State of California

Memorandum

Board of Equalization
Legislative and Research Division

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 25, 2012

From: Joe Fitz
Chief Economist

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

NOVEMBER 2012 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 $15.0 million for fiscal year 2011-12 be approved by the Board as an item on the Administrative Consent Agenda of November 2012. The transfer would be made from revenues received in fiscal year 2012-13 to backfill funds affected by changes in consumption during fiscal year 2011-12.

Last year, the Board approved, on consent, a total backfill figure of $16.5 million for fiscal year 2010-11. This year's proposed backfill figure of $15.0 million for fiscal year 2012-13 is $1.5 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 $15.0 million total backfill figure is approximately 3.4 percent of the $442.9 million in total expenditures for the California Children and Families First Commission of the enacted budget for fiscal year 2012-13.

Table 1 of Attachment 2 summarizes the calculations necessary to derive the proposed backfill figure. Breaking down this $15.0 million quantity, the proposed transfer to breast cancer programs is $3.4 million, and the proposed transfer to targeted Proposition 99 programs is $11.6 million.

JF:jm

Attachments

cc. Ms. Ana J. Matosantos, Director, Department of Finance
Mr. Peter Ng, Department of Finance
Ms. Cynthia Bridges, Executive Director
Mr. Randy Ferris, Chief Counsel
Mr. Robert Lambert
Mr. Robert Ingenito
Ms. Joann Richmond

Recommendation by:

Joe Fitz

Joe Fitz, Chief Economist
Research and Statistics Section
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Approved:

Cynthia Bridges

Ms. Cynthia Bridges
Executive Director

BOARD APPROVED

at the November 15, 2012 Board Meeting

Joann Richmond

Joann Richmond, Chief
Board Proceedings Division

Attachment 1
September 13, 2012

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
10¢	Cigarette Tax Fund	100%	General Fund					
2¢	Cigarette Tax Fund	100%	Breast Cancer Fund	50%	Breast Cancer Research Account 1/	10%	Cancer Surveillance Section	Conduct epidemiological research on the rate of breast cancer occurrence in the population.
						90%	Breast Cancer Research Program	Research the cause, cure, treatment, and earlier detection of breast cancer.
				50%	Breast Cancer Control Account 1/			Provide screening, referral, advocacy, outreach, and education services for uninsured and underinsured women.
25¢	Cigarette and Tobacco Products Surtax Fund	100%	Cigarette and Tobacco Products Surtax Fund	20%	Health Education Account 1/		School and community health education programs	Prevent and reduce tobacco use, primarily among children.
				35%	Hospital Services Account			Treat people who cannot afford to pay for hospital services and are not covered by insurance or a federal program.
				10%	Physician Services Account			Treat people who cannot afford to pay physician services and are not covered by insurance or a federal program.
				5%	Research Account 1/			Research tobacco-related diseases.
				5%	Public Resources Account	50%		Restore, protect, enhance, or maintain fish, waterfowl, and wildlife habitat.
						50%		Enhance state and local park and recreation resources.
				25%	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.[1] As in previous years, we updated the data and used our econometric model to estimate the cigarette consumption impacts of Proposition 10.[2]

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.[3]

Tobacco Products Consumption Impacts. To estimate the impacts of Proposition 10 on tobacco products[4], 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 assuming a price elasticity figure enabled us to determine an expected sales decline

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[1] Copies of the documentation of the model are available upon request from Joe Fitz, Chief Economist, Research and Statistics Section, (916) 323-3802.

[2] As used throughout this discussion, the term “consumption” refers to tax paid distributions.

[3] The model uses California civilian population, beginning fiscal year July 1, to mathematically scale 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.

[4] As defined in statute, “tobacco products” exclude cigarettes.

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, 2011 civilian population of California is estimated by the California Department of Finance to have been approximately 37.385 million people.[5] The statistical model shows that per capita consumption of cigarettes would have been 29.7 packs per person without Proposition 10. Multiplying these two figures yields an estimate of 1,110.3 million packs of cigarettes (far right column of Section 1 of Table 1). The statistical model estimates per capita consumption of cigarettes of 25.2 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 942.1 million packs. The difference in these two estimates is 168.2 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 168.2 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 168.2 million packs yields a result of approximately $3.4 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 x .25 = $0.0625). Multiplying $0.0625 times 168.2 million packs yields a result of approximately $10.5 million. The total backfill amount related to decreased cigarette sales for the Breast Cancer programs and the targeted Proposition 99 programs combined is $13.9 million ($3.4 + $10.5 = $13.9).

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.[6] Our backfill estimate for tobacco products is $1.1 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 components in addition to the formula, which are marked off by horizontal lines. The first

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[5] 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 2011-12, we need to use July 1, 2011 California civilian population. The source of the July 1, 2011 population figure is from an e-mail from staff at the California Department of Finance Demographic Research Unit.

[6] The Breast Cancer programs do not receive revenues from sales of tobacco products, only from sales of cigarettes.

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 2011-12 by 19.27 percent. Lines (f) and (g) show the calculations made to determine the resulting decrease in sales of 9.63 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 $224.29 million in 2011-12 (line h). Line (i) shows the $246.99 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 $22.70 million. Multiplying this figure by the Proposition 99 tax rate of 20.14 percent results in a total Proposition 99 revenue loss of $4.57 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 $1.14 million (line m). Mathematically rounding off this figure produces a result of $1.1 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 93 percent of the entire backfill estimate amount. (Of the $15.0 million backfill total, $13.9 million is related to cigarette consumption changes. The rest, $1.1 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 $15.0 million, with $3.4 million going to Breast Cancer programs and $11.6 million going to the specified Proposition 99 programs. Of the $11.6 million going to Proposition 99 programs, $9.3 million will go to the Health Education Account (which receives 20 percent of Proposition 99 revenues) and $2.3 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 2011-12 (preliminary data). It also shows tax-paid wholesale sales of tobacco products from fiscal years 1990-91 through 2011-12 (preliminary data).

Table 1
Summary of Backfill Calculations for Proposition 99 and Breast Cancer Programs
Fiscal Year 2011-12

(1) Change in California Cigarette Consumption a/

	Estimated July 1, 2011 Civilian California Population (Millions) b/	Estimated Per Capita Consumption (Packs/Person) c/	California Cigarette Consumption (Million Packs)
Model Estimated Cigarette Consumption:	37.385		
Without Proposition 10		29.7	1,110.3
With Proposition 10		25.2	942.1
Difference			-168.2

(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	-168.2	-$3.4
Proposition 99 Programs e/	0.0625	-168.2	-$10.5
Total	0.0825		-$13.9

(3) Change in Tobacco Products Revenue

(See Tables 2A and 2B for Calculations)

	Estimated Change in Revenue ($ Millions)
Proposition 99 Programs f/	-$1.1

(4) Summary of Total Fund Backfill Changes

	Accounts (Millions of Dollars)	Programs (Millions of Dollars)
Breast Cancer Programs		-$3.4
Proposition 99 Programs		-$11.6
Health Education Account (20% of Proposition 99 Funds)	-$9.31	
Research Account (5% of Proposition 99 Funds)	-$2.33	
Total Backfill Amount, All Programs		-$15.0

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.

Source: BOE Research and Statistics Section. September 13, 2012

Table 2A
Revenue Change in Tobacco Products, Proposition 10 Backfill
Fiscal Year 2011-12

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
Solving for the percentage change in tobacco products price:		A/	
a	Average wholesale cost per pack of 20 cigarettes		$4.32
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)		$5.69
e	Estimated change in per pack cost due to Proposition 10, % [line b / ((line a + line c + line d) /2)]		19.27%
Solving for the percentage change in tobacco products sales:			
f	Assumed price elasticity of demand = -0.50		-0.50
g	Estimated percent change in sales of tobacco products, % (line e x line f)		-9.63%
Applying Proposition 99-only portion of 2011-12 tax to predicted change in sales:			
h	California wholesale sales of tobacco products (excluding taxes), FY 2011-12, millions of dollars	B/	$224.29
i	Estimated wholesale sales of tobacco products without Proposition 10, million $ (Table 2B, line 5)		$246.99
j	Estimated decline in wholesale sales of tobacco products due to Proposition 10, million $ (line h - line i)		-$22.70
k	Tobacco products tax rate, excluding Prop. 10, % [$0.87 / wholesale cigarette cost (line a)]	C/	20.14%
l	Estimated taxes lost due to the decline in sales caused by Proposition 10, million $ (line j x line k)		-$4.57
Applying proportion of Proposition 99 revenue loss to backfill Proposition 99 target accounts:			
m	Estimated 2011-12 backfill, million $, line l * 0.25 (25% of all Proposition 99 programs are backfilled)		-$1.14

A/ Source of wholesale price (Line a): State Board of Equalization Meeting Agenda, Item N5, "2011/12 Tobacco Products Tax Rate," April 27, 2011. 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.

B/ Source: Board of Equalization Excise Taxes Division, "Big Return Report Annual Summary," line number 7, run 9/6/12.

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.

Source: BOE Research and Statistics Section, September 13, 2012.

Table 2B

Arc Elasticity Calculations, Tobacco Products, Solving for Q_2 With Known P_1, P_2, Q_1 and Elasticity

		Line Number	
P_1	[Retail price per pack equivalent (includes excise taxes) Current Law, Table 2A, line d]	1	$5.69
P_2	[Retail price per pack equivalent (Without Proposition 10), line 1 - Table 2A, line b]	2	$4.69
Q_1	[Wholesale Sales (Million Dollars, Current Law), Table 2A, line h]	3	$224.29
Elasticity	[Table 2A, line f]	4	-0.50
Q_2	[Estimated Wholesale Sales Without Proposition 10 (Million Dollars), see equation below]	5	$246.99

Arc elasticity of demand formula, solving for Q_2:

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

Where:

E = price elasticity of demand;

Q_1 is quantity demanded in time period 1;

Q_2 is quantity demanded in time period 2;

P_1 is the price in time period 1;

P_2 is the price in time period 2.

Source: BOE Research and Statistics Section, September 13, 2012.

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

Fiscal Year	Tax Paid Cigarette Distributions (Millions of Packs) a/	Percent Change	Wholesale Sales of Tobacco Products (Millions of Dollars) b/	Percent Change
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	-4.5%	174.6	7.4%
2009-10	972	-8.1%	194.0	11.2%
2010-11	961	-1.2%	212.3	9.4%
2011-12	951 d/	-1.0%	224.3	5.7%

a/ Source: *2010-11 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 13, 2012.