



Independent Fiscal Office

**Proposed Sales Tax Exemption:
Aircraft Sales, Parts and Maintenance and Repair**

January 4, 2013

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About the Independent Fiscal Office

The Independent Fiscal Office (IFO) provides revenue projections for use in the state budget process along with impartial and timely analysis of fiscal, economic and budgetary issues to assist Commonwealth residents and the General Assembly in their evaluation of policy decisions. In that capacity, the IFO will not support or oppose any policies it analyzes, and will disclose all methodologies, data sources and assumptions used in published reports and estimates.

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INDEPENDENT FISCAL OFFICE

Second Floor, Rachel Carson State Office Building
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January 4, 2013

To: The Honorable David G. Argall and The Honorable Peter Daley

This report presents the results from an analysis performed by the Independent Fiscal Office (IFO) of a proposed Sales and Use Tax (SUT) exemption for purchases of fixed-wing aircraft, parts and maintenance, repair and overhaul (MRO) services. Legislation creating an SUT exemption consistent with this proposal has been introduced in prior legislative sessions. The most recent examples include House Bill 1100, Printer's Number 1676 and Senate Bill 1552, Printer's Number 2256. These bills are identical and were introduced in the 2011-2012 Legislative Session. This analysis is based on the exemption described in those bills. The proposed SUT exemption for fixed-wing aircraft, parts and MRO would be an expansion of the existing exemption enacted in October 2009 for helicopters, helicopter parts and installation.

The analysis describes Pennsylvania's tax treatment of aircraft purchases, parts and MRO services and compares the treatment of the aircraft industry in Pennsylvania to other states and regions. The analysis also looks at aircraft industry employment trends in Pennsylvania over the past decade, as well as trends in surrounding states that have implemented policy changes related to the taxation of aircraft ("policy change" states) and states that have not implemented policy changes related to aircraft (control states). Finally, the analysis derives the static revenue impact from an SUT exemption for aircraft and examines the number of job gains necessary to offset the static revenue loss due to the exemption. A technical appendix provides data definitions and historical data on active aircraft registrations across states.

Per the policy of the IFO, this report will be posted to the office website three days following transmittal. The IFO welcomes any questions, comments or suggestions regarding the content and methodology of this analysis.

Sincerely,

MATTHEW KNITTEL
Director

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Proposed Sales Tax Exemption: Aircraft Sales, Parts and Maintenance and Repair

This report analyzes the potential impact from the enactment of a broad Sales and Use Tax (SUT) exemption for the sale or use of aircraft, aircraft parts and aircraft maintenance, repair and overhaul (MRO) services. The report has six parts. Part One describes Pennsylvania’s tax treatment of aircraft purchases, parts and MRO services. Part Two compares the tax treatment of the aircraft industry in Pennsylvania to other states in the Northeast, Mid-Atlantic and Midwest regions. Part Three describes the industries included in this analysis and briefly discusses the status of the aircraft industry in Pennsylvania over the past decade. Part Four derives the static revenue impact from an SUT exemption for aircraft. Part Five analyzes employment trends across the states included in this analysis for statistical evidence of an increase in aviation related employment following the enactment of an aircraft related SUT exemption. For that purpose, the analysis compares employment trends in states that have recently enacted an SUT exemption to those that have not altered their policy. Part Six examines the number of job gains necessary to offset the static revenue loss due to exemption. A technical appendix provides data definitions and historical data on active aircraft registrations across states.

Legislation creating an SUT exemption for aircraft, aircraft parts and MRO services has been introduced in prior legislative sessions. The most recent examples include House Bill 1100, Printer’s Number 1676 and Senate Bill 1552, Printer’s Number 2256. The bills are identical and were introduced in the 2011-2012 Legislative Session. For the purpose of this analysis, all references to “the proposal” refer to the exemption described in those bills.

The Independent Fiscal Office (IFO) interprets the proposal to newly exempt the following goods and services from SUT:

- The sale at retail or use of new or used fixed-wing aircraft.
- The sale at retail or use of machinery, equipment, plating, upholstery, other physical components and software installed on aircraft.¹
- The maintenance, installation or overhaul of aircraft parts including machinery, equipment, plating, upholstery, other physical components and software.

I. Aircraft Sales and Use Tax Policy in Pennsylvania

Under Pennsylvania law, SUT is imposed on the sale, use and MRO of fixed-wing aircraft and all aircraft parts. In general, a transaction involving delivery within Pennsylvania is subject to tax and a transaction involving delivery outside of Pennsylvania is exempt, regardless of where the transaction originates. Aircraft and aircraft parts delivered outside of Pennsylvania and subsequently brought into Pennsylvania are generally subject to use tax.

¹ The term “aircraft” as used in the second and third bullets includes fixed-wing, powered, tilt-rotor, glider and unmanned aircraft.

Certain Pennsylvania SUT exemptions are applicable to aircraft, aircraft parts and MRO services. Some common exemptions include:

- Common Carrier - The sale or use of aircraft, aircraft parts and MRO are exempt from SUT when the aircraft is directly engaged as a common carrier for the purpose of transporting people or property. To qualify for the Pennsylvania common carrier exemption, an FAA air carrier operating certificate must be on file with the Pennsylvania Department of Transportation.
- Helicopters – Effective October 2009, Pennsylvania provides an SUT exemption for the sale of helicopters, parts and installation.²
- Sale for Resale - Aircraft and aircraft parts are exempt from SUT when they will be resold, rented or leased in the ordinary course of the purchaser's business.
- Use by a Nonresident - Aircraft and aircraft parts are exempt from SUT when they are brought into Pennsylvania by a nonresident for temporary use, or when the nonresident is a vacationer or a tourist. Temporary use may not exceed seven days.

SUT is imposed on the sale at retail or use of Pennsylvania taxable goods and services. Sales from manufacturers to wholesalers and wholesalers to retailers are generally exempt as sales for resale. The retailer or seller of the aircraft, aircraft parts or MRO service collects the SUT due on the transaction and remits tax to the Department of Revenue (DOR), provided that the seller is licensed to collect SUT in Pennsylvania. If the purchase is taxable for Pennsylvania purposes and the tax is not collected as part of the transaction, then the purchaser generates a use tax liability.

The use tax on aircraft, aircraft parts and MRO services is collected either through voluntary disclosure (i.e., the purchaser recognizes their use tax liability and voluntarily remits the applicable tax to DOR) or involuntary disclosure (i.e., the purchaser remits use tax after an inquiry by DOR). DOR's Bureau of Enforcement Planning, Analysis and Discovery (EPAD) is responsible for the Department's voluntary and involuntary disclosure efforts related to aircraft. Tax collections under these programs can vary greatly from year to year.

Space that is rented or leased for the purpose of storing aircraft is not subject to tax unless the rental or lease qualifies as a self-storage service. In order to be considered self-storage, the building or space must be secure and contain a separate access for each purchaser of the self-storage service. An airplane hangar, where multiple planes are stored and accessed by various individuals, would generally not be considered self-storage.

II. Aircraft Sales and Use Tax Policy in the United States

Aviation related tax exemptions can be found throughout the United States and differ considerably between and within regions. Exemptions may vary based on the use, type, maximum certificated takeoff

² See section 204(67) and (68) of the act of March 4, 1971 (P.L. 6, No.2), known as the Tax Reform Code of 1971. These provisions were added by Act 48 of 2009.

See <http://www.legis.state.pa.us/CFDOCS/Legis/PN/Public/btCheck.cfm?txtType=HTM&sessYr=2009&sessInd=0&billBody=H&billTyp=B&billNbr=1531&pn=2737>.

weight and ownership of the aircraft as well as other criteria. The Northeast region has recently enacted a number of aviation related exemptions, especially for aircraft parts and MRO services. The proximity of states and high population density facilitates interstate travel and commerce, which may be an important factor behind exemptions recently enacted in this region. These qualities allow aircraft transactions to be highly mobile. For example, aircraft might be purchased or leased in a state with a low tax rate or sales tax exemption, or aircraft might be flown to a state with a favorable tax policy for MRO services.³ The significant resources necessary to purchase, repair and maintain aircraft can provide a meaningful incentive for consumers to reduce or eliminate tax liability.

The text that follows provides a brief description of exemptions recently enacted in nearby states. Table 1 and the maps on the subsequent pages provide an overview of the current status of fixed-wing aircraft exemptions in those and other states. The table and maps use the following definitions, although they may not be applicable across all states:

- Common Carrier – An air carrier that “holds itself out” to the public as willing to furnish transportation to all persons who request service (i.e., scheduled airlines).⁴
- Contract Carrier – Carriage for hire which does not involve “holding out.”⁵
- Commercial General Aviation – Civil aviation, except for common carriers and contract carriers, performed in exchange for remuneration. Includes certain charters, banner towing and crop-dusting.
- Non-Commercial General Aviation (private aviation) – Flying for non-commercial purposes. Includes recreational flying.
- Fly-Away Exemption – Exempts the sale of aircraft from SUT as long as the consumer moves the aircraft out of state within a specified period of time. The scope of this exemption varies by state based on how quickly planes must be flown out of state and the time that must elapse before they may return.

Massachusetts

Effective March 1, 2002, all aircraft, all repair or replacement parts used exclusively in aircraft or in significant overhauling or rebuilding of aircraft or aircraft parts or components on a factory basis, and all aircraft storage purchased and used in state are exempt from sales tax (6.25 percent). Prior to March 2002, only the labor charges associated with aircraft MRO were exempt from tax. Since its enactment, there have been multiple attempts to repeal the exemption in whole or in part. To date, those attempts have been unsuccessful.

Connecticut

Under current law, sales of commercial and private aircraft are exempt from sales tax (6.35 percent) provided that one of the following conditions apply: (1) the aircraft’s takeoff weight is 6,000 pounds or greater, (2) the aircraft is owned or leased by a certificated or licensed air carrier engaged in interstate or

³ However, Pennsylvania residents who purchase an aircraft out of state would still be liable for use tax, unless they also store the aircraft out of state.

⁴ See Advisory Circular 120-12A, Federal Aviation Administration, 4/24/86.

⁵ Ibid.

foreign commerce or (3) the sale of the aircraft is to a nonresident for exclusive use outside of Connecticut. All aircraft parts and MRO are exempt. Prior to July 1, 2006, aircraft parts and MRO were only exempt if the aircraft's takeoff weight was greater than or equal to 6,000 pounds or the aircraft was owned or leased by a certificated or licensed air carrier engaged in interstate or foreign commerce.

Ohio

Ohio imposes sales tax (5.5 percent) on all purchases of aircraft, but allows an exemption for parts and MRO services for aircraft with a takeoff weight that exceeds 6,000 pounds. Prior to June 24, 2008, this exemption was limited to private aircraft with fractional share ownership. Currently, Ohio does not have a fly-away exemption.

New York

Sales of private aircraft in New York are generally subject to sales tax (4 percent).⁶ However, sales of commercial aircraft, as well as aircraft parts and MRO are generally exempt from tax. As of December 1, 2004, parts and MRO are also exempt for private aircraft. Like Ohio, New York does not have a fly-away exemption. However, the impact is limited because only purchases of private aircraft are subject to tax in New York.

Other States

States that have not recently enacted an SUT exemption for aircraft provide varying levels of exemption (see Table 1). Certain states provide broad exemptions for sales, parts and MRO for commercial and private aircraft (ME, RI, VT), others largely exempt parts and MRO (GA, IN, MI, IL) or exempt MRO services only (VA, MD). Two states do not levy a sales tax (NH, DE) and so provide full exemption. Among the states included in this analysis, only Pennsylvania, North Carolina and Wisconsin subject all sales, parts and MRO to SUT for both commercial and private aircraft.⁷

⁶ Most sales in New York are also subject to local sales tax which may increase the effective tax rate by three to five percentage points depending on location.

⁷ However, North Carolina applies a reduced tax rate to sales of aircraft.

Table 1: State Fixed-Wing Aircraft Tax Policy Matrix

Policy Change	State	Sales		Parts		MRO Services			SUT
		Commercial	Private	Commercial	Private	Commercial	Private	Fly-Away	Rate 7/
Policy Change	CT	Partial 1/	Partial 1/	Partial 1/	Partial 1/	Partial 1/	Partial 1/		6.35
	7/1/2006	Partial 1/	Partial 1/	Exempt	Exempt	Exempt	Exempt	Yes	
	MA	Taxed	Taxed	Taxed	Taxed	Partial 2/	Partial 2/		6.25
	3/1/2002	Exempt	Exempt	Exempt	Exempt	Exempt	Exempt	No	
	NY	Partial 3/	Taxed	Exempt	Taxed	Exempt	Taxed		4.00
	12/1/2004	Partial 3/	Taxed	Exempt	Exempt	Exempt	Exempt	No	
	OH	Taxed	Taxed	Taxed	Partial 4/	Taxed	Partial 4/		5.50
	6/24/2008	Taxed	Taxed	Partial 1/	Partial 1/	Partial 1/	Partial 1/	No	
Parts and MRO Completely Exempt	ME	Exempt	Exempt	Exempt	Exempt	Exempt	Exempt	Yes	5.00
	RI	Exempt	Exempt	Exempt	Exempt	Exempt	Exempt	No	7.00
	GA	Taxed	Taxed	Exempt	Exempt	Partial 2/	Partial 2/	Yes	4.00
	VT	Taxed	Taxed	Exempt	Exempt	Exempt	Exempt	No	6.00
	NH	No SUT	No SUT	No SUT	No SUT	No SUT	No SUT	N/A	N/A
	DE	No SUT	No SUT	No SUT	No SUT	No SUT	No SUT	N/A	N/A
Parts and MRO Mostly Exempt	IN	Partial 6/	Taxed	Partial 6/	Partial 6/	Exempt	Exempt	Yes	7.00
	IL	Taxed	Taxed	Partial 5/	Partial 5/	Partial 2/	Partial 2/	Yes	6.25
	MI	Taxed	Taxed	Partial 1/	Partial 1/	Exempt	Exempt	Yes	6.00
Parts and MRO Partly Exempt	WV	Taxed	Taxed	Exempt	Exempt	Taxed	Taxed	No	6.00
	VA	Taxed	Taxed	Taxed	Taxed	Exempt	Exempt	No	4.00 8/
	MD	Taxed	Taxed	Taxed	Taxed	Exempt	Exempt	No	6.00
	NJ	Taxed	Taxed	Partial 1/	Partial 1/	Partial 1/	Partial 1/	Yes	7.00
No Exemption	NC	Taxed	Taxed	Taxed	Taxed	Taxed	Taxed	No	4.75 8/
	PA	Taxed	Taxed	Taxed	Taxed	Taxed	Taxed	No	6.00
	WI	Taxed	Taxed	Taxed	Taxed	Taxed	Taxed	Yes	5.00

1/ Exempts aircraft above a certain maximum certificated takeoff weight threshold.

2/ Exempts labor if itemized separately on the sales invoice. The table assumes those charges would be itemized separately.

3/ Exempts aircraft used primarily to transport persons or property, for hire and by the purchaser to transport tangible property for business purposes.

4/ Exempts aircraft with fractional share ownership.

5/ Exempts aircraft considered as rolling stock.

6/ Exempts aircraft purchased for public transportation.

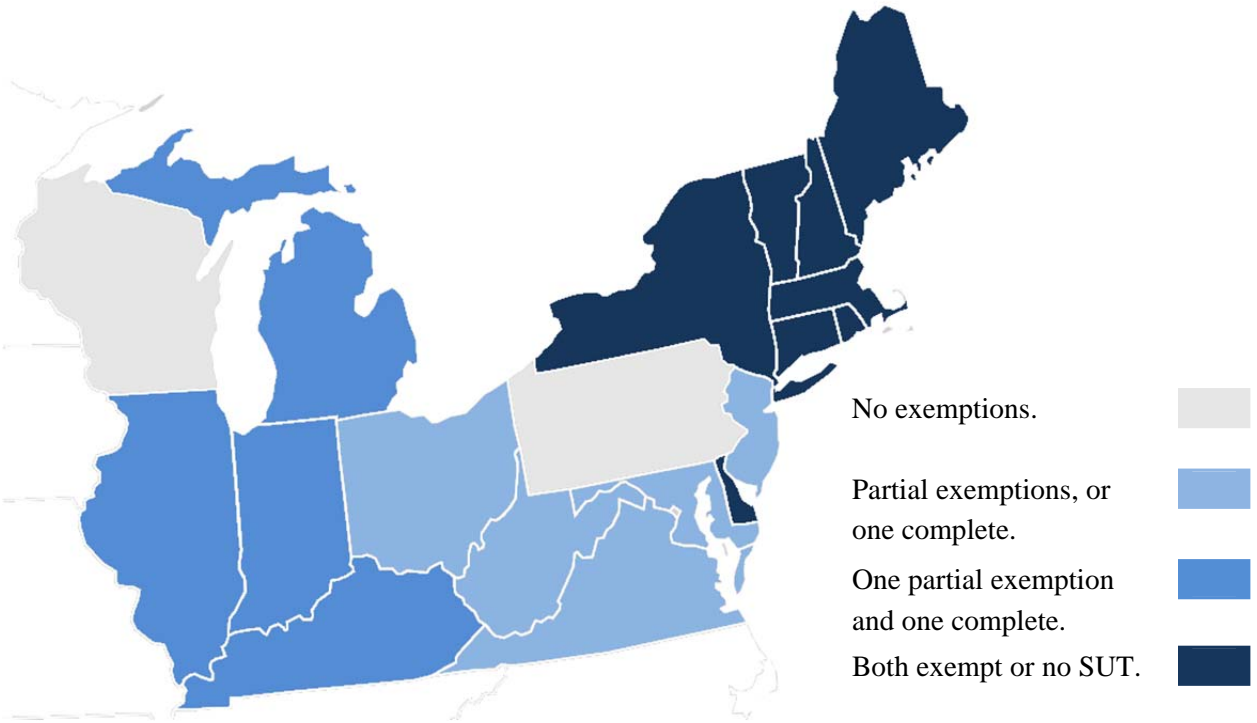
7/ Excludes local sales tax.

8/ The SUT rate for aircraft sales is 2 percent for Virginia and 3 percent for North Carolina.

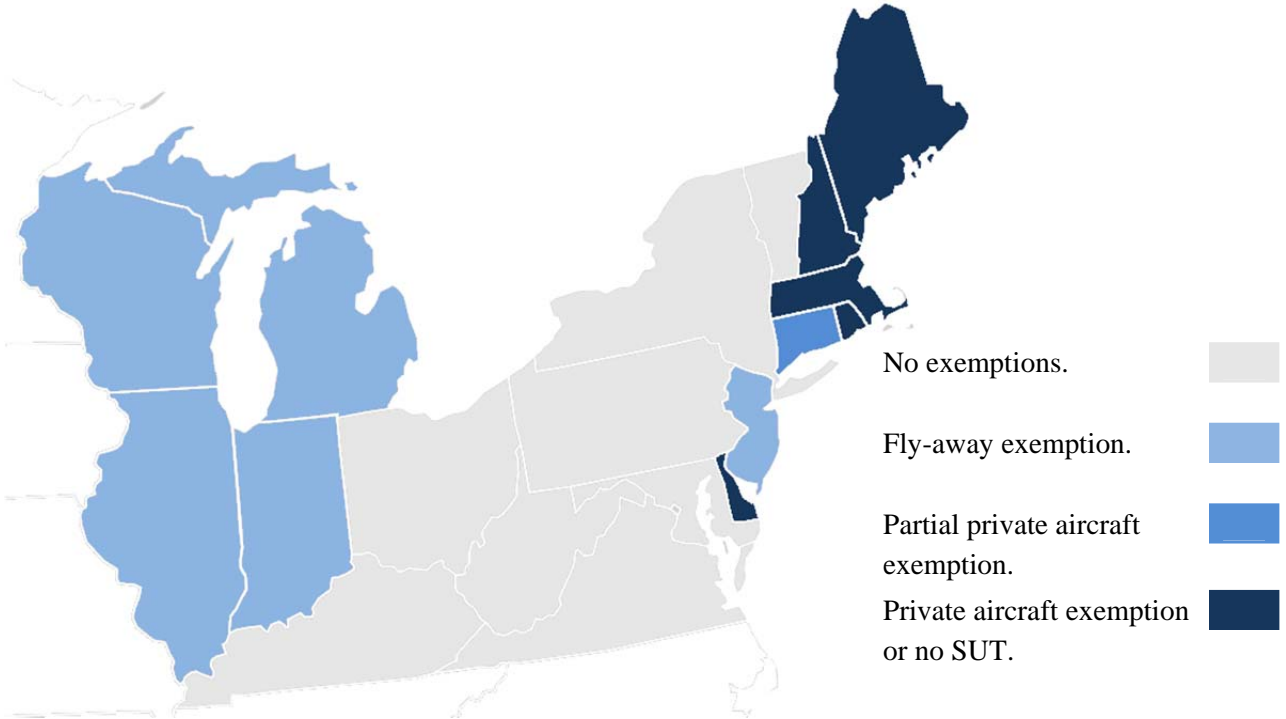
Sources: Conklin & de Decker Aviation Information (State Tax Guide for General Aviation) and state departments of revenue.

Regional Exemptions

Sales of Aircraft Parts and Repair/Maintenance Labor



Sales of Private Aircraft and Fly-Away Exemptions



III. Employment in the Pennsylvania Aircraft Industry

For the purpose of this analysis, the IFO was not able to procure a time series of state employment or sales data for the aircraft industry from the Federal Aviation Administration (FAA) or an industry representative.⁸ Therefore, it was necessary to construct a dataset from figures that are publicly available. The IFO defined the aircraft industry to include private aircraft manufacturers, wholesalers, retailers and providers of MRO services. The data are from the U.S. Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW). The QCEW data provide quarterly employment and wage data by six-digit North American Industry Classification System (NAICS) at the state level, provided that certain disclosure restrictions are met. The data are based on returns filed by firms covered under the national Unemployment Insurance program and comprise 99.7 percent of all private wage and salary civilian employment.⁹ The Bureau of Labor Statistics uses the data to track national and state employment trends, while the Department of Commerce uses the data to track wages and salaries for the National Income and Product Accounts (NIPAs).

It is noted that the database constructed from QCEW data may be an imprecise measure of the true size of the aircraft industry. The QCEW classifies firms by their primary line of business so that the industry might be smaller or larger depending on the relevant good or service under consideration. For example, certain firms may produce aircraft parts, but those parts might comprise a relatively small portion of their total output and they would not be included in the industry definition. Alternatively, the retailers and wholesalers included in the dataset also sell other transportation products not related to aviation.

Table 2
Pennsylvania Aircraft Industry, 2011

<u>NAICS Industry</u>	<u>Number of Establishments</u>	<u>Number of Employees</u>	<u>Average Wage (\$)</u>
336411 – Manufacturers	10	7,275	\$92,094
336412 – Manufacturers	13	1,460	59,500
336413 – Manufacturers	27	1,588	58,142
423860 – Wholesalers	42	492	53,292
441229 – Retailers	40	209	34,773
488190 – MRO Services	95	1,335	47,263
488119 – Support Services	47	1,818	22,579

Data for NAIC 336412 is an estimate based on 2008 value and total for all manufacturers for 2011. Value for 2011 was not disclosed.
Source: BLS, Quarterly Census of Employment and Wages.

For 2011, the QCEW data show that 50 manufacturing establishments employed roughly 10,320 individuals.¹⁰ The manufacturing establishments include general aircraft manufacturing (NAIC 336411), aircraft engines and parts (NAIC 336412) and other aircraft parts and auxiliary equipment (NAIC 336413). The data also show that these manufacturers paid

a much higher wage than the statewide average across all industries (\$47,330).

⁸ The IFO did obtain an industry report that computes MRO employment for 2009 using the Federal Aviation Administration (FAA) database of registered repair stations; however historical data were unavailable, thereby rendering a trend analysis impossible.

⁹ See <http://www.bls.gov/cew/cewfaq.htm>.

¹⁰ Some of these employees may have been part-time, laid off or hired during the year. The tabulations do not include individuals indirectly employed by firms such as independent contractors.

Aircraft wholesalers (NAIC 423860) employed roughly 490 individuals across 42 establishments. These wholesalers deal in aircraft, engines and parts as well as certain boats, golf carts and railroad equipment. Although the QCEW data do not allow for a more refined breakout, other data from the U.S. Census Bureau suggest that roughly 80 percent of revenue for these wholesalers is related to sales of aircraft and/or parts.¹¹ The average wage paid in this industry is also higher than the statewide average.

Aircraft retailers (NAIC 441229) employed roughly 210 individuals across 40 establishments. These retailers deal in new and used aircraft as well as golf carts, snowmobiles and utility trailers. Although the QCEW data do not allow for a more refined breakout, data from the U.S. Census Bureau suggest that roughly half of revenue for these retailers is related to new and used aircraft. The average wage in this industry is lower than the statewide average.

Two industries supply MRO services. The first industry (NAIC 488190, other support services) is largely dedicated to MRO services but may also include aircraft inspection and testing services. Those service providers employed 1,335 individuals across 95 establishments. The average wage paid is comparable to the statewide average. The second industry (NAIC 488119, other airport operations) is much broader and includes hangar rentals, parking services, cargo and baggage handling services, as well as other airport support services. This industry also includes “fixed based operators” who supply MRO services at airports.¹² Data from the U.S. Census suggests that slightly more than half of revenue for this industry is related to fixed based operator services provided at airports. This industry employed 1,818 individuals across 47 establishments. The average wage for the industry is considerably lower than the statewide average (possibly due to part-time workers). However, it is likely that the portion attributable to MRO services is more comparable to the statewide average wage.

State employment trends in these different industries can diverge significantly from national trends. Like many industries, aircraft manufacturing employment in Pennsylvania and the U.S. declined rapidly during the 2001-02 recession. Since 2003, aircraft manufacturing employment has increased dramatically in Pennsylvania (47.7 percent) compared to the U.S. (10.8 percent). Compared to manufacturers, employment by wholesalers and retailers is much smaller (see Table 2). Since 2003, Pennsylvania recorded a substantial decline (24.7 percent) in wholesale-retail employment compared to a minor U.S. gain (2.0 percent). For MRO services (NAIC 488190 only), employment has increased significantly for Pennsylvania (37.1 percent) and the U.S. (34.1 percent) since 2003. For the industry that includes fixed based operators (NAIC 488119), the respective figures are -27.5 percent and 3.1 percent. As noted, that industry includes many firms that provide general airport support services. Hence, those trends need not be representative of employment trends for MRO service providers.

¹¹ U.S. Department of Commerce, 2002 and 2007 Economic Census, Product Line Statistics by Kind of Business.

¹² A fixed based operator is “a commercial business granted the right by the airport sponsor to operate on an airport and provide aeronautical services such as fueling, hangaring, tie-down and parking, aircraft rental, aircraft maintenance, flight instruction, etc.” See http://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.information/documentNumber/150_5190-7.

IV. Static Revenue Impact from SUT Exemption for Aircraft

This analysis separates the potential impact of the SUT exemption into two parts: a static revenue impact and an economic impact. The static impact represents the revenue loss from the exemption assuming that taxpayer behavior does not change. The economic impact considers how the exemption might affect industry employment and output. If employment and output expand in response to the exemption, then some portion of the static revenue loss would be recouped.

For the purpose of the static revenue estimate, the IFO identified the various industries that would be affected by the exemption based on reported NAIC codes. Firms report their six-digit industry code on their SUT return. Relative to the industries discussed in the prior section, more industries are included in the static revenue estimate because certain manufacturers and service providers might remit minor amounts of SUT that are attributable to aircraft sales, parts or MRO services. The SUT remitted by those industries is tangential to their primary line of business, which is generally non-taxable. For example, NAIC 481000 is Air Transportation and the vast majority of industry activity is attributable to non-taxable scheduled and non-scheduled air transportation services. However, the industry remits small amounts of SUT due to activities related to MRO services, the sale of parts or leasing of aircraft.

The industries included in the static revenue estimate can be separated into manufacturers, wholesalers-retailers and MRO service providers. Those industries may remit SUT related to aircraft sales, parts or MRO services. The analysis separates the static revenue estimate into these three components so that policymakers can decide the proper scope of the exemption (i.e., MRO services and parts only, or a broader exemption that also includes aircraft sales). The following list details the industries included in the static revenue estimate. See the technical appendix for a brief description of these industries.

Manufacturers of Planes and Parts

332312 – Fabricated Structural Metal Manufacturing
332912 – Fluid Power Valve and Hose Fitting Manufacturing
334519 – Other Measuring and Control Device Manufacturing
336411 – Aircraft Manufacturing
336412 – Aircraft Engine and Engine Parts Manufacturing
336413 – Other Aircraft Parts and Auxiliary Equipment Manufacturing
All Other – Includes 326211, 332510, 334511, 336321 and 336360.

Wholesalers and Retailers

423860 – Wholesaler: Transportation Equipment and Supplies (except Motor Vehicles)
441229 – Retailer: Other Motor Vehicle Dealers

Services, Sales and Leases

481000 – Air Transportation
488111 – Air Traffic Control
488119 – Other Airport Operations
488190 – Other Support Activities for Airport Transportation
532411 – Commercial Air, Rail and Water Transportation Equipment Rental and Leasing

For the static revenue estimate, the Pennsylvania DOR supplied the IFO with actual SUT remittances by firms in the above referenced NAIC codes as a basis to analyze the fiscal impact of the exemption. For certain industries, remittances were apportioned between aircraft and non-aircraft activity based on data from the 2002 or 2007 Economic Census. Those amounts were then combined with actual use tax remittances to derive the static reduction in SUT from the exemption. For fiscal year (FY) 2013-14, the IFO estimates a \$12.9 million (full-year impact, see Table 3) reduction in SUT. The analysis assumes that the reduction would grow by 4 percent per annum. As shown by the bottom of Table 3, roughly 55 percent of the impact is from sales or leases, 15 percent from parts and 30 percent from MRO services.

It is possible that some of the remittances included in the static revenue estimate would be retained under the exemption. However, it is also possible that other industries not included in the analysis remit minor amounts of SUT that would be foregone due to the exemption. For this estimate, the IFO assumes those amounts roughly offset.

V. Potential Economic Impact from Exemption

The static revenue estimate from Table 3 assumes that the SUT exemption has no impact on economic activity. However, it is likely that the six percentage point price reduction could enhance sales of aircraft, aircraft parts or MRO services.¹³ It is also possible that other taxable sales might increase as a result of the exemption.¹⁴ Either outcome should have a positive impact on industry sales and employment. To examine the potential economic implications from an exemption, the IFO considered employment trends in states that have recently enacted SUT exemptions. Those trends were compared to states that did not enact exemptions over the same time period. All else equal, the relative price reduction due to the exemption should increase industry sales and employment. The analysis only considers employment trends because a time series of retail sales is not available at the state level.

Although four states in proximity to Pennsylvania have recently enacted aviation related exemptions, the IFO was unable to locate any study that performed a statistical analysis of the impact of those exemptions. For reasons discussed below, it may not be possible to construct a dataset that would facilitate such an analysis. Executive agencies in New York and Massachusetts did publish reports, but the analysis was limited to survey data, which suffer from response bias and are not corroborated.¹⁵

¹³ The analysis assumes that the sales tax is fully passed forward to consumers and an exemption would reduce the after-tax price by the full amount of the tax.

¹⁴ For example, two years after New York exempted sales of private aircraft parts and services from sales tax, a survey of Fixed Base Operators (FBOs) reported an increase in taxable sales. "It may be that as FBO's experienced increased repair business as a result of the sales tax exemption, sales of other items not covered by the exemption increased as well." See "A Review of the Sales and Use Tax Exemption for Private Aircraft Parts and Service," New York Office of Tax Policy Analysis (May 2009). However, as noted by the study, the increase in taxable sales may have been due to factors other than the sales tax exemption.

¹⁵ Ibid. See "Impact of Aviation Related Tax Exemptions," Massachusetts Aeronautics Commission and the Massachusetts Airport Management Association (December 2005).

Table 3: Static Revenue Estimate

Manufacturers	Type 1/	Factor 2/	Historical Collections				Projected Collections 3/		
			2004-05	2007-08	2010-11	2011-12	2012-13	2013-14	2014-15
332312 - Landing Mats, Aircraft, Metal	P	2.8%	244	374	194	252	265		
332912 - Subassemblies, Valves, Hoses	P	20.4%	52	24	33	23	24		
334519 - Engine Instruments	P	13.7%	79	68	57	39	41		
336411 - General Manufacturing	S	100.0%	221	839	815	1,361	1,145		
336412 - Engine and Engine Parts	P	100.0%	154	96	168	95	100		
336413 - Other Aircraft Parts	P	100.0%	90	125	114	96	101		
Various - All Other 4/	P	Various	27	13	14	21	22		
Wholesalers and Retailers									
423860 – Trans. Equipment (except auto)	P	80.0%	328	365	226	375	376		
441229 - Other Motor Vehicle Dealers	S/P	50.0%	1,661	1,673	1,257	1,028	1,032		
General MRO Services (and Other)									
481000 – General Air Transportation	S	26.1%	553	586	728	817	840		
	P	11.5%	244	258	321	360	370		
	MRO	59.3%	1,257	1,332	1,654	1,857	1,908		
48811 – Airport Operations	S	41.9%	294	263	250	259	266		
	P	19.2%	135	121	114	119	122		
	MRO	36.4%	255	229	217	225	231		
488190 - Other Support Operations	S	1.9%	28	25	18	25	26		
	P	8.2%	123	108	79	109	112		
	MRO	89.6%	1,339	1,176	860	1,192	1,225		
Rental and Leasing									
532411 - Rental and Leasing	S	69.0%	373	502	690	690	716		
Resales and Use Tax									
Involuntary Remittances	S	100.0%	952	3,658	2,500	1,436	2,042		
Voluntary Remittances	S	100.0%	630	4,449	2,605	265	1,489		
TOTAL SALES			3,882	11,159	8,234	5,368	7,039	7,282	7,561
TOTAL PARTS			2,304	2,388	1,948	2,001	2,048	2,094	2,152
TOTAL MRO			<u>2,851</u>	<u>2,737</u>	<u>2,731</u>	<u>3,274</u>	<u>3,364</u>	<u>3,504</u>	<u>3,684</u>
TOTAL			9,037	16,284	12,914	10,642	12,450	12,879	13,398

1/ “S” represents sales of aircraft, “P” represents sales of parts and “MRO” represents maintenance, repair and overhaul services.

2/ Based on the Economic Census, the estimated share of SUT remittances that would be lost under the proposal.

3/ Projected industry (nominal) growth rates from IHS Global Insight were used. For Resales and Use Tax, two-year average (2010-11 and 2011-12) was used as the basis for projections.

4/ Includes NAIC 326211, 332312, 332510, 334511, 336321 and 336360. See technical appendix for definitions.

Source: Pennsylvania Department of Revenue.

Comparison of State Employment Trends

Table 4 presents employment trends for aircraft manufacturers (NAIC 336411-13), wholesalers (NAIC 423860), retailers (NAIC 441229) and MRO service providers (NAIC 488190 and 488119) for Pennsylvania, the U.S. and 15 states. The table depicts average annual growth rates over two time periods: 1999-2011 and 2005-2011. The time periods were selected based on the earliest year that relevant data were available. For example, the earliest year that FAA active aircraft registrations are available is 1999, which determines the earliest year used in the analysis. The second time period splits that 12-year interval in half. This presentation facilitates a comparison of long-run and more recent employment trends since certain states have enacted SUT exemptions. The exemptions mainly apply to aircraft parts and MRO services; therefore any impact should be more visible for those industries. Overall, a simple comparison of state employment trends between states that have recently enacted an SUT exemption for aircraft (“policy change” states) and those that have not does not reveal any notable differences.

For the manufacturing sector, Pennsylvania has registered impressive employment gains recently. Although some portion of those gains is due to the creation of the Sikorsky Global Helicopters business unit, the manufacturing sector also recorded significant gains prior to that event.^{16 17} For the 2005-11 time period, the average annual growth rate for Pennsylvania (5.8 percent) exceeds every state included in the analysis except North Carolina (8.6 percent), and both states fully tax fixed-wing aircraft sales, parts and MRO services. A comparison of employment trends does not reveal any notable pattern in policy change states versus other states.

The wholesale and retail sectors are much smaller across all states. Nationally, employment in those industries are each roughly five to ten percent the size of the manufacturing sector as defined by this analysis. For the U.S., employment growth has been largely stagnant regardless of the time period used. For Pennsylvania, both sectors registered job attrition at an average rate of five percent per annum since 2005. Similar to manufacturers, employment trends for policy change states do not appear to differ appreciably from national trends or other states.

Recent policy changes should have the greatest impact on the MRO services industry. Three policy change states (MA, CT and NY) completely exempted parts and labor from SUT for commercial and private aircraft; the fourth (OH) enacted a partial exemption. The exemptions could benefit both residents and non-residents. For example, residents in states without an exemption might be unaware of their use tax obligation and cross state lines to reduce tax liability. For major overhaul work, the savings from the tax exemption could be significant.

For this analysis, two industry measures of MRO service were used. The first measure only includes the Other Support Industry (NAIC 488190), and is largely comprised of firms that supply MRO services. The

¹⁶ In February 2009, Sikorsky Aircraft Corporation announced the creation of a new business unit, Sikorsky Global Helicopters, to be located in Coatesville, Pennsylvania. The new unit expanded production through late 2009 and 2010 at an existing Pennsylvania production facility. A helicopter SUT exemption was formally enacted in October 2009. Hence, it is not possible to definitively attribute the employment gains from the new unit to the SUT exemption. The analysis does not consider Pennsylvania to be a “policy change” state because it did not change tax policy with regards to fixed-wing aircraft.

¹⁷ See the February 23, 2009 press release at www.sikorsky.com.

second measure is broader and also includes Other Airport Support (NAIC 488119), which consists of fixed based operators that supply maintenance services, as well as other airport support services. While possibly overly restrictive, this analysis considers the first measure to provide a more accurate depiction of the industry using data that are publicly available.

Since 2005, both industry definitions registered job losses for Pennsylvania. By contrast, U.S. employment increased. Employment trends for policy change states do not appear significantly different than national or regional trends. While New York and Connecticut recorded job losses or stagnant growth, Massachusetts and Ohio registered job gains.

The final columns of Table 4 provide average annual growth rates for FAA registrations of active general aviation aircraft. Since 2005, the number of active aircraft registered with the FAA has declined slightly both nationally and for Pennsylvania. This is likely due to the impact of the 2008-09 recession. State aircraft registration data for 2011 should be released Spring 2013. See the technical appendix for a time series of registrations across all fifty states.

Table 4: Aircraft Industry, Average Annual Employment Growth Rates

	Policy Change?	Manufacturing 1/ <u>1999-11</u> <u>2005-11</u>		Wholesalers 2/ <u>1999-11</u> <u>2005-11</u>		Retailers 3/ <u>1999-10</u> <u>2005-10</u>	
		PA and Surrounding States					
PA 4/	no 5/	-0.5%	5.8%	-1.2%	-5.1%	2.0%	-5.2%
NY 4/	2005	0.2%	0.6%	-2.7%	-1.1%	0.7%	-1.3%
NJ	no	-1.1%	3.7%	-2.5%	-3.3%	11.8%	5.9%
MD	no	nd	nd	-1.5%	-1.1%	5.5%	11.0%
OH	2009	-0.8%	1.1%	-1.7%	-5.3%	-1.9%	-11.1%
New England							
ME	2011	nd	nd	nd	-1.6%	0.3%	-4.9%
NH	no SUT	1.7%	0.2%	1.3%	6.8%	-0.6%	-6.6%
MA 4/	2002	-1.4%	-0.6%	0.7%	-1.9%	-4.2%	-6.1%
CT	2007	-1.0%	0.2%	1.5%	3.2%	-3.7%	-11.6%
US and Other States							
VA 4/	no	-3.4%	-2.7%	-1.5%	-1.7%	2.9%	-0.6%
NC	no	5.5%	8.6%	-2.1%	-5.4%	6.2%	3.5%
MI	no	-4.1%	2.5%	2.4%	1.5%	-1.7%	-7.7%
IL	no	0.0%	2.8%	-3.5%	-2.1%	1.0%	4.1%
IN	no	-2.1%	-0.2%	-3.6%	1.5%	6.1%	4.6%
GA	no	4.9%	2.8%	1.1%	3.3%	3.5%	6.9%
WI 4/	no	4.0%	-0.1%	1.0%	1.0%	-4.6%	-8.1%
US	n/a	-1.1%	1.3%	-0.7%	0.1%	1.3%	-1.3%

Note: ND denotes that the data are not disclosed due to the Bureau of Labor Statistics confidentiality standards.

Note: VT, RI, WV and DE were not included because data are non-disclosable for most industries.

1/ Includes NAIC 336411, 336412 and 336413. Includes eventual sales to taxable and tax-exempt (i.e., government) entities.

2/ NAIC 423860. The industry also sells other transportation related goods such as golf carts and snowmobiles.

3/ NAIC 441229, data through 2010 only. The industry also sells other transportation related goods such as snowmobiles and trailers.

4/ Due to data missing for certain years, manufacturing growth rates also reflect NAIC 336419, which typically comprises a minor portion of all aviation manufacturing for most states. Data for MA only reflects NAIC 336412 and 336413.

5/ In October 2009, Pennsylvania did enact an SUT exemption for helicopter sales, parts and repair, but not fixed-wing aircraft.

Table 4: Aircraft Industry, Average Annual Employment Growth Rates (Continued)

	Policy Change?	MRO Services - Narrow 1/		MRO Services - Broad 2/		Registrations 3/	
		<u>1999-11</u>	<u>2005-11</u>	<u>1999-11</u>	<u>2005-11</u>	<u>1999-10</u>	<u>2005-10</u>
PA and Surrounding States							
PA	no	5.6%	-1.9%	0.0%	-4.5%	-0.6%	-0.1%
NY	2005	3.2%	-0.7%	-1.5%	-1.6%	0.2%	3.5%
NJ 4/	no	-0.2%	1.3%	-0.6%	1.4%	-2.4%	-5.6%
MD	no	9.8%	1.3%	1.0%	-0.1%	-1.7%	-2.3%
OH	2009	2.2%	7.4%	1.9%	5.9%	-2.2%	-2.6%
New England							
ME	2011	1.4%	-0.4%	0.2%	-0.2%	-0.2%	-0.3%
NH 4/	no sales tax	0.0%	-5.9%	nd	-1.7%	-1.3%	0.5%
MA	2002	-0.7%	0.4%	1.8%	5.4%	-0.7%	-1.6%
CT	2007	-1.4%	-1.0%	-0.4%	0.4%	-1.2%	-5.9%
US and Other States							
VA	no	8.0%	5.6%	5.5%	2.8%	2.5%	2.4%
NC	no	2.4%	-1.5%	1.4%	-0.9%	0.4%	-1.4%
MI 4/	no	-1.2%	-3.1%	0.1%	-0.5%	-1.7%	-0.5%
IL 4/	no	3.7%	2.5%	3.2%	4.3%	-1.8%	-0.6%
IN 4/	no	11.2%	13.7%	2.2%	1.4%	-3.4%	-4.6%
GA	no	0.3%	-1.9%	1.4%	-1.3%	1.9%	1.7%
WI 4/	no	1.8%	15.6%	0.8%	4.9%	0.3%	1.7%
US	n/a	2.6%	2.3%	1.5%	1.3%	0.2%	-0.1%

Note: ND denotes that the data are not disclosed due to the Bureau of Labor Statistics confidentiality standards.

Note: VT, RI, WV and DE were not included because data are non-disclosable for most industries.

1/ NAIC 488190 only.

2/ Includes both NAIC 488190 and 488119.

3/ FAA Active Aircraft. Data available through 2010 only.

4/ NAIC 48811 used as proxy for NAIC 488119. For U.S., NAIC 488119 comprises 95 percent of NAIC 48811 employment.

Statistical Analysis of Employment Trends

Although comparisons of employment trends are straightforward, they do not control for relevant factors that might vary across states and affect employment trends, such as the number of registered aircraft or economic conditions. They also do not control for the specific year that an SUT exemption becomes effective. A more complete analysis of the impact of the SUT exemption on industry employment would attempt to control other factors that might impact employment levels. For this purpose, the IFO constructed a dataset of the states listed in Table 4 for 2000-2011 to be used in a panel regression model. Regression models attempt to isolate the impact of an independent economic (e.g., GDP) or policy variable (e.g., tax rate) on a dependent variable (e.g., employment in a specific industry) that economic theory suggests they should affect.

While it is possible that the SUT exemption could impact various industries, the analysis assumes that the impact should be strongest for MRO services. As noted, three of the four policy change states enacted full SUT exemptions for parts and MRO services. Those exemptions could both retain resident purchases as well as attract non-residents from states that do not have an exemption. The analysis considers employment trends in two industries: (1) a narrow definition of MRO services (NAIC 488190 only), and (2) a broad definition of MRO services (NAIC 488190 and 488119).¹⁸ Explanatory variables (state specific) include the number of registered aircraft (lagged one year), gross state product (GSP, to control for economic growth), a year-specific dummy, and the effective sales tax rate. If an SUT exemption takes effect, then the state sales tax rate equals zero. For states that do not change policy but already exempt parts and MRO services (ME, RI, GA, NH), the tax rate is also equal to zero. For states that partially exempt parts or MRO services, an average effective tax rate was used depending on the scope of the exemption. Local sales taxes are also included in the rate.¹⁹ For this simple model, it is expected that the number of registered aircraft and gross state product would be positively related to industry employment, and the tax rate would be negatively related. This modeling attempts to isolate the impact of the sales tax rate on employment levels while controlling for the impact of other pertinent factors such as the number of registered owners and general economic growth.

Specifically, the regression equation takes the following form.²⁰ The two subscripts denote the state and the year:

$$Employment_{i,t} = \alpha + \beta_1 GSP_{i,t} + \beta_2 Registrations_{i,t} + \beta_3 Tax Rate_{i,t} + \beta_4 Year_t + \varepsilon_{i,t}$$

Although the independent variables generally had the predicted impact on employment, only the GSP variable was found to have statistical significance. Hence, the regression was unable to identify a

¹⁸ The combined wholesale-retail industries (NAIC 423860 and 441229) were also examined, but due to their much smaller size, any analysis is more difficult.

¹⁹ To capture the impact of any local sales tax, the state tax rate was grossed up by the ratio of state sales tax collections to the sum of state and local tax collections by state based on data from the U.S. Census Bureau. For states that provide an exemption for labor but not parts, the effective rate is equal to one-third of the statutory rate. For states that only exempt parts and MRO services for aircraft above a specified weight, the effective rate was set equal to one half the statutory rate. Effective tax rates were informed by data supplied or published by an industry source.

²⁰ A log transformation was also used.

statistically significant relation between SUT rates and industry employment. There are many technical factors that might explain this result. For example, it is possible that the employment data used by the analysis were insufficiently refined to isolate the impact of the policy change. Alternatively, the treatment of the tax rate variable for states that provide partial exemptions might not accurately reflect its true impact. All else equal, a roughly four to six percent price reduction from SUT exemption should increase demand for a product or service and thereby stimulate employment. Due to the significant outlays associated with aircraft parts and services, it seems likely that consumers would be fairly responsive to price differentials.

It is not unusual for analytical models to be unable to establish a link between tax rates and sales or employment. On January 1, 1991, a ten percent federal luxury excise tax was enacted on private boats, cars, aircraft, jewelry and furs over a specified price level. A General Accountability Office (formally known as the General Accounting Office) report that analyzed the impact of the excise tax on sales “could not disentangle the effects of (economic) factors from the effect of the tax and therefore could not quantify the tax effects.” The report further noted that “while some portion of the decline in sales during 1991 may have resulted from the price effect of the luxury excise tax, it is likely that other factors also significantly affected these markets.”²¹

Alternative Methodology: SUT Due on Parts and MRO Services

An alternative method to gauge the potential economic impact from exemption is to compare actual SUT remittances with total projected SUT liability, both amounts collected and uncollected. A significant shortfall might imply that Pennsylvania owners travel out of state for parts and MRO services and fail to remit use tax. An SUT exemption might be sufficient to retain some portion of those out-of-state expenditures. Using the total number of registered aircraft in Pennsylvania, and estimates for average hours flown and average maintenance costs per hour flown, it is possible to derive projected parts and MRO expenditures if all registered aircraft owners purchased parts and MRO services in Pennsylvania. It is noted that this alternative methodology is subject to a high degree of uncertainty since the computation must make numerous assumptions. The computation merely provides additional context for the potential economic impact of the SUT exemption.

Table 5 displays industry-supplied data for average hours flown, average maintenance costs per hour flown and average annual maintenance costs by type of aircraft. Aircraft maintenance costs vary greatly depending on aircraft size and engine type. Industry data suggest that average annual maintenance costs can range from \$16,000 for a light aircraft with a single piston engine to \$482,000 for a large jet.²² These costs include charges for labor, parts, inspections, engine restore, and component overhaul. Most general aviation aircraft have piston engines and do not have the high maintenance costs associated with jets. For 2012, FAA registration data for Pennsylvania reveal the following shares by type of aircraft: 85 percent

²¹ See “Luxury Excise Tax Issues and Estimated Effects,” General Accountability Office (February 1992), GAO/GGD-92-9.

²² Industry data are from Conklin and de Decker.

piston engine, 2 percent turbo-prop engine, 1 percent turbo-jet engine, 3 percent turbo-fan engine, and the residual share largely distributed among the various piston engine categories.²³

Combining the FAA data that details aircraft registrations by type of aircraft with average annual maintenance costs implies annual maintenance and parts expenditures of \$230 million by aircraft owners. If accurate, then the implied SUT liability on those expenditures would be roughly \$14 million. The static revenue estimate projects \$5 million of SUT collections on parts and MRO services, \$9 million less than total computed liability.²⁴ The differential implies that much SUT liability related to aircraft parts and MRO might not be remitted. This could occur if owners have MRO services performed out of state and are unaware of their use tax liability.

	Total Maintenance Cost per Hour	Typical Annual Hours	Annual Maintenance Budget
Piston Single Engine	\$80	200	\$16,000
Large Piston Single Engine	162	200	32,400
Light Twin Engine Piston	201	200	40,200
Large Twin Engine Piston	253	200	50,600
Single Engine Turboprop	387	400	154,800
Light Twin Engine Turboprop	515	400	206,000
Twin Engine Turboprop	287	400	114,800
Light Jet	618	400	247,200
Mid-Size Jet	1,006	400	402,400
Large Jet	1,205	400	482,000
Maintenance costs include labor, parts, inspection, restores and overhauls.			
Dollar amounts are rounded.			
Source: Conklin & de Decker Associates Inc.			

If the computed shortfall in SUT liability is reasonable, then total sales associated with the liability shortfall would equal \$150 million (\$9 million divided by six percent). However, data from the FAA suggest that average hours flown by registered owners in Pennsylvania is closer to 100-

120 hours, roughly one half the amount from Table 5 for the majority of affected aircraft.²⁵ A fifty percent reduction implies total sales of \$75 million. If that figure is reasonably accurate, then it is likely that a six percentage point reduction in price would recoup only a portion of those sales.²⁶

It is not clear what impact the SUT exemption would have on resident owners who purchase parts and MRO services out of state. The IFO was unable to locate any studies that quantify the responsiveness of

²³ FAA Aircraft Registry, see http://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/releasable_aircraft_download/.

²⁴ The computation assumes that all current collections are from Pennsylvania residents. It also assumes that FAA registered aircraft represent the entire universe of planes that require parts and MRO that could benefit from an SUT exemption.

²⁵ See "2010 General Aviation and Air Tax Number of Active Aircraft and Total Hours Flown by FAA Region and State Aircraft Primarily Flown," FAA General Aviation and Part 135 Activity Surveys.

²⁶ As noted, the analysis assumes that the exemption would reduce the effective price by the full amount of the tax.

aircraft owners to parts and MRO prices. Due to the lack of empirical evidence, the IFO elected not to extend this computation. The analysis is best used to provide an upper bound on the economic impact. If the analysis from the preceding paragraph is reasonable, then sales would likely increase by less than \$75 million. That implicitly assumes that the exemption would not attract non-resident owners to Pennsylvania. Although the exemption could attract non-residents, Pennsylvania is one of the last states in the region to enact such an exemption.

VI. Revenue Neutrality Analysis

As shown in Table 3, total SUT revenue from the purchase of aircraft, aircraft parts and MRO services is projected to equal \$12.5 million for FY 2012-13. This section estimates the number of direct (affected industries) and indirect (all other industries) jobs that must be generated to offset the projected static revenue loss. To simplify computations, the analysis only considers any personal income and SUT tax revenues that would be generated by additional employment.

(\$ millions)	
Static Revenue Loss	\$12.5
Increase to Personal Income Needed to Offset Loss	\$265.0
Associated PIT Revenues – Wage Income	\$7.3
Associated PIT Revenues – Business Income	\$0.8
Associated SUT Revenues	\$4.4
Direct Employment: Average Wage	\$50,800
Indirect Employment: Statewide Average Wage	\$49,900
Multiplier: Direct to Indirect Jobs	1 to 1.3
Direct Jobs	2,060
Indirect Jobs	2,680
Total Jobs Required for Neutrality	4,740

Under reasonable assumptions, an approximate \$265 million increase in personal income could be expected to generate \$8.1 million of personal income tax revenue (3.07 percent rate) and \$4.4 million of sales tax (six percent rate), yielding a total of \$12.5 million in tax revenue.²⁷ (The analysis assumes that the change in personal income is comprised of wage income (90 percent) and business income or profits (10 percent).²⁸) Hence, if the proposal generates an additional \$265 million in personal income, then the static revenue loss to the Commonwealth would be offset. Two

additional pieces of information are required to determine the number of jobs necessary to generate an additional \$265 million of personal income. First, the average wage in the affected industry and the statewide average wage must be known. Data from the BLS Quarterly Census of Employment and Wages show that the weighted average wage for an MRO service provider (NAIC 488190) was \$48,400 for 2011, while the statewide average wage for all industries is \$47,500. The analysis assumes that average wages would be five percent higher by 2013. Second, the analysis must specify the ratio of direct to indirect jobs created. In other words, if one new job is created in the aircraft industry due to the

²⁷ The sales tax computation assumes that the (1) combined federal and state income and payroll taxes equal 18 percent of personal income, (2) new employees spend 95 percent of their (after-tax) disposable income, and (3) 35 percent is spent on taxable items. The share spent on taxable items is based on data from the U.S. Bureau of Labor Statistics Consumer Expenditure Survey.

²⁸ Tax return data show that business income comprises 10 percent of all taxable income for Pennsylvania residents. The analysis assumes this relation holds for any new jobs generated by the exemption.

exemption, how many other jobs would be created indirectly due to increased industry demands for inputs and spending by the new employee? This is known as the “multiplier effect.” Data from the U.S. Department of Commerce suggests a ratio of 1.0 to 1.3.²⁹

Once these inputs are known, it is straightforward to derive the number of direct and indirect jobs that the exemption must generate to create an additional \$265 million of personal income and \$12.5 million in tax revenues. As shown by Table 6, the analysis finds the required number of direct jobs to be 2,060 and the number of indirect jobs to be 2,680. If the wage assumptions from Table 6 are lower (higher), then revenue neutrality requires more (fewer) jobs. However, changing the direct employment multiplier would not generally alter the number of jobs required for revenue neutrality; it merely changes the mix between the number of direct and indirect jobs required.

VII. Summary of Findings

This brief report analyzes the potential impact of a proposed SUT exemption for aircraft sales, parts and MRO services for Pennsylvania. Although Pennsylvania remains one of the only states in the Northeast and Mid-Atlantic regions to fully tax commercial and private aircraft parts and MRO services, most states continue to tax aircraft sales and leases.

Over the past decade, four states in proximity to Pennsylvania have enacted partial or full SUT exemptions for aircraft parts and MRO services: New York, Massachusetts, Connecticut and Ohio. An analysis of employment trends is not able to discern any statistically significant impact on employment levels due to the enactment of an SUT exemption. However, due to the absence of well-defined industry data over time and across states, as well as other technical issues, it is possible that the data used for this analysis were insufficiently refined to allow the isolation of any impact due to policy changes. Purchases of aircraft, parts and MRO services have qualities that suggest consumers would be responsive to prices: (1) the purchases represent significant outlays, (2) there are relatively close alternatives available (i.e., a competitive market) and (3) MRO expenses are incurred on a fairly regular and predictable basis and can be anticipated (and planned) by owners.

Although aircraft owners might be relatively sensitive to prices and the exemption is likely to increase demand for parts and MRO services, the magnitude of that increase is unclear. If enacted, Pennsylvania would be one of the last states in the region to exempt parts and MRO services. Hence, it seems likely that the strongest effect of the exemption would be the retention of residents who might otherwise purchase parts and services out of state. A simplified computation suggests that many parts and MRO services might be purchased out of state. If accurate, it is not known to what extent an SUT exemption would encourage resident owners to purchase parts and services in Pennsylvania.

²⁹ A direct employment multiplier is not available for aircraft MRO service providers. The analysis uses the multiplier for Commercial and Industrial Machinery Equipment Repair and Maintenance (NAIC 811300). Data from BLS show that employees of that industry earn a wage similar to MRO service providers.

Technical Appendix

Industries were selected for use in this analysis based on the 2007 North American Industry Classification System (NAICS). This appendix contains additional detail regarding the industries included in the analysis.

Manufacturing Planes and Parts

NAICS 326211 – Tire Manufacturing (except Retreading) – Comprises establishments primarily engaged in manufacturing tires and inner tubes from natural and synthetic rubber.

NAICS 332312 – Fabricated Structural Metal Manufacturing – Comprises establishments primarily engaged in fabricating structural metal products, such as assemblies of concrete reinforcing bars and fabricated bar joists.

NAICS 332510 – Hardware Manufacturing – Comprises establishments primarily engaged in manufacturing metal hardware, such as metal hinges, metal handles, keys, and locks (except coin-operated, time locks).

NAICS 332912 – Fluid Power Valve and Hose Fitting Manufacturing – Comprises establishments primarily engaged in manufacturing fluid power valves and hose fittings.

NAICS 334511 – Search, Detection, Navigation, Guidance, Aeronautical and Nautical System and Instrument Manufacturing – Comprises establishments primarily engaged in manufacturing search, detection navigation, guidance, aeronautical and nautical systems and instruments. Examples of products made by these establishments include aircraft instruments (except engine), flight recorders, navigational instruments and systems, radar systems and equipment and sonar systems and equipment.

NAICS 334519 – Other Measuring and Control Device Manufacturing – Comprises establishments primarily engaged in manufacturing measuring and controlling devices (except search, detection, navigation, guidance, aeronautical and nautical instruments and systems; automatic environmental controls for residential, commercial and appliance use; instruments for measurement, display and control of industrial process variables; totalizing fluid meters and outing devices; instruments for measuring and testing electricity and electrical signals; analytical laboratory instruments; watches, clocks and parts; irradiation equipment; and electromedical and electrotherapeutic apparatus).

NAICS 336321 – Vehicular Lighting Equipment Manufacturing – Comprises establishments primarily engaged in manufacturing vehicular lighting fixtures.

NAICS 336360 – Motor Vehicle Seating and Interior Trim Manufacturing – Comprises establishments primarily engaged in manufacturing motor vehicle seating, seats, seat frames, seat belts, and interior trimmings.

NAICS 336411 – Aircraft Manufacturing – Comprises establishments primarily engaged in one or more of the following: (1) manufacturing or assembling complete aircraft; (2) developing and making aircraft prototypes; (3) aircraft conversion (i.e., major modifications to systems); and (4) complete aircraft overhaul and rebuilding (i.e., periodic restoration of aircraft to original design specifications).

NAICS 336412 – Aircraft Engine and Engine Parts Manufacturing – Comprises establishments primarily engaged in one or more of the following: (1) manufacturing aircraft engines and engine parts; (2) developing and making prototypes of aircraft engines and engine parts; (3) aircraft propulsion system conversion (i.e., major modifications to systems); and (4) aircraft propulsion systems overhaul and

rebuilding (i.e., periodic restoration of aircraft propulsion system to original design specifications).

NAICS 336413 – Other Aircraft Parts and Auxiliary Equipment Manufacturing – Comprises establishments primarily engaged in (1) manufacturing aircraft parts or auxiliary equipment (except engines and aircraft fluid power subassemblies) and/or (2) developing and making prototypes of aircraft parts and auxiliary equipment. Auxiliary equipment includes such items as crop dusting apparatus, armament racks, inflight refueling equipment, and external fuel tanks.

Wholesalers and Retailers

NAICS 423860 – Transportation Equipment and Supplies Wholesaler (except Motor Vehicles) – Comprises establishments primarily engaged in the merchant wholesale distribution of transportation equipment and supplies (except marine pleasure craft and motor vehicles).

NAICS 441229 – Other Motor Vehicle Dealers – Comprises establishments primarily engaged in retailing new and/or used aircraft, utility trailers and other vehicles (except automobiles, light trucks, recreational vehicles, motorcycles, boats, motor scooters, motorbikes, off-road all-terrain vehicles, and personal watercraft) or retailing these new vehicles in combination with activities, such as repair services and selling replacement parts and accessories.

Services, Sales and Leases

NAICS 481000 – Air Transportation – Industries in the Air Transportation subsector provide air transportation of passengers and/or cargo using aircraft, such as airplanes and helicopters.

NAICS 488111 – Air Traffic Control – Comprises establishments primarily engaged in providing air traffic control services to regulate the flow of air traffic.

NAICS 488119 – Other Airport Operations – Comprises establishments primarily engaged in (1) operating international, national, or civil airports, or public flying fields or (2) supporting airport operations, such as rental of hangar space, and providing baggage handling and/or cargo handling services.

NAICS 488190 – Other Support Activities for Airport Transportation – Comprises establishments primarily engaged in providing specialized services for air transportation (except air traffic control and other airport operations).

NAICS 532411 – Commercial Air, Rail and Water Transportation Equipment Rental and Leasing – Comprises establishments primarily engaged in renting or leasing off-highway transportation equipment without operators, such as aircraft, railroad cars, steamships, or tugboats.

FAA Number of Active Aircraft

	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>1/ 2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
Alabama	3,227	3,480	3,012	3,423	3,249	3,712	3,495	4,477	3,719	3,549	3,145	5,095
Alaska	6,122	5,925	5,714	5,718	5,489	6,207	6,217	6,201	6,111	6,076	6,017	6,113
Arizona	5,432	6,062	6,707	5,506	5,072	6,607	5,867	6,438	7,636	5,767	6,896	7,531
Arkansas	3,146	2,660	2,730	2,807	3,286	2,621	2,467	2,382	2,575	2,291	2,661	3,028
California	24,760	23,454	22,708	24,448	23,501	23,700	25,337	23,854	23,813	25,292	24,811	22,830
Colorado	6,004	5,246	5,104	5,625	5,343	5,222	5,755	5,623	5,441	6,268	4,973	5,483
Connecticut	1,798	1,793	1,573	1,597	1,790	1,780	2,120	2,090	2,296	2,228	1,868	1,566
Delaware	1,485	2,068	1,938	1,957	2,256	2,365	2,596	2,409	2,494	1,830	2,261	1,934
Florida	15,301	14,096	14,773	13,188	14,236	15,385	15,776	14,226	16,341	16,143	16,804	16,126
Georgia	4,756	4,809	5,324	6,098	4,981	5,490	5,381	5,762	4,758	6,674	5,970	5,843
Hawaii	378	435	282	356	414	331	481	619	531	530	499	741
Idaho	1,721	2,328	2,504	2,548	2,156	2,193	2,664	2,786	2,747	2,816	3,282	2,860
Illinois	7,469	7,478	6,041	5,976	5,895	6,942	6,283	5,841	6,872	5,480	6,786	6,112
Indiana	4,611	3,964	4,143	3,574	4,550	4,173	3,987	3,909	4,862	3,764	4,008	3,151
Iowa	2,675	2,772	3,156	2,742	2,899	3,035	2,943	2,798	2,982	3,361	2,935	2,629
Kansas	3,821	3,611	3,361	3,122	3,141	3,750	3,330	3,393	3,044	3,814	3,805	3,547
Kentucky	1,868	2,033	2,191	2,109	2,165	1,870	1,778	1,497	2,073	1,726	1,780	2,082
Louisiana	3,761	3,012	2,355	2,488	2,886	2,721	3,030	2,393	2,857	3,136	2,970	3,512
Maine	1,378	1,086	1,207	913	1,210	1,238	1,370	948	1,463	1,284	1,230	1,347
Maryland	3,342	3,436	2,784	2,367	3,214	2,550	3,123	2,317	2,699	2,671	2,971	2,774
Massachusetts	2,635	2,717	2,600	2,843	2,580	2,985	2,636	2,655	2,738	2,417	2,539	2,426
Michigan	7,379	7,236	6,234	7,375	5,694	6,975	6,274	6,229	6,443	8,668	6,068	6,112
Minnesota	4,994	5,141	5,928	5,229	4,241	4,861	5,728	5,414	5,086	4,840	5,187	4,690
Mississippi	1,850	2,038	1,893	1,811	2,198	2,563	2,068	2,159	1,939	1,298	2,237	2,543
Missouri	4,144	3,777	3,503	3,893	3,919	3,902	3,774	4,312	4,616	3,596	4,119	3,847
Montana	2,398	2,374	2,180	2,324	2,274	2,200	2,408	2,911	3,110	2,152	2,576	2,536
Nebraska	2,167	2,013	1,919	1,729	1,734	1,936	2,109	2,057	2,127	2,074	2,314	2,076
Nevada	2,405	2,715	2,563	2,427	2,034	3,033	2,990	3,374	3,512	3,093	2,022	2,030
New Hampshire	1,519	1,485	1,753	1,455	1,472	1,566	1,282	1,320	1,425	1,624	1,361	1,316
New Jersey	3,871	3,791	3,917	3,647	3,341	3,466	3,944	3,683	3,369	4,076	3,232	2,954
New Mexico	2,254	2,990	2,486	2,272	2,784	3,088	3,076	3,375	4,221	3,519	2,663	3,411
New York	6,349	6,082	5,570	6,180	6,205	5,959	5,437	5,829	5,661	6,074	5,577	6,457
North Carolina	5,621	5,620	5,272	5,727	5,830	5,602	6,298	6,106	5,917	5,376	6,004	5,883
North Dakota	933	1,585	1,434	1,224	1,322	812	1,350	1,533	1,236	1,276	1,101	1,366
Ohio	7,451	6,486	7,325	6,719	7,391	6,458	6,630	7,108	6,189	6,200	6,329	5,823
Oklahoma	4,479	4,080	3,421	3,693	3,770	4,347	3,910	4,734	4,021	4,911	4,229	4,794
Oregon	5,084	4,687	4,955	5,219	4,669	5,384	5,029	4,800	6,029	4,614	5,234	5,200
Pennsylvania	6,455	5,648	5,825	5,806	5,590	6,281	6,041	5,865	5,881	7,410	6,539	6,012
Rhode Island	347	393	232	294	384	383	523	320	243	299	234	352
South Carolina	2,237	2,689	2,152	2,422	2,505	2,271	2,690	2,236	3,214	2,845	2,425	2,634
South Dakota	1,344	1,376	971	1,331	960	1,156	1,281	1,293	1,143	1,554	1,843	1,024
Tennessee	3,731	4,228	3,610	3,912	3,909	3,906	4,148	4,156	4,286	4,438	3,820	3,993
Texas	15,681	18,869	17,564	16,915	16,889	17,999	18,338	18,415	20,235	18,117	19,416	17,595
Utah	1,561	1,673	1,653	1,805	1,316	1,923	1,936	1,856	2,057	2,583	1,859	2,298
Vermont	698	600	546	698	565	726	514	636	431	628	553	603
Virginia	3,946	3,354	4,451	4,524	4,472	4,455	4,590	4,809	4,642	5,605	3,961	5,178
Washington	6,834	7,166	6,666	6,043	6,143	6,623	7,154	7,042	7,722	7,198	6,604	7,585
West Virginia	901	1,075	1,071	1,196	862	888	1,208	957	1,101	1,247	1,160	1,292
Wisconsin	5,524	4,649	4,667	4,639	4,944	4,226	5,244	5,290	5,872	3,911	5,134	5,694
Wyoming	1,144	778	1,030	906	1,501	1,166	1,125	1,241	1,287	1,493	1,299	836
Total	218,991	217,063	210,998	210,820	209,231	219,032	223,735	221,678	231,067	227,836	223,311	222,864

1/ Beginning in 2007, the survey asked the state in which the aircraft was "primarily flown" rather than where the aircraft was "based."

Source: FAA General Aviation and Part 135 Activity Surveys.