

Alaska's Non-Petroleum Corporate Income Tax
Trends in Collections by Sector and Revised Corporate
Income Tax Forecast Model

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Purpose

To examine trends in Alaska's non-petroleum corporate income tax collections from different sectors and present the revised corporate income tax forecast model.

Findings

This paper is both a historical review of past corporate income tax collections by sector and a forward-looking study regarding our revised corporate income tax forecast model. The two issues are presented together because comprehensive review of historical collections provided the direct impetus for revision of the forecast model.

Alaska's collections from the non-petroleum corporate income tax increased from \$52.3 million to \$176.9 million from 2002 to 2007.^{1,2} Over that period, collections from various sectors have changed significantly. In particular, collections from mining sector soared from \$50,000 to \$71.3 million, while collections for all other sectors grew from \$52.3 million to \$105.6 million. Mining now contributes about 40% of corporate income tax collections, compared to only 0.1% in 2002.

The growth in mining collections led us to modify our revenue forecast model for the corporate income tax. Currently, the corporate income tax forecast uses a single statistical model for all collections based on national corporate profit trends and other variables. In the future, the mining sector will be forecast separately using a statistical model that incorporates minerals prices and other variables; other sectors will be forecast using a revised aggregate model. The new approach results in higher projected corporate income tax revenue, due to futures market expectations for continued high minerals prices. For the coming 10-year period, the new models predict average annual collections of \$173 million as opposed to \$146 million predicted by re-estimating the current model. Both are higher than the \$136 million expected in the official Spring 2007 forecast.³

This paper is organized into several sections that analyze sector collections and present our new corporate income tax model. The following topics are presented:

- **Background** – This section provides technical information about the corporate income tax and comparisons to total state revenue.
- **Sector Collections** – This section presents a detailed analysis of corporate income tax collections by sector for 2002 through 2007. The most significant growth came from the mining sector.
- **Methodology** – This section presents our definitions and methodology for analyzing collections by sectors.

¹ Alaska has two corporate income taxes: one that applies to petroleum corporations and one that applies to all other corporations. Unless specified, all references in this paper are to the non-petroleum corporate income tax.

² This and all references to years in this paper refer to state fiscal years.

³ Alaska Department of Revenue, Spring 2007 Revenue Sources Book, <http://www.tax.alaska.gov/sourcesbook/2007/Spr2007/Revenue-Sources-Book-Spring-2007.pdf>.

- **Revenue Forecasting Model** – This section presents our current revenue forecast model and our new models for corporate income taxes. Due to the growth of mining collections, the mining sector will be forecast separately.

Background

Alaska's Corporate Income Tax

Alaska has two corporate income taxes: one that applies to petroleum corporations and one that applies to most other corporations. Unless stated otherwise, all discussions in this paper refer to the non-petroleum corporate income tax.

Corporate income tax rates are graduated from 1 percent to 9.4 percent in \$10,000 increments of Alaska taxable income; the 9.4 percent rate applies to taxable income over \$90,000. The tax base is federal taxable income apportioned to Alaska with certain Alaska adjustments. The three-factor apportionment used gives equal weighting to property, payroll and sales.⁴

Corporate Income Tax Revenue Forecasts and Comparisons

Alaska is one of only two states with no state sales or personal income tax. Unrestricted state revenue comes mostly from the oil sector, which generated 88 percent of unrestricted revenue in 2006. Unrestricted revenue represents the discretionary part of the budget that is available for general appropriation.⁵ From 2006 to 2016, forecasted unrestricted oil revenues will decline from \$3.7 billion to \$1.5 billion, for an average annual decline of 9 percent. Over this time period, forecasted unrestricted non-oil revenues will climb from \$501 million to \$609 million, for an average annual increase of 2 percent. By 2016, non-oil sources will account for 30 percent of unrestricted revenue.⁶ The corporate income tax, the largest source of unrestricted non-oil revenue, is forecast to generate \$135 million in 2016, barely changed from \$138 million in 2006. These forecasts do not include the revisions to our corporate income tax model outlined later in this paper.

Figure 1 compares the corporate income tax to total unrestricted revenue. The tax will grow in importance over the next decade but is still forecast to be less than 7 percent of revenue by 2016. Figure 2 compares the corporate income tax to total non-oil unrestricted revenue. In 2006, the tax generated 27 percent of non-oil revenue, and will remain over 21 percent for the next decade.

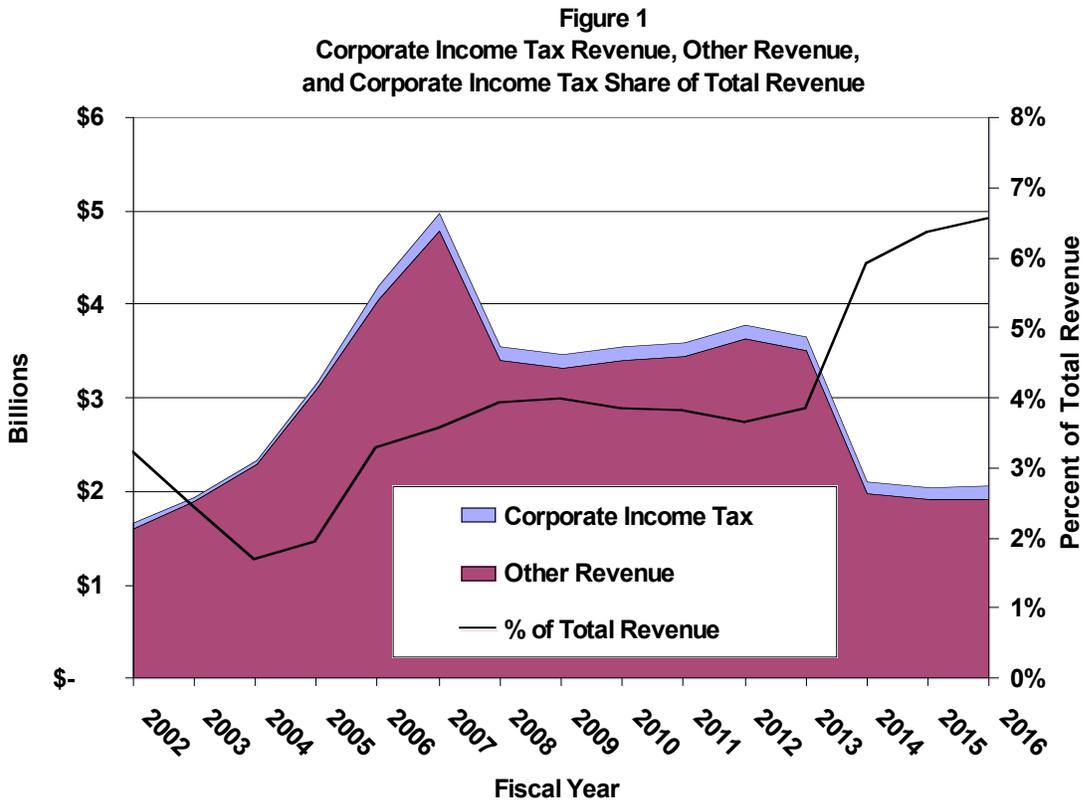
During the 2003-2006 period, Alaska's corporate income tax revenue grew at an average annual rate of 27%. This compares to a average growth rate of 18% across all

⁴ For more detailed information, see the Tax Division 2006 Annual Report, http://www.tax.state.ak.us/programs/division/2006_Tax_Annual_Report.pdf.

⁵ In Department of Revenue forecast documents, this is called Unrestricted General Purpose Revenue, which is available for general appropriation. Revenues that are restricted by constitution, state or federal law, trust or debt restrictions or by customary practice are not included in this amount.

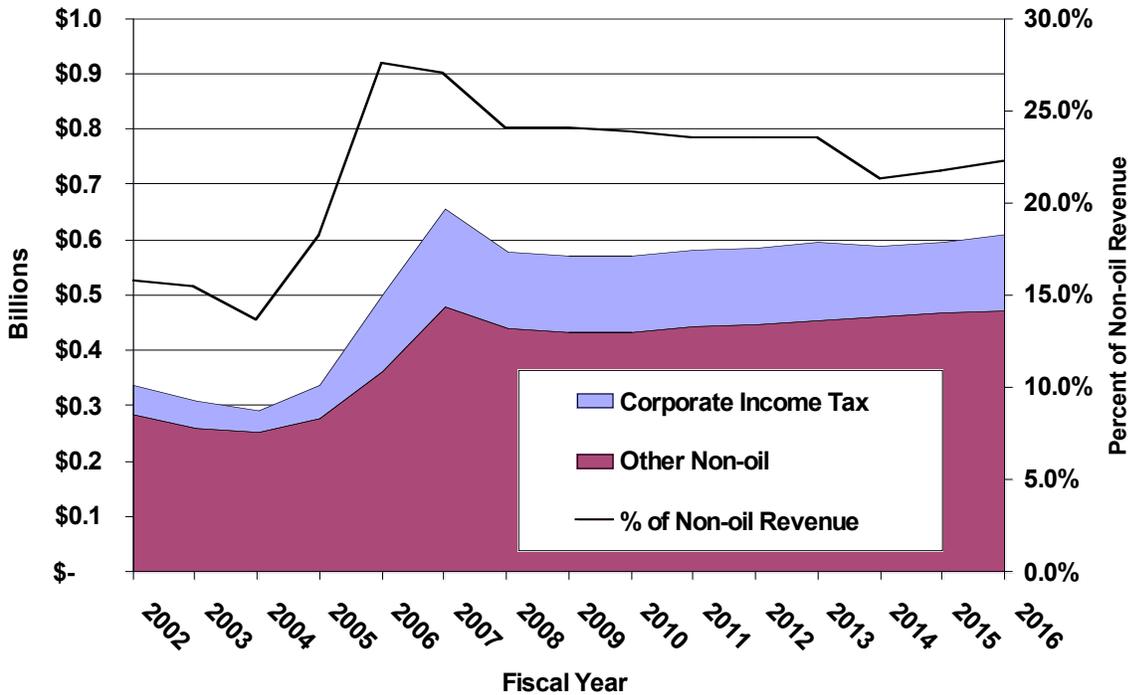
⁶ Alaska Department of Revenue, Spring 2007 Revenue Sources Book, <http://www.tax.alaska.gov/sourcesbook/2007/Spr2007/Revenue-Sources-Book-Spring-2007.pdf>.

states (In Alaska, collections grew 30% in 2007; data for all states is not yet available).⁷ Therefore, Alaska's corporate income tax growth rate has exceeded the national average for the past several years.



⁷ Rockefeller Institute of Government “Percentage Change in Quarterly State Tax Revenue by Major Tax,” <http://www.rockinst.org/WorkArea/showcontent.aspx?id=11922>.

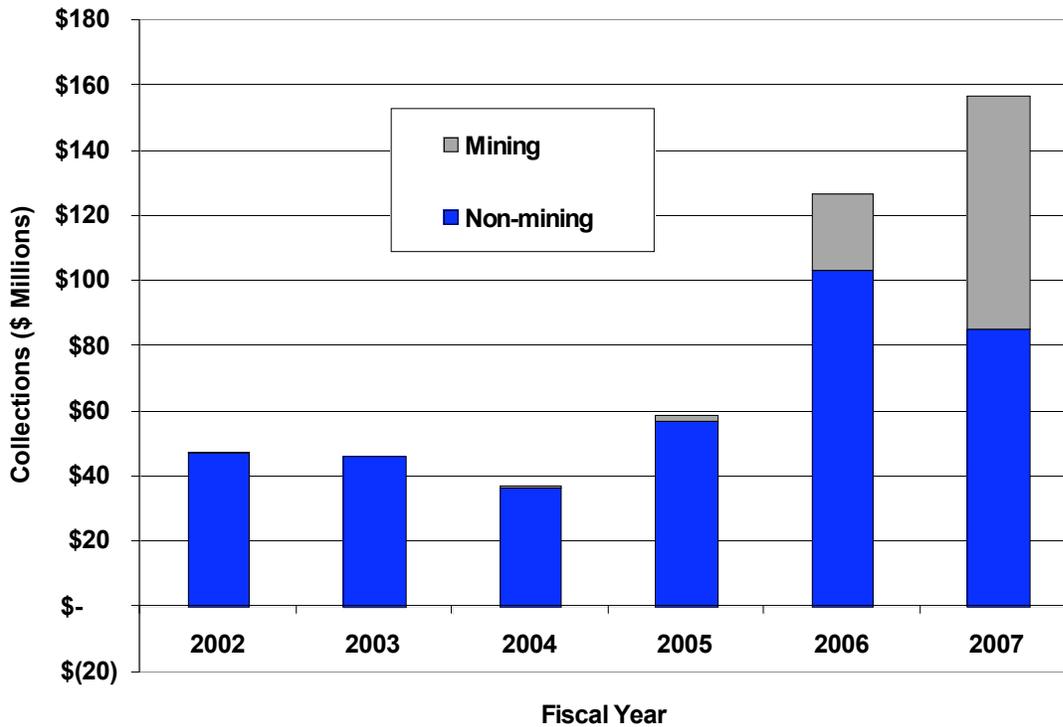
Figure 2
Corporate Income Tax Revenue, Other Non-oil Revenue,
and Corporate Income Tax Share of Total Non-Oil Revenue



Sector Collections

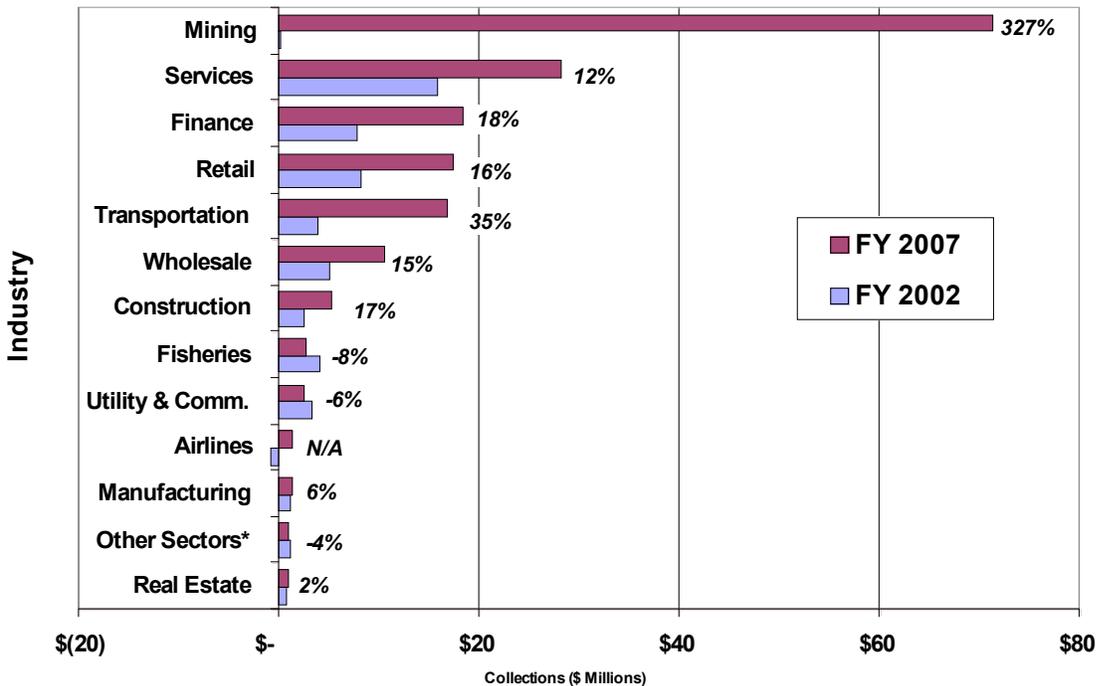
Corporate income tax growth was broad based in 2005 and 2006, with mining showing particular strength. However, in 2007, the \$47.7 million increase in mining collections accounted for the entire increase in collections, with the balance of sectors actually showing a modest decline. Figure 3 shows corporate income tax collections and the share generated by mining and other sectors for 2002 – 2007. The average annual growth rate for the corporate income tax from 2002 to 2007 was 28%. Mining led the way with 327% average annual growth, while the remaining sector grew at a 15% average annual rate.

Figure 3
Non-Oil Corporate Income Tax Collections: Mining and Non-mining



Non-oil corporate income tax collections are organized into 13 sectors. Of these, 10 showed increases over the 2002 to 2007 period. All but one sector increased from the 2004 low to 2007. The performance of each sector is shown in Figure 4 and is discussed below. Appendix B contains a list of our sector definitions.

Figure 4
Changes in Corporate Income Tax Collections by Sector and Average Annual Growth Rates, FY 2002- FY 2007



Airlines

Collections from the airline sector increased from a net \$0.8 million payout (due to refunds exceeding payments) in 2002 to \$1.4 million in 2007. 2007 was the best year out of the last six and a net \$3.5 million payout in 2005 was the worst. The average annual growth rate is not meaningful because of the shift from negative collections to positive collections.

Construction

Collections from the construction sector increased from \$2.4 million in 2002 to \$5.1 million in 2007. Those were the lowest and highest collections out of the last six years. The average annual growth rate from 2002 to 2007 was 17%.

Finance

Collections from the finance sector increased from \$7.8 million in 2002 to \$18.3 million in 2007. 2006 was the best year out of the last six at \$20.1 million and 2004 was the worst at \$7.2 million. The average annual growth rate from 2002 to 2007 was 18%.

Fisheries

Collections from the fisheries sector declined from \$4.0 million in 2002 to \$2.6 million in 2007. 2006 was the best year out of the last six at \$7.1 million and 2004 was the worst at \$1.4 million. From 2002 to 2007 collections declined at an average annual rate of 8%.

Manufacturing

Collections from the manufacturing sector increased from \$1.0 million in 2002 to \$1.3 million in 2007. 2005 was the best year out of the last six at \$9.5 million and 2003 was the worst with a net \$0.1 million payout. The average annual growth rate from 2002 to 2007 was 6%.

Mining

Collections from the mining sector dominated non-oil corporate income tax growth, increasing from \$0.1 million in 2002 to \$71.3 million in 2007. 2007 was by far the best year out of the last six, and 2003 was the worst with a net payout of \$0.2 million. The average annual growth rate from 2002 to 2007 was 327%, by far the best growth of any industry. Now that mining is solidly profitable, the growth rate will not continue.

Real Estate

Collections from the real estate sector increased from \$0.7 million in 2002 to \$0.8 million in 2007. 2007 was the best year out of the last six and 2003 was the worst at \$0.6 million. The average annual growth rate from 2002 to 2007 was 2%.

Retail

Collections from the retail sector increased from \$8.1 million in 2002 to \$17.3 million in 2007. 2006 was the best year out of the last six at \$20.8 million and 2004 was the worst at \$7.7 million. The average annual growth rate from 2002 to 2007 was 16%.

Restaurants and bars

Collections from the restaurants and bars industry (part of the retail sector) increased from \$0.3 million in 2002 to \$0.6 million in 2007. 2006 was the best year out of the last six at \$0.9 million and 2003 was the worst at \$0.2 million. The average annual growth rate from 2002 to 2007 was 17%.

Services

Collections from the services sector increased from \$15.7 million in 2002 to \$28.1 million in 2007. 2007 was the best year out of the last six and 2004 was the worst at \$6.0 million. The average annual growth rate from 2002 to 2007 was 12%.

Tourism

Collections from the tourism industry (part of the services sector) declined from \$7.8 million in 2002 to \$3.5 million in 2007. 2002 was the best year out of the last six and 2004 was the worst at \$1.6 million. From 2002 to 2007 collections declined at an average annual rate of 15%.

Oil Services

Collections from the oil services industry (part of the services sector) increased from \$4.6 million in 2002 to \$20.3 million in 2007. 2007 was the best year out of the last six and 2003 was the worst at \$1.6 million. The average annual growth rate from 2002 to 2007 was 34%.

Healthcare

Collections from the healthcare industry (part of the services sector) declined from \$2.0 million in 2002 to \$0.5 million in 2007. 2006 was the best year out of the last six at \$4.2 million and 2007 was the worst. From 2002 to 2007 collections declined at an average annual rate of 24%.

Transportation

Collections from the transportation sector increased from \$3.8 million in 2002 to \$16.8 million in 2007. 2007 was the best year out of the last six and 2002 was the worst; in fact collections increased in each year we examined. The average annual growth rate from 2002 to 2007 was 35%.

Utilities & Communications

Collections from the utilities and communications sector fell from \$3.2 million in 2002 to \$2.4 million in 2007. 2004 was the best year out of the last six at \$4.7 million and 2005 was the worst at \$0.4 million. From 2002 to 2007 collections declined at an average annual rate of 6%.

Wholesale

Collections from the wholesale sector increased from \$5.1 million in 2002 to \$10.4 million in 2007. 2006 was the best year out of the last six at \$11.9 million and 2004 was the worst at \$1.9 million. The average annual growth rate from 2002 to 2007 was 15%.

Other Sectors

Collections from other sectors – a category that includes forestry, insurance and some data adjustments – fell from \$1.1 million in 2002 to \$1.0 million in 2007. 2006 was the best year out of the last six at \$1.7 million and 2004 was the worst at \$0.5 million. From 2002 to 2007 collections declined at an average annual rate of 4%.

Methodology

Sector Definitions

Sector assignments are based on the primary Alaska business operations of a corporation. Our sectors are similar to those of the North American Industrial Classification System (NAICS) but differ in two important ways:

- 1) For companies whose primary Alaska operations differ from those indicated by their NAICS code, we assign them to sectors based on their primary Alaska operations. For instance, a company who manufactures automobiles outside Alaska and wholesales them in Alaska would be assigned to the manufacturing sector under NAICS but would be assigned to the wholesale sector for our analysis.
- 2) Important sectors of the Alaska economy that do not neatly align with NAICS are constructed using portions of various NAICS sectors. In particular:

- The fisheries sector is created from portions of the NAICS agriculture (110000) and manufacturing (310000) sectors;
- The oil services industry (part of the services sector) is created from portions of the NAICS mining (210000), transportation and warehousing (480000) and professional, scientific and technical services (540000) sectors; and
- The tourism industry (part of the services sector) is created from portions of the transportation and warehousing (480000), real estate and rental and leasing (530000), administrative and support services (560000) and accommodation and food services (720000) sectors.

Other minor adjustments were made to ensure that the industry definitions best represented the composition of Alaska industries. Appendix B contains a list of our sector definitions and Appendix C contains a complete reconciliation of our sector definitions to NAICS categories.

Collections Data

Corporate income tax collections data come in the form of payments and refunds for each company throughout the year. We query these data from an internal database called the Tax Accounting System. This information was linked to our database of sector definitions to yield collections data for each sector. Four different types of collections are included in the data:

- Quarterly estimated payments based on estimated liability for the tax year;
- Payments with returns or extension payments;
- Payments from collections activity, such as audits and compliance; and
- Tax refunds.

When analyzing corporate income tax revenue, we have a choice of studying either collections or liabilities. Collections are preferred because they provide an accounting of actual cash into the state treasury during the year, which is the variable we must ultimately forecast for the future. Also, compared to liabilities, collections provide more timely data due to the delay in receiving tax returns for a period.

Revenue Forecasting Model

Current Forecast Model

Our current approach to corporate income tax forecasting utilizes a single statistical model; we currently do not separately forecast any sectors. We forecast quarterly estimated payments based on the statistical relationship between payments, U.S. corporate profits, Alaska oil prices and several indicator variables. The quarterly payments forecast is then converted to a forecast of total collections based on the historical relationship between estimated payments and total collections.

The corporate income tax model uses aggregate quarterly payments for all sectors as the dependent variable, with the following independent variables:

- U.S. Corporate Profits, before taxes;

- The price of Alaska North Slope (ANS) crude oil;
- Indicator variables for the second and third quarters; and
- An indicator variable for federal accelerated depreciation from 2003-2005.

Figure 5
Probabilities and Regression Statistics for Current Corporate Income Tax Model

Probability (1 minus P Value)					Regression Statistics	
NIPA Corporate Profits	ANS Crude Oil Price	Q2 Indicator	Q3 Indicator	Accelerated Depreciation Indicator	Adjusted R-square	Durbin-Watson statistic
100%	100%	100%	99%	100%	0.77	1.16

For all model runs there were 5 independent variables specified, plus a constant. There were 67 data points for the series ending in Q1 2007 and 59 data points for the series ending in Q1 2005.

Figure 5 presents the probabilities and regression statistics for the current model. Regression statistics for the current model include an adjusted R-squared of 0.77, meaning that 77% of the variance in corporate income tax payments was explained by the independent variables.⁸

The Durbin-Watson statistic is 1.16, suggesting that autocorrelation is present in the current model.⁹ This means that there is a positive relationship among the errors from quarter to quarter: if the model predicts too low, it is likely to also predict low in the following quarter. Both the adjusted R-squared and the Durbin-Watson statistics have been getting worse in recent quarters; likely this is because the current model does not adequately account for the changing makeup of corporate income tax collections. The Durbin-Watson statistic in particular indicates room for model improvement.

Modeling Mining Separately

In the future, we will forecast corporate income tax revenue in two parts: an aggregate model that excludes mining and a separate forecast for the mining sector. This is based both on the fact that mining is now the most significant sector in terms of collections and on the results of statistical testing.

We analyzed the effects of using various dependent variable definitions for the corporate income tax model that exclude certain sectors. Excluding mining provides a statistically superior model, with improvements to the adjusted R-square and the Durbin-Watson statistic. Excluding other sectors shows mixed results. See appendix D for probabilities and regression statistics from the various model specifications we analyzed.

⁸ The adjusted R-square statistic is a statistic that indicates the proportion of variability in a data set that is accounted for by a statistical model. A value of 1 indicates that 100% of the variability is accounted for.

⁹ The Durbin-Watson statistic is a statistic that shows whether autocorrelation, or correlation between errors, is present in a model. A value of 2 indicates that there is no autocorrelation in a model; values below 2 can indicate positive autocorrelation and values above 2 can indicate negative autocorrelation.

Figure 6 shows probabilities and regression statistics for the new mining and aggregate statistical models.

Figure 6
Probability and Regression Statistics for Mining Sector and Aggregate Payment Models

Corporate Income Tax Model	Probability (1 minus P Value)						Regression Statistics	
	NIPA Corporate Profits	ANS Crude Oil Price	4-quarter average zinc price	Q2 Indicator	Q3 Indicator	Accelerated Depreciation Indicator	Adjusted R-square	Durbin-Watson statistic
Mining Sector	100%	---	100%	21%	49%	55%	0.78	1.51
All Other Sectors	100%	100%	93%	100%	100%	100%	0.79	1.77

For all model runs there were 5 independent variables specified, plus a constant. There were 67 data points for the aggregate series and 66 data points for the mining series.

New Forecast Model: Mining

Mining sector corporate income taxes will be forecast using a separate statistical model, based on a modified version of the aggregate model in use today. The primary modification is that the mining model incorporates an indicator of metals prices. Zinc prices are used because zinc accounts for over half of the value of Alaska minerals production.

The mining model uses quarterly payments for the mining sector as the dependent variable, with the following independent variables:

- U.S. Corporate Profits, before taxes;
- The 4-quarter average zinc price;
- Indicator variables for the second and third quarters; and
- An indicator variable for federal accelerated depreciation from 2003-2005.

The mining model suffers from some of the autocorrelation problems that existed in the current aggregate tax model, but to a lesser extent. Also, low probabilities for the indicator variables are not optimal, but these variables were still included based on forecaster judgment.

New Forecast Model: All Other Sectors

Sectors other than mining will be forecast using an aggregate model. The model will be similar to the current model except that the dependent variable will exclude the mining sector.

The aggregate model uses aggregate quarterly payments for all sectors except mining as the dependent variable, with the following independent variables:

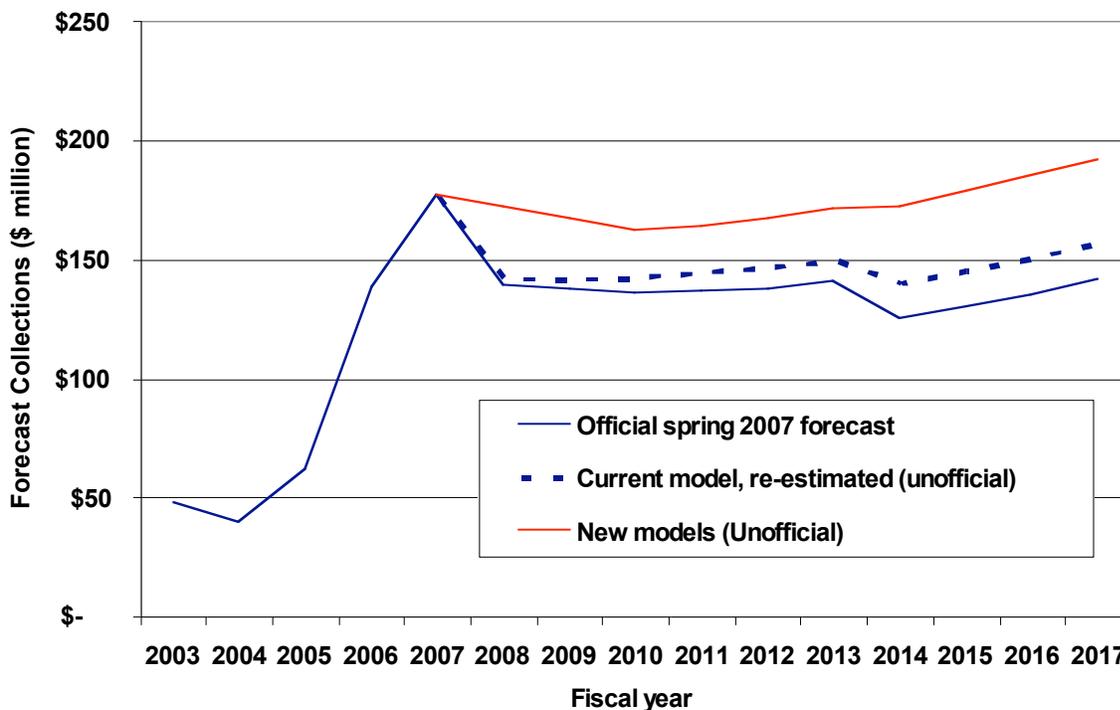
- U.S. Corporate Profits, before taxes;
- The price of Alaska North Slope (ANS) crude oil;
- Indicator variables for the second and third quarters; and
- An indicator variable for federal accelerated depreciation from 2003-2005.

Excluding the mining sector from the model improves the statistical indicators. The new aggregate model relieves the autocorrelation issues that existed previously, while at the same time improving the proportion of variance explained by the model.

Higher Expected Revenues

Due to the expectation of continued high minerals prices, the new forecast models predict higher revenues than the past model. In spring 2007, the official revenue forecast called for collections to average \$136 million 2008-2017. The estimate increases to \$146 million with re-estimation of the model and incorporation of new data. The new models, which break out the important mining sector, predict \$173 million per year over the 10-year period. Figure 7 shows the official Spring 2007 forecast, the revised unofficial forecast using the current model, and the new unofficial forecast using the new two-model approach.

Figure 7: History and 10-year Forecast Comparison for Non-oil Corporate Income Tax



Improved Forecast Accuracy

Two tests were used to compare expected forecast accuracy of the current and new corporate income tax models. Both assessments indicated that the new approach, with a separate mining model, should produce more accurate forecasts.

First, we compared the performance of both the old model and the new models to actual quarterly data for Q1 2000 through Q1 2007. On a quarterly basis, the absolute average error declined from 23% to 15% over the sample period. Given continued projections for historically high metals prices, the performance of the models over the past year should

be of particular interest: over the past 4 quarters, the absolute average error declined from 21% to 16% using the new models.

Back-testing by withholding the last 4 quarters of data also suggests that the new approach offers improved forecast accuracy. We estimated the forecast models using both approaches, withholding data for Q2 2006 through Q1 2007. When forecasts were produced for the withheld periods, the new models outperformed for every quarter, with an average error of 23% versus 37% for the old model.

Conclusion

Non-oil corporate income tax collections have grown dramatically in recent years: over 350% from 2004 to 2007, reaching \$177 million. The mining sector has been a main engine of growth for the corporate income tax and now accounts for 40% of collections, up from just 0.1% in 2002. As a result, our revenue forecast model has been adjusted to forecast mining separately from the rest of the tax.

Mining collections growth has come very quickly, and futures markets and analysts suggest that high minerals prices may persist for some time. As additional data become available, the new mining sector model should be revisited with an eye to further improving our corporate income tax forecast accuracy with regard to this important sector. Other avenues for further study include considering other key sector models, improving the aggregate tax model, and searching for leading indicators that could predict a return of collections to lower, historical levels.

Appendix A
Non-Oil Corporate Income Tax Collections

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Sector	Collections	Collections	Collections	Collections	Collections	Collections
Airlines	(\$832,152)	\$284,177	(\$704,090)	(\$3,484,339)	\$522,276	\$1,361,135
Construction	2,378,418	3,294,846	3,687,699	4,963,951	4,981,917	5,124,995
Finance	7,841,933	8,074,342	7,236,630	10,177,768	20,111,071	18,300,203
Fisheries	4,011,488	3,887,754	1,390,456	4,060,225	7,145,461	2,649,827
Manufacturing	1,016,378	(138,991)	798,922	9,529,313	7,424,086	1,349,303
Mining	50,266	(221,936)	406,064	2,104,144	23,641,883	71,299,684
Real Estate	749,347	592,065	648,137	683,134	597,701	832,731
Retail	8,117,494	10,385,256	7,745,680	10,619,770	20,776,815	17,334,767
<i>Restaurants/Bars</i>	265,277	233,345	479,092	509,501	891,260	569,750
Services	15,748,303	9,539,836	5,997,279	12,153,681	22,143,585	28,134,390
<i>Healthcare Services</i>	2,025,620	2,565,598	1,068,564	1,145,215	4,184,800	499,446
<i>Oil & Gas Services</i>	4,647,347	1,581,477	1,946,928	6,022,533	9,819,475	20,310,311
<i>Tourism</i>	7,824,459	4,130,730	1,560,722	3,213,743	6,160,446	3,514,241
Transportation	3,756,454	4,593,819	4,764,221	4,935,390	11,556,784	16,792,548
Utility & Comm.	3,216,248	1,273,724	4,728,594	405,889	4,084,708	2,363,196
Wholesale	5,080,252	4,532,158	1,940,234	8,189,672	11,931,222	10,427,820
Other Sectors*	1,145,393	1,511,646	514,053	708,652	1,702,071	953,940
Total	\$52,279,823	\$47,608,696	\$39,153,879	\$65,047,250	\$136,619,580	\$176,924,539
Mining Share	0.1%	-0.5%	1.0%	3.2%	17.3%	40.3%

NOTE: Totals may not exactly match those reported in the Revenue Sources Book due to data revisions.

*Other Sectors includes forestry and insurance which are combined for confidentiality, and other adjustments.

Negative amounts indicate that refunds exceeded payments for the fiscal year.

Timing of payments, refunds or assessment activity adds volatility between fiscal years.

Appendix B Sector Definitions

Corporations are assigned to sectors based on Department of Revenue determination of their primary line of business. The few corporations whose primary line of business cannot be determined are assigned to the Services category.

Airlines: Corporations primarily involved in air transportation.

Construction: Corporations primarily involved in building infrastructure, including homes, buildings, transportation infrastructure, etc. Building contractors and maintenance companies (such as electrical or plumbing) are included in this category.

Finance: Corporations primarily involved directly in financial markets, such as banks, brokers, leasing companies (equipment and other non-real estate goods), investment, and lending companies (excluding mortgage companies). This category also includes most Alaska Native corporations due to the broad range of investments they are involved in.¹⁰

Fisheries: Corporations primarily involved in the fishing sector, including processing, stock preservation, or harvesting of fish. This category includes fish processors that are classified as manufacturing under NAICS.

Manufacturing: Corporations primarily involved in physically creating goods in Alaska to be sold in either the wholesale or retail market. Printing, metalworking and fertilizer manufacturing are examples of activities that would be included in this category. Does not include fish processing which is included under Fisheries or wood products manufacturing which is included under Other Sectors.

Mining: Corporations primarily involved in the extraction of minerals other than oil, such as gold, silver, coal, or sand and gravel.

Real Estate: Corporations primarily involved in the buying, selling and operation of real estate, including home owners associations, realtors, renting or leasing, and financial companies that primarily deal in real estate or mortgages.

Retail: Corporations primarily involved in selling goods directly to consumers (final users of the good).

Restaurant/bars: Corporations primarily involved in serving food or beverages to consumers.

¹⁰ Several Native corporations were established by the 1971 passage of the Alaska Native Claims Settlement Act. For more information about Alaska's native corporations, see http://en.wikipedia.org/wiki/Alaska_Native_Regional_Corporations.

Services: Corporations primarily involved in providing non-material services to consumers or other businesses.

Tourism: Corporations primarily involved in leisure and recreation services. Tourism includes hotels, lodges and guided tour operators. Air transportation including helicopters is included in Airlines category; other transportation is included in Transportation category.

Oil & Gas Services: Corporations primarily involved in providing support services to oil or gas exploration or production companies.

Healthcare: Corporations primarily involved in providing health services to patients, or corporations involved in providing individual health care goods such as prosthetics. This category does not include manufacturers of drugs and other supplies; these companies are generally classified as wholesale.

Transportation: Corporations primarily involved in transporting goods by means other than air, such as trucking and ocean transport. Air transportation is reported separately in Airlines.

Utilities & Communications: Corporations primarily involved in constructing, maintaining, or providing communications or utilities. Newspapers, radio, television and magazines are included in this category.

Wholesale: Corporations primarily involved in selling goods to intermediate consumers that intend to resell or use the goods to operate their business.

Other Sectors: This category combines Forestry (corporations primarily involved in harvesting or processing timber) and Insurance (corporations primarily involved in underwriting, selling or collecting insurance that are not exempt from the Corporate Income Tax by virtue of paying the Insurance Premium Tax).

Appendix C
Reconciliation to North American Industrial Classification System (NAICS)

NAICS Code	NAICS Sector	Dept of Revenue Sector
11	Agriculture, Forestry, Fishing and Hunting	
1125	Aquaculture	Fisheries
113	Forestry and Logging	Forestry
1141	Fishing, Hunting and Trapping	Fisheries
11 - other	Other Agriculture, Forestry, Fishing and Hunting	Minimal
21	Mining, Quarrying, and Oil and Gas Extraction	
211	Oil and Gas Extraction	Oil & Gas Corp
213111	Drilling Oil and Gas Wells	Oil Services
213112	Support Activities for Oil and Gas Operations	Oil Services
21 - other	Other Mining, Quarrying, and oil and gas extraction	Mining
22	Utilities	Utilities and Communications
23	Construction	Construction
31-33	Manufacturing	
3117	Seafood Product Preparation and Packaging	Fisheries
3211	Sawmills and Wood Preservation	Forestry
3221	Pulp, Paper and Paperboard Mills	Forestry
31-33 - other	All other Manufacturing	Manufacturing
42	Wholesale Trade	Wholesale
44-45	Retail Trade	Retail
48-49	Transportation and Warehousing	
481	Air Transportation	Airlines
486	Pipeline Transportation	Oil Services or Oil & Gas Corp
487	Scenic and Sightseeing Transportation	Services / Tourism
4881	Support Activities for Air Transportation	Airlines
4882-4889	Support Activities for Rail, Water, Road	Services
48-49	All other Transportation and Warehousing	Non-air Transportation
51	Information	
5111	Newspaper Publishers	Utilities and Communications
511	Other Publishing Industries (except Internet)	Manufacturing
515	Broadcasting (except Internet)	Utilities and Communications
517	Telecommunications	Utilities and Communications
51 - other	Other Information	Services
52	Finance and Insurance	
524	Insurance Carriers and Related Activities	Insurance
52 - other	Other Finance and Insurance	Finance
53	Real Estate and Rental and Leasing	
531	Real Estate	Real Estate
532111	Passenger Car Rental	Services / Tourism
5321 - other	Other Automotive Equipment Rental and Leasing	Finance
532 - other	Other Rental and Leasing Services	Services

NAICS Code	NAICS Sector	Dept of RevenueSector
54	Professional, Scientific, and Technical Services	
54 - oil	Note: some service companies are primarily for	Oil Services
54 - other	Other Professional, Scientific and Technical	Services
56	Administrative and Support and Waste Management and Remediation Services	
5615	Travel arrangement and reservation services	Services / Tourism
562	Waste Management and Remediation Services	Utilities and Communications
56 - other	Other Admin Support and Waste Management	Services
61	Educational Services	Services
62	Health Care and Social Assistance	
624	Social Assistance	Services
62 - other	Other Health Care and Social Assistance	Services / Healthcare
71	Arts, Entertainment, and Recreation	
712	Museums, Historical Sites, and Similar Institutions	Services / Tourism
71 - other	Other Arts, Entertainment, Recreation	Services
72	Accommodation and Food Services	
721	Accommodation	Services / Tourism
722	Food Services and Drinking Places	Retail / Restaurants
81	Other Services (except Public Administration)	Services
92	Public Administration	Services

Source: US Census Bureau, 2007 NAICS US codes

Appendix D Model Results: Baseline and Withholding Sectors

Sectors Included in Dependent Variable	Probability (1 minus P Value)						Regression Statistics	
	NIPA Corporate Profits	ANS Crude Oil Price	Q2 Indicator	Q3 Indicator	Accelerated Depreciation Indicator	Adjusted R-square	Durbin-Watson statistic	
All Industries	100%	100%	100%	99%	100%	0.77	1.16	
With sectors withheld:								
Finance	100%	100%	100%	99%	100%	0.75	1.23	
Mining	100%	93%	100%	100%	100%	0.79	1.77	
Oil Services	100%	99%	100%	99%	100%	0.75	1.24	
Retail	100%	99%	100%	99%	100%	0.72	1.15	
Transportation	100%	99%	100%	99%	100%	0.75	1.17	
Wholesale	100%	99%	100%	98%	100%	0.75	1.14	
With sectors withheld (in addition to mining)								
Finance	100%	100%	100%	100%	100%	0.77	2.02	
Oil Services	100%	67%	100%	100%	100%	0.69	1.62	
Retail	100%	71%	100%	100%	100%	0.74	1.95	
Transportation	100%	83%	100%	100%	100%	0.78	1.88	
Wholesale	100%	83%	100%	100%	100%	0.78	1.73	
Finance, Oil Services	99%	95%	100%	100%	100%	0.66	1.83	
Finance, Retail	100%	96%	100%	100%	100%	0.71	2.19	
Finance, Transportation	100%	98%	100%	100%	100%	0.75	2.20	
Finance, Wholesale	100%	98%	100%	100%	100%	0.76	1.99	
Oil Services, Retail	100%	9%	100%	100%	100%	0.61	1.84	
Oil Services, Transportation	100%	33%	100%	100%	100%	0.66	1.66	
Oil Services, Wholesale	100%	36%	100%	99%	100%	0.67	1.59	
Retail, Transportation	100%	38%	100%	100%	100%	0.72	2.10	
Retail, Wholesale	100%	41%	100%	100%	100%	0.72	1.93	
Transportation, Wholesale	100%	61%	100%	100%	100%	0.76	1.83	
Finance, Oil Services, Retail	95%	72%	100%	100%	99%	0.56	2.07	
Finance, Oil Services, Transportation	99%	84%	100%	100%	100%	0.60	1.94	
Finance, Oil Services, Wholesale	100%	85%	100%	100%	100%	0.62	1.82	
Finance, Retail, Transportation	100%	87%	100%	100%	100%	0.67	2.40	
Finance, Retail, Wholesale	100%	88%	100%	100%	100%	0.68	2.18	
Finance, Transportation, Wholesale	100%	95%	100%	100%	100%	0.73	2.16	
Oil Services, Retail, Transportation	100%	41%	100%	100%	100%	0.56	1.93	
Oil Services, Retail, Wholesale	100%	35%	100%	100%	99%	0.57	1.84	
Oil Services, Transportation, Wholesale	100%	10%	100%	99%	100%	0.63	1.62	
Retail, Transportation, Wholesale	100%	7%	100%	100%	100%	0.69	2.06	
All but Finance	100%	75%	100%	100%	100%	0.51	1.91	
All but Oil Services	100%	65%	100%	100%	100%	0.63	2.38	
All but Retail	100%	61%	100%	100%	100%	0.55	1.91	
All but Transportation	100%	37%	100%	100%	98%	0.50	2.08	
All but Wholesale	93%	33%	100%	100%	99%	0.49	2.20	
All six largest sectors withheld	95%	12%	100%	100%	97%	0.40	2.20	

For all model runs there were 5 independent variables specified, plus a constant. There were 67 data points.