	907 d/	-4.7%	254.6	12.9%

a/ Source: 2011-12 Board of Equalization Annual Report

b/ Source: Board of Equalization Excise Taxes Division. Represents wholesale sales of tobacco products as reported by distributors.

c/ Fiscal year 1997-98 was the last year unaffected by Proposition 10, which became law on January 1, 1999.

d/ Preliminary data. Source: Board of Equalization Excise Taxes Division.

n.a. not applicable

Source: BOE Research and Statistics Section, September 23, 2013.