

ECONOMIC  
FORECASTING  
CENTER

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July 14, 2009

Mr. Richard Marsh  
Director of Treasury Services/Treasurer  
MARTA  
2424 Piedmont Road, NE  
Atlanta, GA 30324

**Re: Sales Tax Projections for FY2010-FY2040**

Dear Mr. Marsh:

Enclosed is our analysis of MARTA's sales and use tax revenues. Monthly projections are included for calendar years 2009 to 2016, quarterly projections are included for 2009q3 to 2017q4, and annual projections are included through FY2040. To make these projections, we have used the Economic Forecasting Center's model to generate revenue estimates for MARTA's operating purposes.

Since the last report in January, the economic situation at the national level continues to remain very weak, as ongoing job losses, anemic home and auto sales and weak international trade dampen economic growth and activity. However, there have been a number of emerging positive signs, such as a recent climb in consumer confidence index and the double-digit stock market gains from its low in mid-March: the so called "green shoots" of recovery. But maturing of new shoots into full-fledged grain stalks is not automatic, and this growth process is fraught with too many "ifs". To continue the analogy, there needs to be enough moisture in the soil (consumers' willingness to spend), treatment with fertilizers (corporate investment), careful nurturing (working relationship between private capital and the government), and avoiding frost at the early stage (no more Black Swan events like Lehman and AIG failures of last fall). Moreover, the "green shoots" must also fight the excess salinity in the soil (toxic securities and loans that have gummed up the banking system) just to survive.

The last two GDP reports had real GDP dropping at an annual rate of about 6%, but consumption growth was a positive 1.4% in the first quarter after two consecutive negative quarters. This uptick in consumption, however, was primarily due to data from only one month, January, and is likely attributable to post-Christmas clearance and liquidation sales. Unfortunately, spending could not be sustained (at reasonable rates) in later months as consumers' incomes have been shrinking for the past several months. Thus, the rise in the consumer confidence will not impact retail sales if current cash flows (paychecks) are still declining. The rising stock market also fails to make up for the severely depressed value of consumers' biggest component of wealth: their homes. Add in still rising foreclosure

rates that will keep home prices depressed for the coming few years, and the pressure on the deteriorating wealth position of homeowners is severe.

Thus, the prognosis is negative for coming quarters, too, notwithstanding the stimulus efforts of the Federal government. The real GDP growth will turn positive by 2010q2, marking the end of the recession in technical terms, but the ensuing recovery will be very anemic. After retreating 3.4% in 2009, real GDP growth will still be a negative 0.2% in 2010. In 2011, real GDP will grow by a subpar 1.8%. Forecasted consumer spending will be very weak during the so called "recovery". For example, auto sales will barely average 13 million units even in 2011 (a substantial moderation from 17-million level seen in 2006), and new residential construction will remain below the one-million unit threshold until 2012.

Meanwhile, the labor market continues to hemorrhage, with the economy losing another 467,000 jobs in June for a total loss of about 6.5 million jobs since the beginning of the recession in December 2007. Unfortunately, the losses won't stop there. The situation in the labor market will continue to deteriorate, as another 1.5 million jobs will be shed by mid-2010, making for a total of almost 8.0 million job losses in this recession. This recession cycle is going to be particularly severe in one respect: the corporate job loss rate (jobs in Professional & Business Services sector). During the 2001 recession, the corporate job loss rate was 4.8%, which made for a very severe white collar recession. This time around we're looking at a corporate job loss rate of more than 8%, which is one quarter of the total job losses, and will impact the convention and hospitality industry adversely. The labor market will finally show some job growth by late 2010, when job additions average 40,000 jobs per month, which is very anemic to support healthy consumer spending on activities that generate sales tax collections: autos, household consumer goods, recreation and tourism, and home improvements.

At the local level, while metro Atlanta was once insulated from the "headwinds" of the national economy through the Olympic buildup, corporate relocations, the growth of Delta and investments in hotel and convention facilities, the region's economy is now suffering with the rest of the United States. There is no new big public project (or even private project) about to begin. Hotel and commercial construction is at a standstill and the corporate sector is too busy fighting sinking sales to entertain thoughts about relocation. We expect significant layoffs in the state and a continuous decline in state government sales tax revenue collections.

For the Atlanta metro area, after losing almost 95,000 jobs in 2008, 110,500 job losses are expected in calendar year 2009. In calendar year 2010, a moderate 13,000 job losses are expected. The recovery will come in 2011 when 47,300 jobs are created. Atlanta's housing permits will plummet again in 2009 by 70.5%. Permit activity will increase in 2010 by only 5.9%. Permit activity will post an overall increase of 16.9% in 2011. However, permit levels will still be less than 7,000, which is much lower than the 64,000 average for the period 2000-2007.

Given the expectations of a continuing recession until early 2010, and of a slow recovery afterwards, our regression model predicts a 9.7% drop in tax collections for FY2010 followed by a 3.2% decline in FY2011. The growth in tax collections is expected to be positive in FY2012, when total receipts grow by 2.2%. As the national and local economic growth remains below par due to lingering banking problems, tax collections will increase at a moderate rate of 2.9% rate in FY2013 and 3.2% in FY2014.

Other assumptions behind the sales tax projections are:

- The Federal Reserve will maintain a neutral stance at 0-0.25% target rate until early 2011, when the FOMC will start raising rates for a total of 250 basis points by 2012. The benchmark 10-year bond rate will average 3.5% in 2009, rise to 4.0% in 2010, and be 4.5% in 2011.

- The price of oil will average \$64.0 per barrel in 2009, and rise gradually to \$75.0 per barrel in 2011.
- Real GDP growth for 2009 will be -3.4%, improving somewhat to a still negative 0.2% in 2010. In 2011, real GDP will grow by a subpar 1.8%.
- In the second half of 2009, the economy will shed jobs at a monthly rate of 200,000 jobs. In 2010, as the economy enters a jobless recovery, monthly job losses will be limited to only 25,000 jobs. The situation will improve in 2011, when the economy will add jobs at a rate of 85,000 jobs per month.
- For 2009, the inflation rate will average -0.6%. In 2010, the inflation rate will average 1.7% and will be 2.4% in 2011.
- Atlanta's employment growth will remain negative for a total loss of 110,500 jobs in calendar year 2009. The calendar year 2010 will see 13,000 job losses. Local labor market will recover in 2011– it is expected that 47,300 jobs will be created.

### Sales Tax Model

We have used the same model as that in our December 2005 30-year sales tax revenue report, and we have found it to be extremely accurate. The model in the last report forecasted a 7.0% drop in collections for FY2009, and the actual sales tax revenue posted a 6.9% decline. The model is:

$$\begin{aligned} \text{Price adjusted collections (000)} = & - 20495.4 + 65.8 * \text{Lagged Metro Employment (000)} \\ & \quad (2.87) \quad (6.58) \\ & + 38.2 * \text{Season2} - 1114.0 * \text{Season3} - 1529.9 * \text{Season4} - 567.1 * \text{Time} \\ & \quad (0.03) \quad (0.85) \quad (1.17) \quad (3.52) \end{aligned}$$

$$R^2 = 0.87$$

Our forecasting equation models price-adjusted collections as a function of lagged metro area employment, a constant, and a time trend, while controlling for the seasonal fluctuations of collections. The t-statistics of the estimated parameter values are in parentheses in the above equation. We chose to include a longer time frame for estimation because this variable makes the model more robust in terms of its predictive power, as seen from a very high number of the 0.87 R-square statistic. The coefficient on the lagged employment variable is highly significant with a t-statistic of 6.58. We used lagged employment values, as there is a lag in the sales tax collection and reporting procedure. Therefore, lagging the independent variable reconciles the timing issue. Simple logic indicates that salary payments today are for work completed yesterday, which then determines current consumption and therefore sales tax collections. The other variables retain their predictive power, and the constant and time trend parameters are significant with t – statistics of 2.87 and 3.52, respectively.

In our long-term forecast, we added near recessions at approximately seven-year intervals to reflect the cyclical characteristics of the economy. This approach may lead to errors in a single year in the event of a recession, but the moderation followed by a return to trend growth rates should provide reasonable estimates of economic activity over time.

## Quarterly Projections

The quarterly history and projections from calendar years 2008 to 2017 are listed in Table 1. Sales tax revenue is expected to post negative growth numbers in the coming quarters, and as the economy approaches its potential in 2012-2013, the sales tax revenue growth also recovers. The years 2014 to 2016 are closer to the normal growth range of 5-6%.

Table 1

<b>QUARTERLY SALES TAX REVENUE</b>			
<b>PERFORMANCE AND PROJECTIONS: 2008-2017</b>			
<b>CALENDAR YEAR</b>			
<u>Quarter</u>	<u>Revenue</u>	<u>Quarter</u>	<u>Revenue</u>
	(000s)		(000s)
2008:01	84,550	2013:01	76,840
2008:02	87,046	2013:02	76,634
2008:03	86,513	2013:03	75,789
2008:04	81,160	2013:04	76,086
2009:01	81,177	2014:01	79,166
2009:02	78,575	2014:02	79,860
2009:03	74,914	2014:03	79,375
2009:04	72,896	2014:04	79,933
2010:01	75,025	2015:01	83,220
2010:02	72,690	2015:02	84,632
2010:03	70,471	2015:03	84,114
2010:04	70,245	2015:04	84,523
2011:01	72,609	2016:01	87,514
2011:02	72,818	2016:02	89,444
2011:03	71,814	2016:03	88,028
2011:04	71,772	2016:04	87,504
2012:01	74,315	2017:01	89,838
2012:02	74,678	2017:02	89,091
2012:03	73,772	2017:03	88,138
2012:04	73,935	2017:04	88,597

*\*Source: Historical data provided by MARTA. Projections for 2009q3-2017 were based on the model explained earlier with an inflation rate superimposed on projections of real activity.*

## Monthly Projections

Our monthly projections through 2016 are as follows:

Table 2

	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
January	23,527,161	22,211,574	21,496,222	22,001,335	22,749,031	23,437,482	24,637,660	25,908,931
February	32,016,402	27,988,502	27,087,097	27,723,583	28,665,744	29,533,252	31,045,580	32,647,491
March	25,633,193	24,824,903	24,025,385	24,589,928	25,425,595	26,195,047	27,536,433	28,957,277
April	21,262,027	22,651,800	22,691,881	23,271,330	23,881,068	24,886,241	26,373,302	27,872,772
May	34,570,370	25,056,955	25,101,292	25,742,267	26,416,747	27,528,648	29,173,605	30,832,288
June	22,743,084	24,980,946	25,025,148	25,664,179	26,336,612	27,445,141	29,085,107	30,738,760
July	25,931,515	24,393,701	24,858,527	25,536,167	26,234,241	27,475,750	29,116,050	30,470,971
August	23,752,948	22,344,329	22,770,104	23,390,814	24,030,242	25,167,449	26,669,943	27,911,034
September	25,229,492	23,733,309	24,185,552	24,844,847	25,524,022	26,731,921	28,327,814	29,646,055
October	26,075,767	25,127,551	25,673,755	26,447,435	27,217,000	28,593,046	30,234,976	31,301,230
November	24,839,862	23,936,588	24,456,904	25,193,914	25,927,004	27,237,830	28,801,938	29,817,655
December	21,980,351	21,181,060	21,641,478	22,293,645	22,942,343	24,102,269	25,486,321	26,385,111

## Modeling Tax Collections

Ideally, sales taxes would be related to changes in retail sales and to any tax base or tax rate changes that develop. Although further erosion of the base is possible if food exemptions are again legislated in the future, we have assumed no base erosion. We expect no rate changes in current projections.

One accepted approach would be the use of standard economic relationships to estimate per capita sales after adjustment for inflation, application of population estimates to convert those projections into retail sales, and then a derivation of sales tax receipts via ratio to sales. Unfortunately, some of the variables that would be necessary to derive real per capita sales, such as wealth, are not easily available at the county level. Inflation-adjusted incomes for the county depend upon earnings, transfer payments, and property incomes. Income estimates are available historically by county. However, a model would be needed to project personal incomes before we could derive sales. Furthermore, population changes would be related to employment opportunities as well as residential selection within the metro area. Finally, taxable sales are not available by county and are no longer produced for the metro area.

In short, any model would need employment estimates to derive income and population estimates. These estimates then would be used to derive retail sales. Sales tax receipts then would be developed from retail sales projections. When all the steps are consolidated, employment becomes the basic determinant of net sales tax receipts.

Therefore, we preferred a consolidated model that directly derives net sales tax receipts from employment to the development of a set of relationships, all of which depend upon employment projections.

Historically, employment for individual counties is available with a lag along with employment for the Atlanta MSA. However, a relatively consistent decay in employment shares for MARTA counties has developed in recent years. Therefore, a variable that incorporates this shifting share of Atlanta employment should be used in any projection model. Moreover, the Economic Forecasting Center at Georgia State University has been forecasting Atlanta employment since 1975 with some considerable degree of success. To exploit this metropolitan forecasting competence and capture the shifting shares of employment in Fulton and DeKalb counties, our forecasting model used Atlanta employment projections and a share-shifting time variable.

Once forecasts are derived for Atlanta employment, the model estimates real net sales tax receipts. An inflation factor must be included to gross these sales to actual values. Our estimates of use taxes then are added to the sales tax receipts to determine total MARTA receipts.

Use taxes have continued to fall to only slightly more than the \$9 million in 1995. Instead of relating the use tax for Fulton and DeKalb to the use tax statewide, we chose to assume that avoidance would continue to drift upward, preserving the nominal value of use taxes at \$9 million. In the past three years, this assumption slightly understated use tax collections. Because sales tax estimates are so sensitive to inflation projections, we used forecasted values from Georgia State University's Forecast of the Nation to determine inflation through 2010, and we based the rest of the years on a special forecast prepared for the project. Finally, our forecasts of sales and use tax receipts correspond with June 30 fiscal years used by MARTA. Of course, economic conditions reflect calendar years.

## Assumptions

The underlying assumptions of the model are the same as in past years. A detailed discussion of the structure of the model can be found in the report dated March 10, 2000, in the section entitled "Modeling Tax Collections."

The assumptions about employment growth for 2009 to 2040 are contained in Table 3.

- Inflation is expected to remain relatively modest. The assumptions about inflation for 2009 to 2040 are contained in Table 4.
- No significant changes in boundaries, government structure, or state involvement in local government were assumed.
- No further changes in tax rates or base changes were assumed.
- Alternative tax changes in non-MARTA counties were not assumed to alter the metropolitan area shopping patterns.
- No government or resource-induced limits to growth were assumed in the projections.
- No additional counties were assumed to provide revenues to MARTA during the forecast period.

Table 3

<b>EMPLOYMENT HISTORY &amp; PROJECTIONS FOR ATLANTA 1995-2040</b>			
<b>YEAR</b>	<b>LEVEL</b>	<b>ANNUAL JOBS ADDED. (5-YEAR AVG)</b>	<b>5-YEAR GROWTH RATE</b>
1995	1,877.7	54.2	3.2
2000	2,289.6	82.4	4.0
2005	2,336.1	9.3	0.4
2010	2,270.2	-13.2	-0.6
2015	2,469.4	39.8	1.7
2020	2,750.3	56.2	2.2
2025	3,012.6	52.5	1.8
2030	3,319.5	61.4	2.0
2035	3,639.7	64.0	1.9
2040	3,975.2	67.1	1.8

Table 4

<b>INFLATION HISTORY &amp; PROJECTIONS 1970-2040</b>		
<b>YEAR</b>	<b>LEVEL</b>	<b>FIVE YEAR GROWTH RATE</b>
1970	28.27	3.65
1975	38.43	6.33
1980	55.67	7.69
1985	71.55	5.15
1990	86.05	3.76
1995	97.89	2.61
2000	106.89	1.78
2005	119.27	2.22
2010	129.04	1.59
2015	141.49	1.86
2020	155.45	1.90
2025	172.48	2.10
2030	191.36	2.10
2035	212.32	2.10
2040	235.57	2.10

## Long-Term Forecast

Based on the assumptions discussed above, the long-term performance and projections for MARTA sales tax revenues are as follows. History is available from 1973. However, due to space limitations, we have listed the history from 1994:

Table 5

### VALUES FOR MARTA SALES AND USE TAX RECEIPTS

	FY	Net Sales Tax		Use Tax		Total Receipts		Additions (000's)
		(000's)	%chg	(000's)	%chg	(000's)	%chg	
	1994	189,490	9.9	9,000	0.0	198,490	9.5	17,145
	1995	213,475	12.7	9,000	0.0	222,475	12.1	23,985
	1996	242,668	13.7	9,000	0.0	251,668	13.1	29,193
	1997	247,171	1.9	9,000	0.0	256,171	1.8	4,503
	1998	233,924	-5.4	9,000	0.0	242,924	-5.2	(13,247)
	1999	263,793	12.8	9,000	0.0	272,793	12.3	29,869
	2000	288,796	8.7	9,000	0.0	295,796	8.4	23,003
	2001	295,388	3.0	9,000	0.0	304,388	2.9	8,992
	2002	277,435	-6.1	9,000	0.0	286,435	-5.9	(17,953)
	2003	263,578	-5.0	9,000	0.0	272,578	-4.8	(13,857)
	2004	271,663	3.1	9,000	0.0	280,663	3.0	8,085
	2005	287,351	5.8	9,000	0.0	296,351	5.6	15,688
	2006	322,213	12.1	9,000	0.0	331,213	11.8	34,862
	2008	342,596	6.7	9,000	0.0	351,596	6.7	2,381
	2009	318,425	-7.1	9,000	0.0	327,425	-6.9	(24,171)
	2010	286,525	-10.0	9,000	0.0	295,525	-9.7	(31,901)
	2011	277,144	-3.3	9,000	0.0	286,144	-3.2	(9,381)
	2012	283,579	2.3	9,000	0.0	292,579	2.2	6,435
	2013	292,182	3.0	9,000	0.0	301,182	2.9	8,603
	2014	301,901	3.3	9,000	0.0	310,901	3.2	9,719
	2015	318,160	5.4	9,000	0.0	327,160	5.2	16,259
	2016	336,595	5.8	9,000	0.0	345,595	5.6	18,435
	2017	346,460	2.8	9,000	0.0	354,460	2.6	8,866
	2018	352,855	2.1	9,000	0.0	361,855	2.1	7,395
	2019	373,458	5.8	9,000	0.0	382,458	5.7	20,601
	2020	394,623	5.7	9,000	0.0	403,623	5.5	21,167
	2021	416,767	5.6	9,000	0.0	425,767	5.5	22,144
	2022	442,177	6.1	9,000	0.0	451,177	6.0	25,410
	2023	462,400	4.6	9,000	0.0	471,400	4.5	20,223
	2024	473,216	2.3	9,000	0.0	482,216	2.3	10,816
	2025	482,865	2.0	9,000	0.0	491,865	2.0	9,649
	2026	504,668	4.5	9,000	0.0	513,668	4.4	21,803
	2027	531,159	5.2	9,000	0.0	540,159	5.2	26,491
	2028	557,345	4.9	9,000	0.0	566,345	4.8	26,186
	2029	584,069	4.8	9,000	0.0	593,069	4.7	26,724
	2030	606,575	3.9	9,000	0.0	615,575	3.8	22,506
	2031	623,044	2.7	9,000	0.0	632,044	2.7	16,469
	2032	638,835	2.5	9,000	0.0	647,835	2.5	15,791
	2033	666,755	4.4	9,000	0.0	675,755	4.3	27,920
	2034	702,702	5.4	9,000	0.0	711,702	5.3	35,947
	2035	742,906	5.7	9,000	0.0	751,906	5.6	40,204
	2036	782,466	5.3	9,000	0.0	791,466	5.3	39,559
	2037	826,392	5.6	9,000	0.0	835,392	5.6	43,927
	2038	860,257	4.1	9,000	0.0	869,257	4.1	33,864
	2039	884,456	2.8	9,000	0.0	893,456	2.8	24,200
	2040	925,469	4.6	9,001	1.0	934,470	4.6	41,014

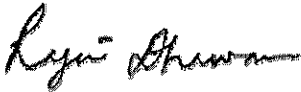
*\*Source: Historical data supplied by MARTA and the Georgia Department of Revenue. Projections were based on the model explained earlier with an inflation rate superimposed upon projections of real activity.*

The total receipts collected in fiscal year 2010 are projected to drop by 9.7% which is a downward revision from the negative 6.3% growth rate projection made in the December 2008 report. Additionally, we also have revised the estimate for FY2011 downward from a negative 1.4% growth rate to a negative 3.2%. Two subsequent fiscal years were also revised slightly downward to reflect the effects of an anemic recovery in the national and the local economy.

### CONCLUSION

By using a forecasting model of sales tax receipts and making assumptions about the future performance of the volatile and shrinking use tax, we have derived estimates of MARTA sales and use tax receipts between now and 2040. Of course, any projections depend upon the assumptions used to drive the analysis. We believe the assumptions are reasonable, based upon previous historical relationships and normal behavior related to the development of cities. Of course, reality can deviate substantially from those assumptions, and the resulting tax receipt estimates could change materially.

Sincerely,



Prof. Rajeev Dhawan  
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J. Mack Robinson College of Business  
Georgia State University