ADDENDUM: ECONOMIC IMPACT OF REGULATIONS ON THE MARINE FISHERIES INDUSTRY IN THE STATE OF MASSACHUSETTS

Brett M. Baden, Ph.D.*
Marcelo Bianconi, Ph.D.**

August 27, 2006: Marine Fisheries Industry Economic Impact Study for the State of Massachusetts
Ref: Contract on Bid No. 06-41: Marine Fisheries Industry Economic Impact Study

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Massachusetts Fisheries Recovery Commission

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Executive Summary

The revised econometric analysis of sales tax data shows negative impacts of Amendments on coastal towns where fishing is active. For Amendment 5, in 1994-1995 US dollars, in the worst case scenario, costal towns had average losses of *$2,168* per month and a total loss of *$2,691,000* per month. In the best case scenario, costal towns had average losses of *$354* per month and a total loss of *$176,468*. For Amendment 13, the effect on the Port of Gloucester is given by, in 2005 US dollars, in the worst case scenario, an average loss of *$17,339* per month per business unit and a total loss of *$11,400,000* across the town per month. In the best case scenario, the town had average of no losses, of *$0* per month per business unit, and a total gain of *$1,000,000* across the town per month. Hence, the predictive power of future fisheries regulations may have further impacts on gross sales tax receipts that lie within the worst and best case scenarios obtained here. The employment results continue to show that Massachusetts' fishing communities have experienced higher rates of unemployment, lost employment in fishing after the passage of Amendment 13, and lost employment in fishing during the 1990s. In theory, we show that large restrictions can impose negative expected profits which may take a productive unit out of the business activity.

AD.I. Addendum to Data and Econometric Models of the Massachusetts Gross Sales Tax Data

In Baden and Bianconi (2006), chapter II, the econometric analysis of gross sales tax receipts data was done exploring the cross-sectional and time series variation of the data. However, the analysis did not include the possibility of autocorrelation across time of sales tax receipts within each town in the State. It is important to check the robustness of the results previously obtained when autocorrelations are taken into account. Here, we include evidence of the existence of autocorrelation across time, and show how it affects the results previously obtained.

AD.I.1. Amendment 5: May 1993 to April 1995 Period

First, we provide time series analysis and intervention analysis for Amendment 5, focusing on Boston, Gloucester, New Bedford, Fairhaven, Plymouth, and Marshfield.

Boston

Figure AD.1.1 presents the (logarithm of) average real gross sales tax receipts (upper line), the line below represents the introduction of the amendment on May 1, 1994. For the city of Boston, we observe a slight additional variation after the amendment.

Figure AD1.1

Table AD.1.1 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of

the amendment. We find some evidence of a statistically negative effect, about *4.8%* decline, with a *5%* significance level.[1]

Table: AD.1.1

```
Linear regression                                    Number of obs =      25
                                                     F(  2,    22) =   28.55
                                                     Prob > F      =  0.0000
                                                     R-squared     =  0.7467
                                                     Root MSE      = .05106

-------------------------------------------------------------------------------
             |              Robust
       lrmst |     Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
-------------+-----------------------------------------------------------------
       lrmst |
         L1. |  .7020638   .1637072     4.29   0.000     .3625559    1.041572
       dfyear | -.0488181   .0283635    -1.72   0.099    -.1076404    .0100043
        _cons |  2.067471   1.133922     1.82   0.082    -.2841395    4.419081
-------------------------------------------------------------------------------
```

Figure AD.1.2 presents the (logarithm of) total real gross sales tax receipts (upper line), the line below represents the introduction of the amendment in May 1994. We also observe a very slight additional variation after the amendment.

Figure AD.1.2

Table AD.1.2 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of

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[1] Significance levels are for one-tailed tests. Additional lags were tested in all intervention and other regressions, when statistically significant they were included, otherwise they were excluded.

the amendment. We find some evidence of a negative effect, about *5.8%* decline, with a *5.3%* significance level.

```
Table AD.1.2
```

```
Linear regression                                    Number of obs =        25
                                                     F(  2,    22) =    41.59
                                                     Prob > F       =   0.0000
                                                     R-squared      =   0.8052
                                                     Root MSE       =   .05538

---------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-------------------------------------------------------------
     lrtotst |
         L1. |   .7020817    .154243     4.55   0.000     .3822012    1.021962
       dfyear | -.0580054   .0345588    -1.68   0.107    -.1296759    .0136652
        _cons |   4.684886    2.42598     1.93   0.066    -.346288    9.716059
---------------------------------------------------------------------------
```

Gloucester

Figure AD.1.3 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 1994. For Gloucester, we observe additional variation after the amendment.
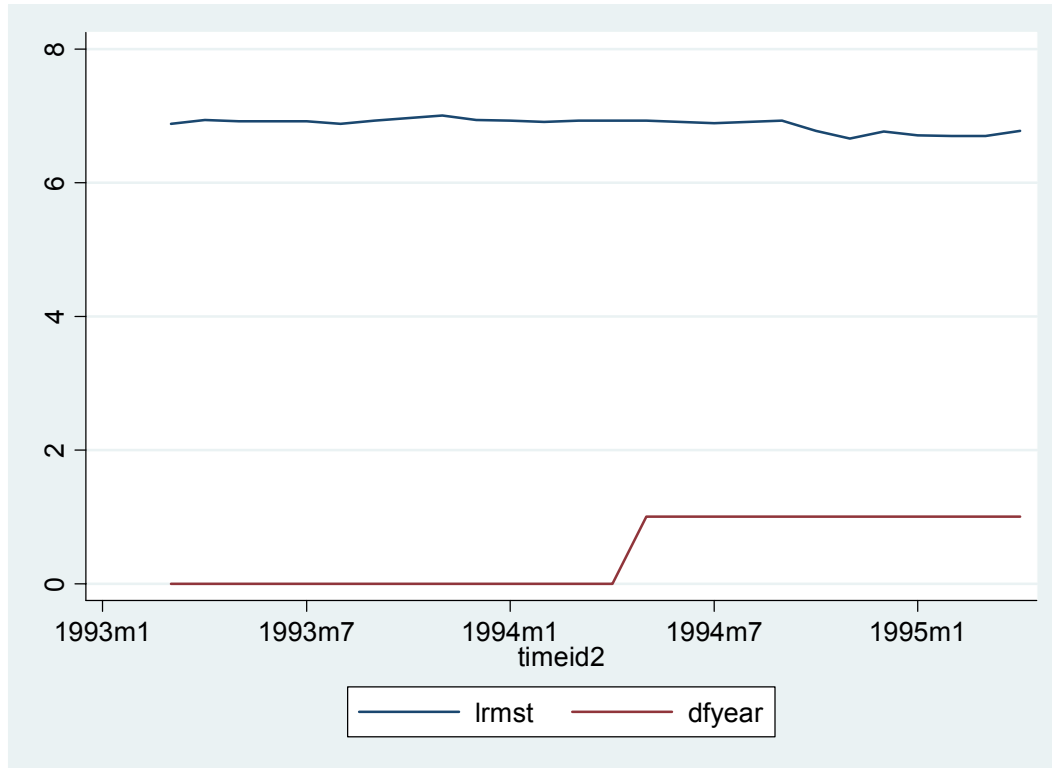
```
Figure AD.1.3
```

Table AD.1.3 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a negative effect, but not statistically significant.

```
Table AD.1.3
Linear regression                                    Number of obs =       25
                                                     F(  2,   22) =    16.71
                                                     Prob > F      =   0.0000
                                                     R-squared     =   0.5780
                                                     Root MSE      =   .32836

-------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
       lrmst |
         L1. |   .7557838   .1358592     5.56   0.000     .4740291    1.037539
      dfyear |  -.0737762   .1340773    -0.55   0.588    -.3518354    .2042831
       _cons |   1.541461    .848474     1.82   0.083    -.2181662    3.301088
-------------------------------------------------------------------------------
```

Figure AD.1.4 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 1994. We also observe additional variation after the amendment.

Figure AD.1.4

Table AD.1.4 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of

the amendment. We also find a negative effect, but not statistically significant for
Gloucester.

```
Table AD.1.4
Linear regression                                      Number of obs =       25
                                                       F(  2,    22) =    12.95
                                                       Prob > F      =   0.0002
                                                       R-squared     =   0.5360
                                                       Root MSE      =   .33262

-------------------------------------------------------------------------------
             |                  Robust
     lrtotst |      Coef.    Std. Err.      t     P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     lrtotst |
         L1. |    .7207727    .1484292     4.86   0.000     .4129493    1.028596
       dfyear |   -.0769807    .1372089    -0.56   0.580    -.3615346    .2075732
       _cons |    3.501684    1.857282     1.89   0.073    -.3500843    7.353452
-------------------------------------------------------------------------------
```

New Bedford

Figure AD.1.5 presents the (logarithm of) average real gross sales tax receipts (line
above), the line below represents the introduction of the amendment in May 1994. We
observe a slight hump-shaped pattern after the amendment for New Bedford.
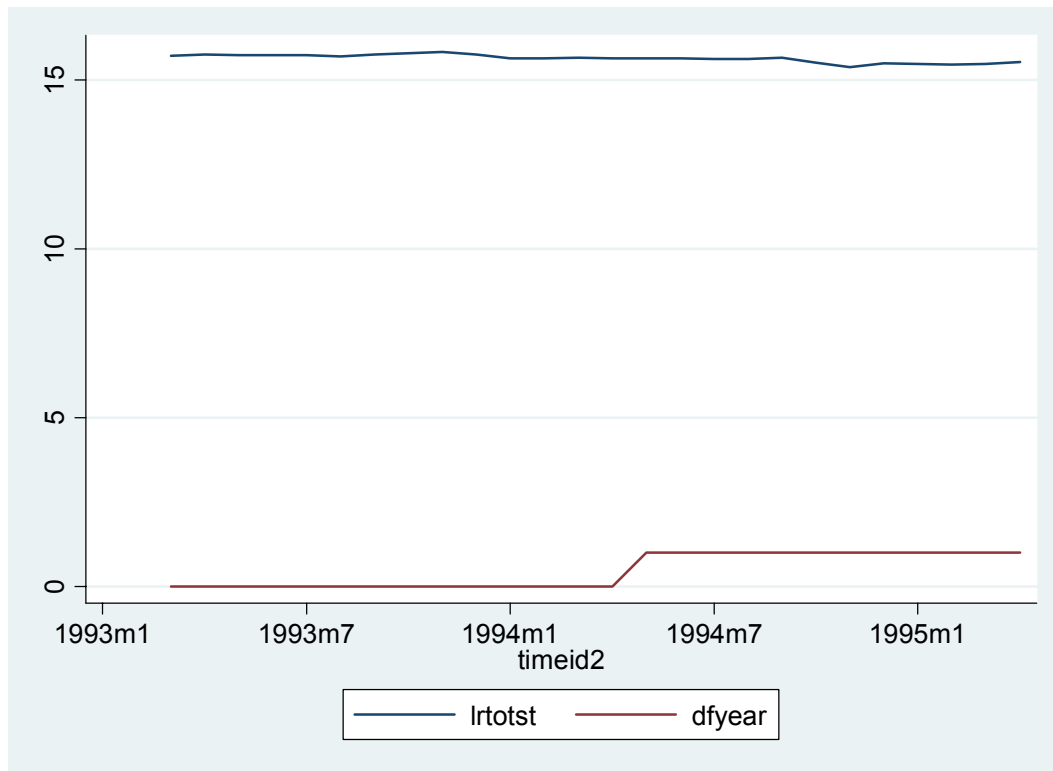
Figure AD.1.5

Table AD.1.5 presents the time series linear regression of the average real gross sales tax
receipts taking into account the own lagged value and the intervention dummy variable of

the amendment. We find weak evidence of a negative effect, about *7.2%* decline, with a *7%* significance level.

Table AD.1.5

```
Linear regression                                    Number of obs =      25
                                                     F(  2,    22) =   46.96
                                                     Prob > F       = 0.0000
                                                     R-squared      = 0.7904
                                                     Root MSE       = .11421

-------------------------------------------------------------------------
             |               Robust
       lrmst |     Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
-------------+-----------------------------------------------------------
       lrmst |
         L1. |  .8667046   .0923897     9.38   0.000      .6751   1.058309
       dfyear | -.0718274   .0463115    -1.55   0.135   -.1678716   .0242168
       _cons |   .841227   .5792763     1.45   0.161   -.3601185   2.042573
-------------------------------------------------------------------------
```

Figure AD.1.6 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 1994. We again observe a hump-shaped pattern after the amendment.

Figure AD.1.6
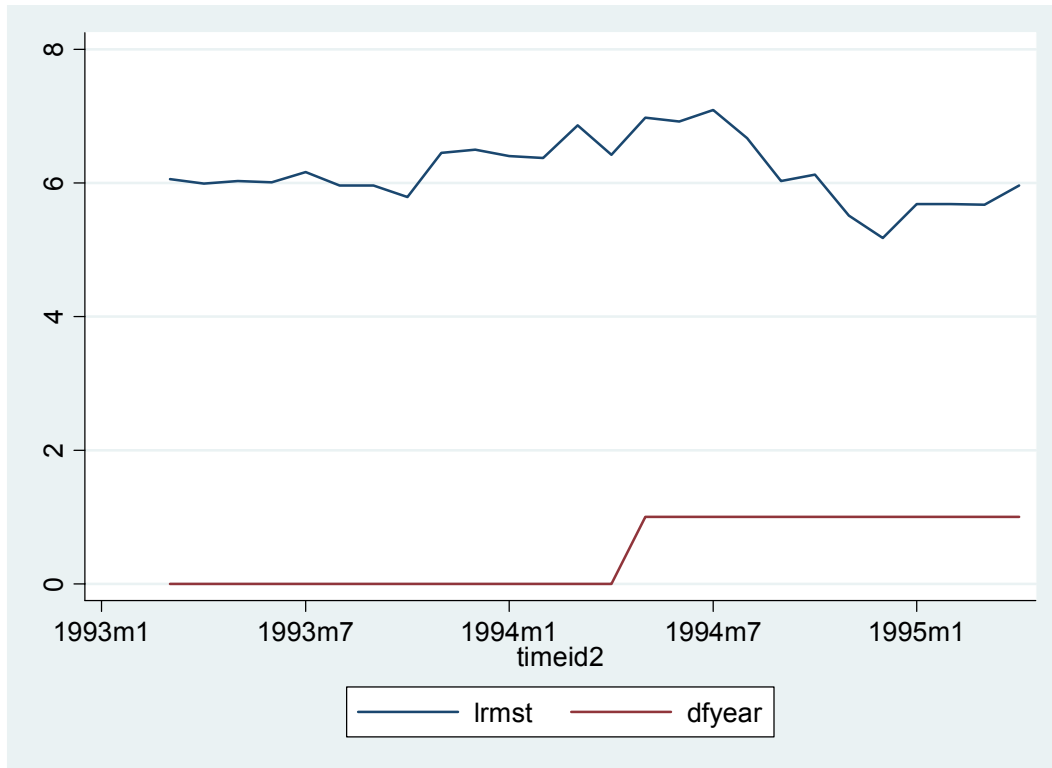

Table AD.1.6 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of

the amendment. We find weak evidence of a negative effect, about *7.1%* decline, with a *7%* statistical significance level.

Table AD.1.6

```
Linear regression                                 Number of obs =      25
                                                  F(  2,   22) =   50.64
                                                  Prob > F      =  0.0000
                                                  R-squared     =  0.8147
                                                  Root MSE      =  .10888


------------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lrtotst |
         L1. |   .8511604   .0947545     8.98   0.000     .6546516    1.047669
      dfyear |  -.0717439   .0464427    -1.54   0.137    -.1680602    .0245725
       _cons |   1.985678     1.2678     1.57   0.132    -.6435774    4.614933
------------------------------------------------------------------------------
```

Fairhaven

Figure AD.1.7 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 1994. We observe some additional variation after the amendment for Fairhaven.
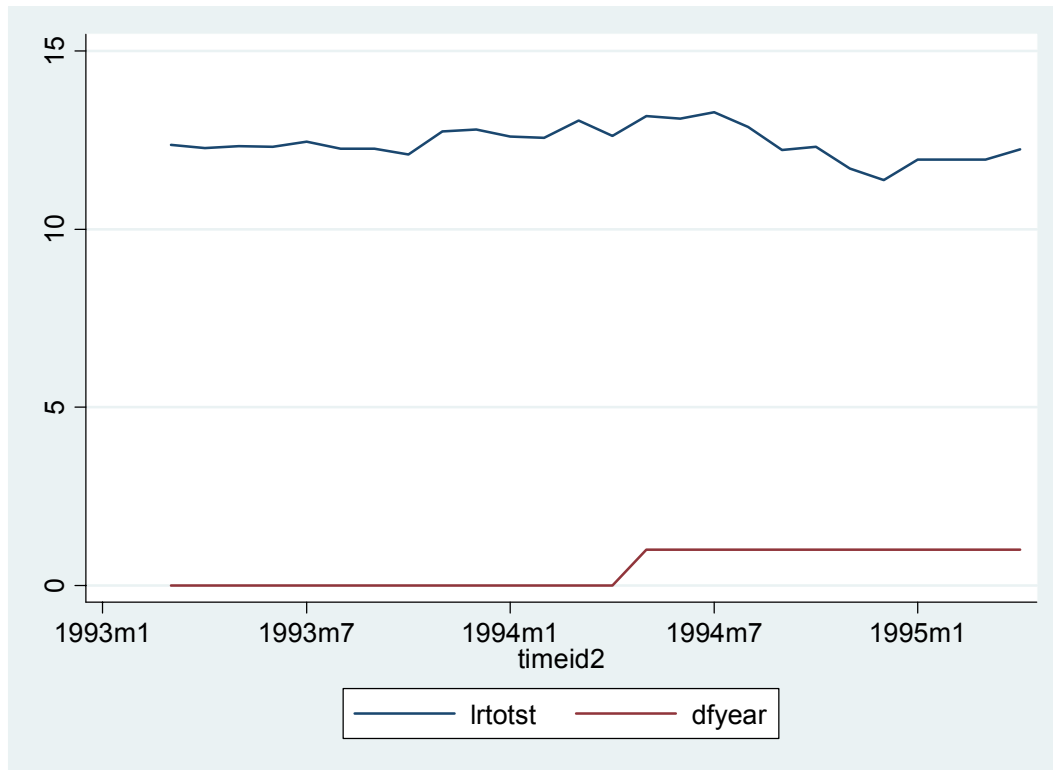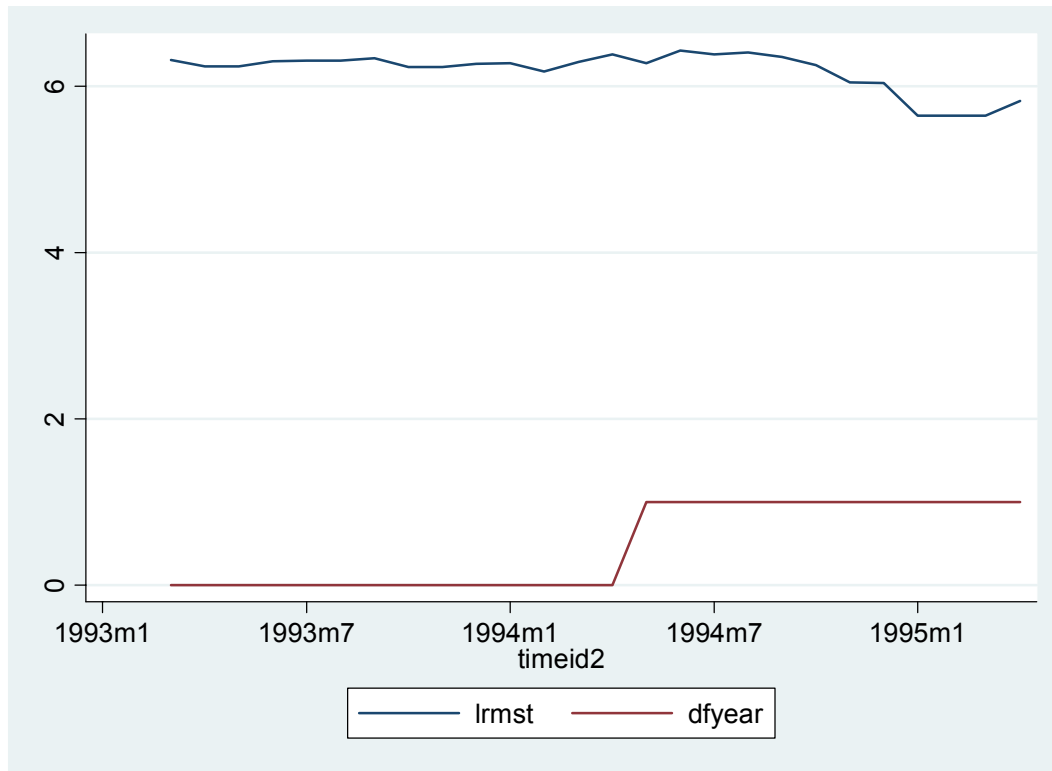
Figure AD.1.7

Table AD.1.7 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a negative effect, but not statistically significant.

Table AD.1.7

```
Linear regression                                  Number of obs =       25
                                                   F(  2,    22) =    18.33
                                                   Prob > F      =   0.0000
                                                   R-squared     =   0.6457
                                                   Root MSE      =   .16234


-----------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t     P>|t|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
       lrmst |
         L1. |   .6926132   .1631972     4.24   0.000     .3541629    1.031064
      dfyear |  -.1023845    .079878    -1.28   0.213    -.2680414    .0632724
       _cons |   1.541932   .8115539     1.90   0.071    -.1411278    3.224992
-----------------------------------------------------------------------------
```

Figure AD.1.8 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 1994. We observe a slight additional variation after the amendment.

Figure AD.1.8

Table AD.1.8 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a negative effect, but not statistically significant.

11

Table AD.1.8

```
Linear regression                                   Number of obs =       25
                                                    F(  2,    22) =    19.58
                                                    Prob > F      =   0.0000
                                                    R-squared     =   0.6489
                                                    Root MSE      =   .16422

------------------------------------------------------------------------------
             |               Robust
    lrtotst  |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lrtotst  |
         L1. |   .6810002   .1618996     4.21   0.000     .345241    1.016759
      dfyear |  -.1072909   .0832944    -1.29   0.211    -.2800329    .0654511
       _cons |   3.363831   1.702691     1.98   0.061    -.1673332    6.894995
------------------------------------------------------------------------------
```

Plymouth

Figure AD.1.9 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 1994. We observe some additional variation after the amendment.
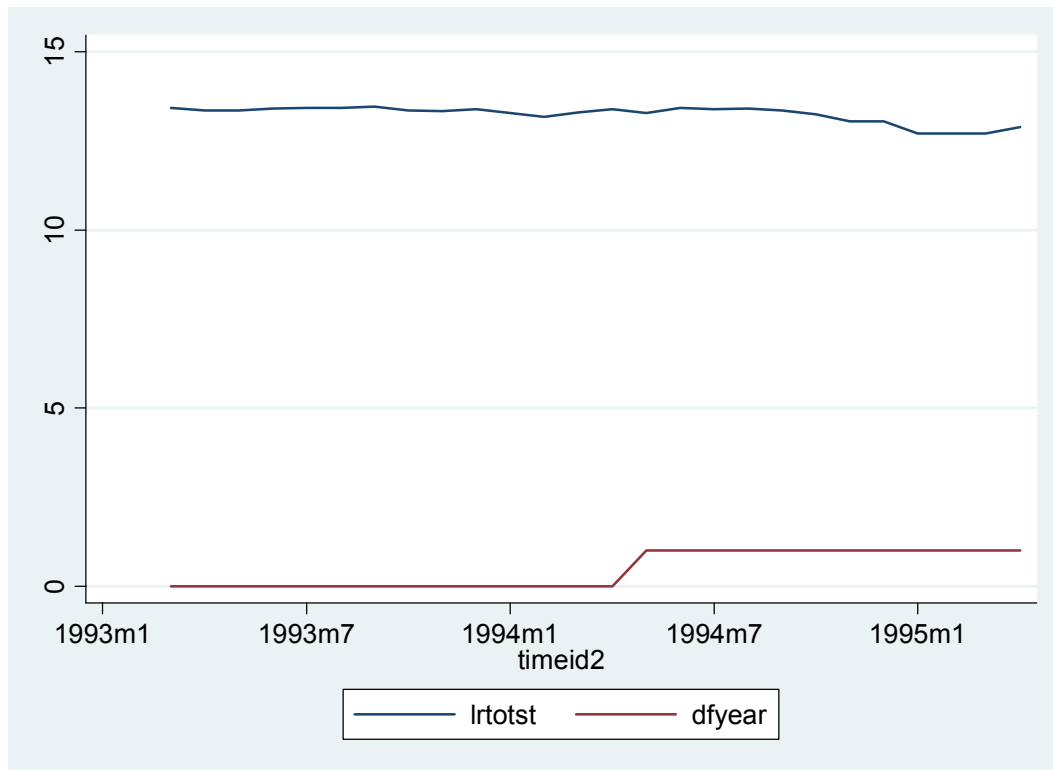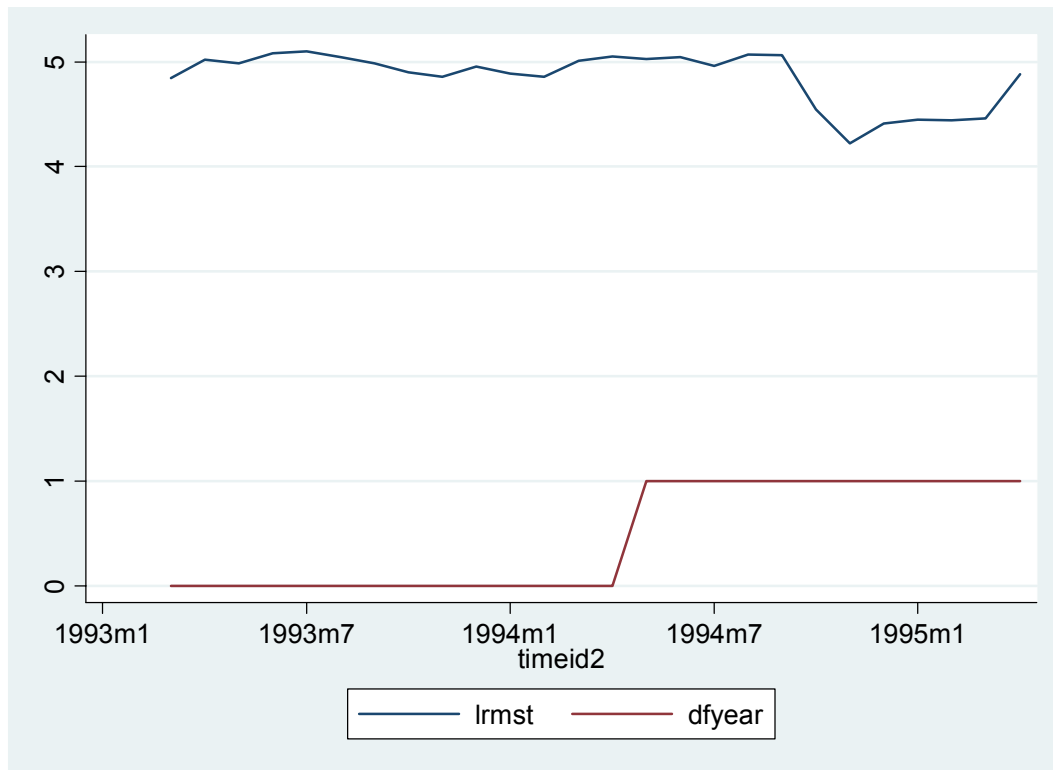
Figure AD.1.9

Table AD.1.9 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a negative effect, but not statistically significant for Plymouth.

Table AD.1.9

```
Linear regression                                Number of obs =      25
                                                 F(  2,    22) =   20.18
                                                 Prob > F      =  0.0000
                                                 R-squared     =  0.6438
                                                 Root MSE      =  .11507


------------------------------------------------------------------------------
             |               Robust
      lrmst  |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lrmst  |
        L1.  |   .6453961   .1912497     3.37   0.003     .2487685    1.042024
      dfyear |  -.086538    .0666969    -1.30   0.208    -.2248588    .0517829
       _cons |   1.768497   .9507453     1.86   0.076    -.2032278    3.740222
------------------------------------------------------------------------------
```

Figure AD.1.10 presents the (logarithm of) total real gross sales tax receipts (line above),
the line below represents the introduction of the amendment in May 1994. We observe a
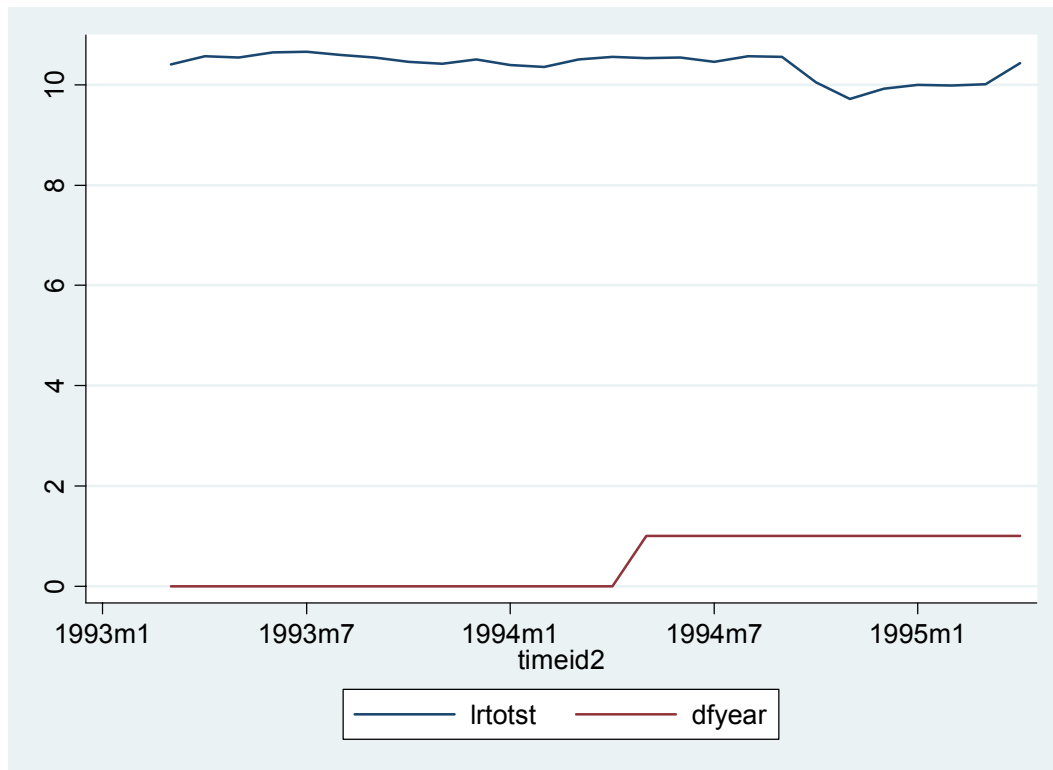slight additional variation after the amendment.

Figure AD.1.10

Table AD.1.0 presents the time series linear regression of the total real gross sales tax
receipts taking into account the own lagged value and the intervention dummy variable of
the amendment. We find a negative effect, but not statistically significant.

Table AD.1.10

```
Linear regression                                    Number of obs =       25
                                                     F(  2,    22) =    20.83
                                                     Prob > F      =   0.0000
                                                     R-squared     =   0.6324
                                                     Root MSE      =   .11381

-----------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
     lrtotst |
         L1. |   .6291977   .1948568     3.23   0.004     .2250895    1.033306
       dfyear |  -.0839341    .068947    -1.22   0.236    -.2269214    .0590533
       _cons |    4.23336   2.222615     1.90   0.070    -.3760609    8.842781
-----------------------------------------------------------------------------
```

Marshfield

Figure AD.1.11 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 1994. We observe more variation across all period for Marshfield.

Figure AD.1.11

Table AD.1.11 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a negative effect, but not statistically significant.

Table AD.1.11

```
Linear regression                                    Number of obs =        25
                                                     F(  2,    22) =     29.99
                                                     Prob > F       =    0.0000
                                                     R-squared      =    0.5714
                                                     Root MSE       =    .19826


------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |   .7290684   .1022929     7.13   0.000     .5169259    .9412108
      dfyear |  -.0647785   .0837421    -0.77   0.447    -.2384489    .1088919
       _cons |   1.272012   .4872598     2.61   0.016     .2614975    2.282527
------------------------------------------------------------------------------
```

Figure AD.1.12 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 1994. We observe more variation across all period..
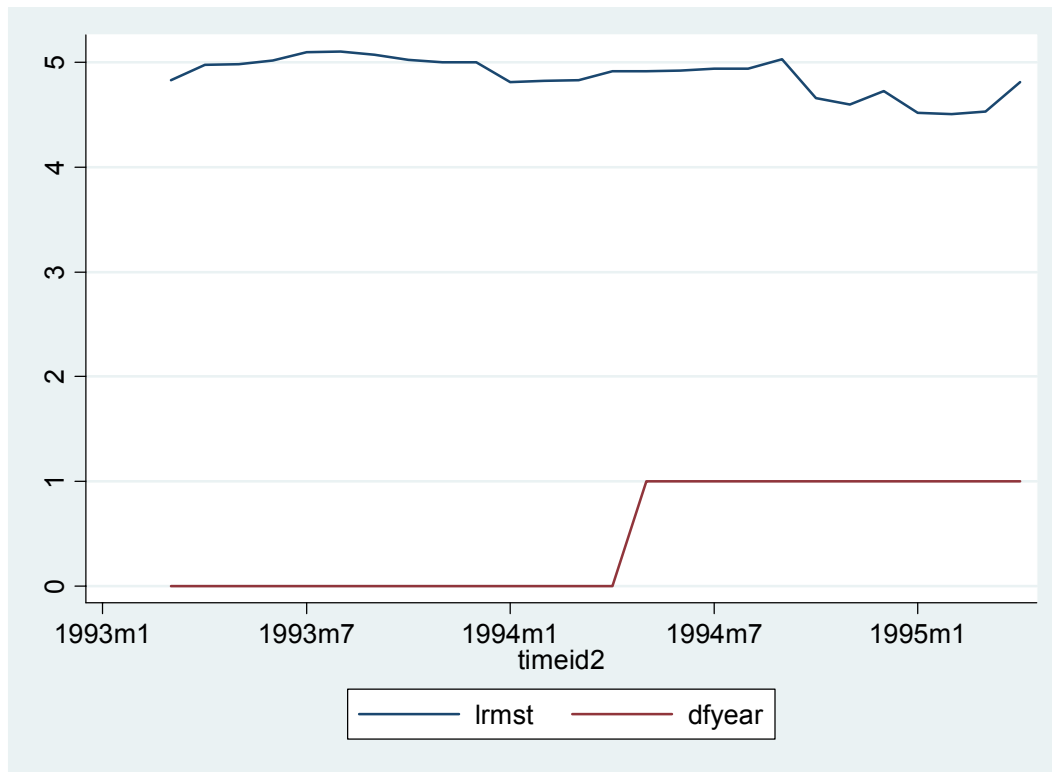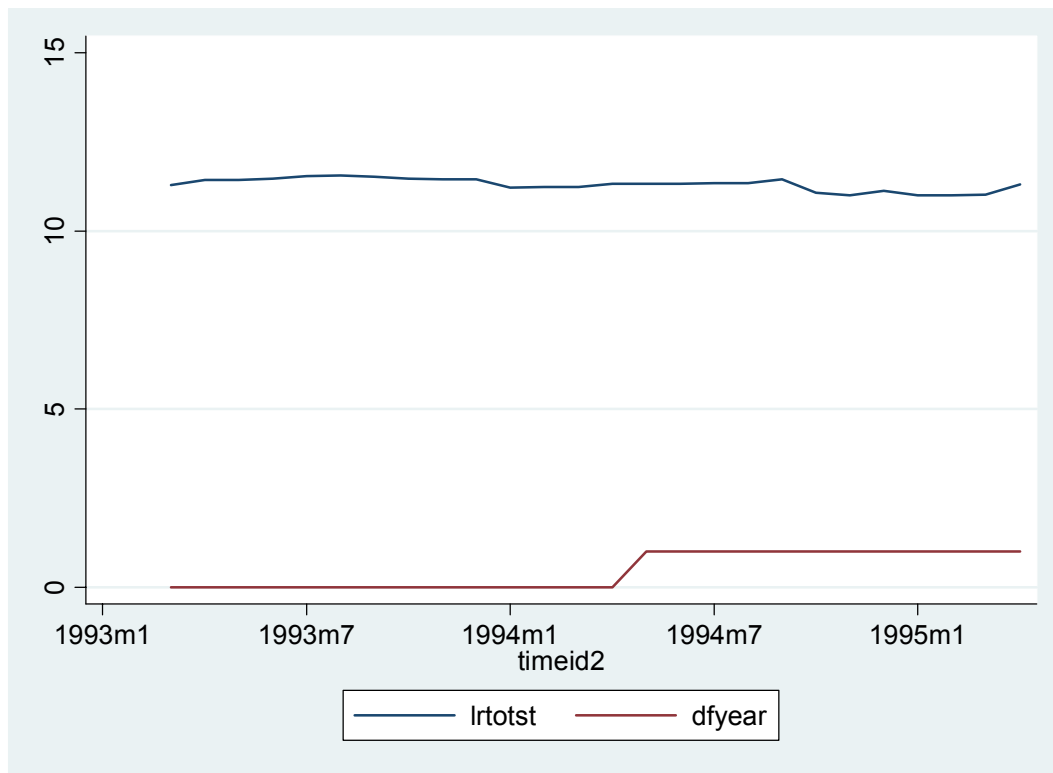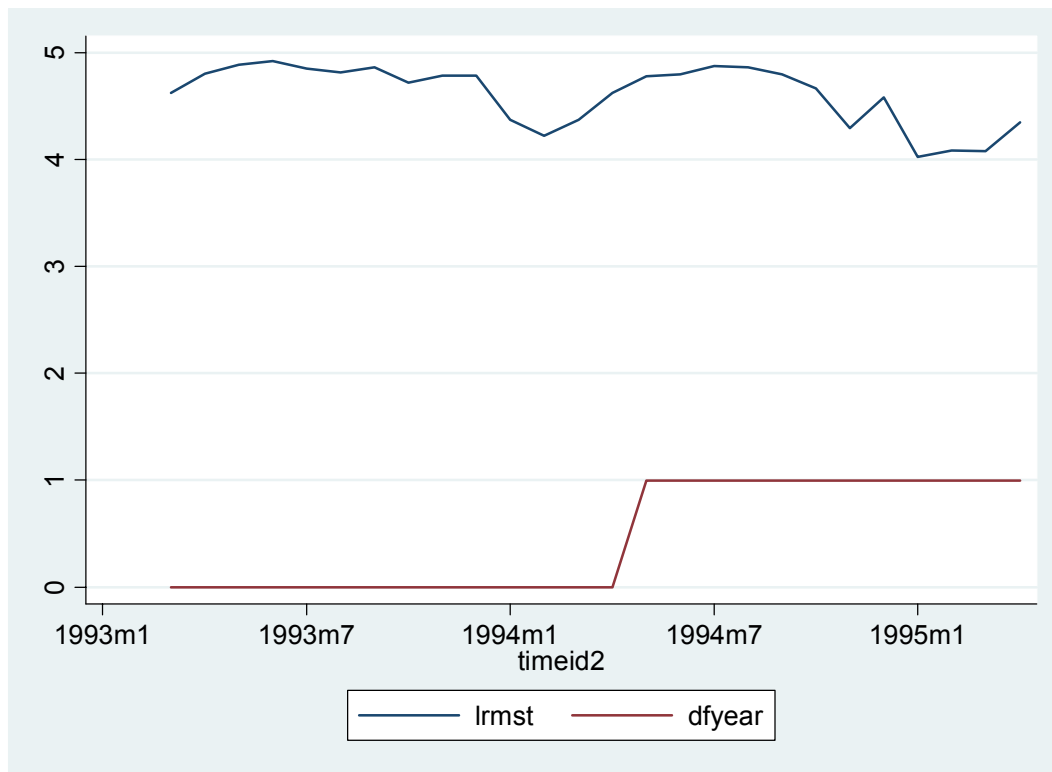
Figure AD.1.12

Table AD.1.12 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a negative effect, but not statistically significant.

15

Table AD.1.12

```
Linear regression                                Number of obs =      25
                                                 F(  2,    22) =   23.95
                                                 Prob > F      =  0.0000
                                                 R-squared     =  0.5748
                                                 Root MSE      =  .19297

------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------
     lrtotst |
         L1. |   .7213359   .1109822     6.50   0.000     .491173    .9514989
      dfyear |  -.0565143   .0799462    -0.71   0.487   -.2223125    .1092839
       _cons |   2.885355   1.154992     2.50   0.020    .4900479    5.280661
------------------------------------------------------------------------
```

In summary, the time series intervention evidence for Amendment 5 is as follows:

Table AD.1.12a

	Policy Intervention Variable	Statistically Significant
Boston	Negative	Yes
Gloucester	Negative	No
New Bedford	Negative	No
Fairhaven	Negative	No
Plymouth	Negative	No
Marshfield	Negative	No

AD.I.1.1. Amendment 5: May 1993 to April 1995 Period - Autocorrelation

We proceed now with estimates of the regressions in Baden and Bianconi (2006), but including lagged dependent variables, and with other assumptions as well.

First, in reference to Table 2.2 in Baden and Bianconi (2006), Table AD.1.13 shows the simple differences-indifferences estimator without further factors, fixed effects or controls, but with a lagged dependent variable. Note that original results are not changed in any dramatic fashion, but the autocorrelation of taxes is statistically significant, with a two month history in this case.[2] Note also that taking into account the lagged dependent variables increases the explanatory power of the regressions considerably, relative to the original regression in Table 2.2.

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[2] We have performed several other econometric models and tests of fixed and random effects, available upon request. Results are unchanged.

Table AD.1.13

```
Linear regression                                    Number of obs =    7978
                                                     F(  5,  7972) =13240.51
                                                     Prob > F      =  0.0000
                                                     R-squared     =  0.9442
                                                     Root MSE      = .29254

-------------------------------------------------------------------------------
             |               Robust
       lrmst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
       lrmst |
         L1. |   .7442927   .0300629    24.76   0.000     .6853615    .803224
         L2. |   .2406551   .0295319     8.15   0.000     .1827648   .2985454
      dfyear |   -.062464   .0067811    -9.21   0.000    -.0757568  -.0491713
      dtreat |  -.0033531   .0125926    -0.27   0.790    -.0280379   .0213317
   dyeartreat |   .0023568   .0233305     0.10   0.920     -.043377   .0480906
       _cons |   .0868473   .0212589     4.09   0.000     .0451743   .1285202
-------------------------------------------------------------------------------
Linear regression                                    Number of obs =    7978
                                                     F(  5,  7972) =47992.09
                                                     Prob > F      =  0.0000
                                                     R-squared     =  0.9819
                                                     Root MSE      = .29142

-------------------------------------------------------------------------------
             |               Robust
      lrtotst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     lrtotst |
         L1. |   .7525383   .0302483    24.88   0.000     .6932437    .811833
         L2. |   .2436991   .0298928     8.15   0.000     .1851014   .3022968
      dfyear |  -.0433426   .0066894    -6.48   0.000    -.0564556  -.0302297
      dtreat |   .0032653   .0130321     0.25   0.802     -.022281   .0288117
   dyeartreat |   .0000211    .023393     0.00   0.999    -.0458353   .0458775
       _cons |   .0384676   .0229291     1.68   0.093    -.0064793   .0834146
-------------------------------------------------------------------------------
```

In reference to Tables 2.7-2.10 in Baden and Bianconi (2006), we present in Table
AD.1.14 models with separate difference-in-difference estimators for each town of the
fishing industry group, reflecting changes in each town relative to all other towns in the
state. However, here we underline exclude other fishing towns, and underline include lagged dependent
variables. In Table AD.1.14, we note that the results previously obtained are not robust.
The time series autocorrelation of the tax receipts has more explanatory power and the
cross sectional evidence is weakened.

Table AD.1.14

```
Linear regression                                   Number of obs =    7967
                                                    F( 71,  7895) = 1921.91
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9551
                                                    Root MSE      =  .26128


------------------------------------------------------------------------------
             |               Robust
       lrmst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |  .7139483   .0272806    26.17   0.000     .6604711    .7674255
         L2. |  .2756499   .0272069    10.13   0.000     .2223171    .3289826
      dfyear | -.0643485   .0062367   -10.32   0.000    -.0765741   -.0521229
      dtreat | -.0106406   .0190186    -0.56   0.576    -.0479221    .0266408
   dyeartreat |  .0522775   .0464371     1.13   0.260    -.0387514    .1433064
        dfeb |  .1399109   .0219726     6.37   0.000     .0968388     .182983
        dmar |  .2647972   .0199974    13.24   0.000      .225597    .3039974
        dapr |  .3841265   .0220181    17.45   0.000     .3409652    .4272878
        dmay |  .3062554   .0202533    15.12   0.000     .2665535    .3459572
        djun |  .2851283   .0200077    14.25   0.000     .2459079    .3243487
        djul |  .2236462   .0209932    10.65   0.000     .1824939    .2647985
        daug |  .2542912   .0200383    12.69   0.000     .2150109    .2935716
        dsep |  .2202719   .0201644    10.92   0.000     .1807444    .2597993
        doct |  .0993815   .0229275     4.33   0.000     .0544376    .1443254
        dnov |  .1002066   .0223267     4.49   0.000     .0564403    .1439729
        ddec |  .2908418   .0224127    12.98   0.000      .246907    .3347767
     dboston |  .0195993   .0386232     0.51   0.612    -.0561124    .0953111
     dchatam |  .0028996   .0694195     0.04   0.967     -.133181    .1389801
   dfairhaven |  .0056989   .0289683     0.20   0.844    -.0510867    .0624845
  dgloucester |  .0665489   .0861426     0.77   0.440    -.1023134    .2354112
  dmarshfield | -.0250851   .0352297    -0.71   0.476    -.0941447    .0439744
  dnewbedford |    .02438   .0302798     0.81   0.421    -.0349764    .0837363
    dplymouth | -.0060727   .0248507    -0.24   0.807    -.0547867    .0426412
  dprovincet~n | -.0135327    .082284    -0.16   0.869    -.1748311    .1477657
    dscituate |   .007596   .0385873     0.20   0.844    -.0680454    .0832373
     dbeverly | -.0102718   .0320365    -0.32   0.748    -.0730718    .0525282
     deastham |   .003526   .0655217     0.05   0.957     -.124914    .1319659
  dedgardtown | -.0178232   .0943736    -0.19   0.850    -.2028204     .167174
     dharwich |  .0107813   .0442502     0.24   0.808    -.0759609    .0975234
    dwestport |  .0150642   .0249394     0.60   0.546    -.0338237    .0639521
  dmarblehead | -.0092377   .0404991    -0.23   0.820    -.0886266    .0701511
    dnantucket |  .0167553   .0745199     0.22   0.822    -.1293235     .162834
  dnewburyport |  .0002102    .056452     0.00   0.997    -.1104506     .110871
    drockport |  .0000613   .0443717     0.00   0.999    -.0869189    .0870415
    dsandwich |   .027157   .0609075     0.45   0.656    -.0922377    .1465518
       dswamp | -.0099235   .0394964    -0.25   0.802    -.0873469    .0674999
    dwellfleet | -.0013824   .1133443    -0.01   0.990    -.2235672    .2208023
     dyarmouth |  .0119995   .0396239     0.30   0.762    -.0656738    .0896728
       dsalem |  .0128536   .0319433     0.40   0.687    -.0497636    .0754709
   dmanchester |  .0246584   .0511217     0.48   0.630    -.0755537    .1248705
     dorleans |  .0111371   .0330535     0.34   0.736    -.0536564    .0759307
        doakb |   .016459   .1148089     0.14   0.886    -.2085967    .2415147
     dtisbury |  .0036947   .0528354     0.07   0.944    -.0998767     .107266
    ddartmouth |  .0186071   .0306497     0.61   0.544    -.0414745    .0786887
     dtboston | -.0072655   .0608854    -0.12   0.905     -.126617     .112086
     dtchatam | -.0954083   .1108112    -0.86   0.389    -.3126276    .1218111
   dtfairhaven | -.0241559     .07653    -0.32   0.752     -.174175    .1258632
  dtgloucester |  -.108352   .1484017    -0.73   0.465    -.3992586    .1825546
  dtmarshfield |  .0022225   .0661967     0.03   0.973    -.1275406    .1319857
  dtnewbedford | -.0630977   .0558201    -1.13   0.258    -.1725199    .0463244
```

```
   dtplymouth |  -.0006434    .0547319    -0.01    0.991    -.1079325     .1066456
 dtprovince~n |   -.108413    .2010048    -0.54    0.590    -.5024355     .2856095
  dtscituate |  -.0013097    .1187624    -0.01    0.991    -.2341154     .2314959
   dteastham |  -.1285599    .1169872    -1.10    0.272    -.3578858      .100766
 dtedgardtown |  -.0206485    .1593545    -0.13    0.897    -.3330254     .2917284
    dtharwich |  -.0492016    .0751428    -0.65    0.513    -.1965013     .0980982
   dtwestport |   -.033191    .0595145    -0.56    0.577    -.1498552     .0834732
 dtmarblehead |  -.0497002    .0791436    -0.63    0.530    -.2048426     .1054422
  dtnantucket |  -.0277093    .1106829    -0.25    0.802    -.2446771     .1892585
 dtnewburyp~t |   .0021287    .0829154     0.03    0.980    -.1604075     .1646649
   dtrockport |  -.0721718    .0747707    -0.97    0.334    -.2187421     .0743985
   dtsandwich |  -.1230408     .179101    -0.69    0.492    -.4741261     .2280445
      dtswamp |  -.0448389    .0647544    -0.69    0.489    -.1717747      .082097
  dtwellfleet |  -.0467202    .1830025    -0.26    0.798    -.4054535     .3120131
   dtyarmouth |  -.0228779    .0828293    -0.28    0.782    -.1852452     .1394895
      dtsalem |  -.0162487    .0577407    -0.28    0.778    -.1294357     .0969383
 dtmanchester |   -.104601    .0816229    -1.28    0.200    -.2646034     .0554014
    dtorleans |  -.0260683    .0693566    -0.38    0.707    -.1620255     .1098889
      dtoakb |  -.0996095    .1940096    -0.51    0.608    -.4799198     .2807007
   dttisbury |  -.0221011    .1222417    -0.18    0.857    -.2617271     .2175249
  dtdartmouth |    -.08306    .0803825    -1.03    0.301     -.240631     .0745111
       _cons |  -.1506941    .0271255    -5.56    0.000    -.2038672    -.0975209
-------------+----------------------------------------------------------------

Linear regression                               Number of obs =     7967
                                                F( 71,  7895) = 7034.25
                                                Prob > F      =   0.0000
                                                R-squared     =   0.9856
                                                Root MSE      =   .25901


-------------------------------------------------------------------------------
             |               Robust
     lrtotst |     Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lrtotst |
         L1. |   .7214126    .0277769    25.97    0.000     .6669625     .7758627
         L2. |   .2765529    .0276941     9.99    0.000     .2222652     .3308407
      dfyear |  -.0449614    .0060961    -7.38    0.000    -.0569114    -.0330115
      dtreat |  -.0072685     .015766    -0.46    0.645     -.038174      .023637
  dyeartreat |   .0510754    .0494919     1.03    0.302    -.0459418     .1480927
        dfeb |   .1462289    .0218432     6.69    0.000     .1034104     .1890474
        dmar |    .273487    .0194708    14.05    0.000     .2353192     .3116549
        dapr |   .3925167    .0215326    18.23    0.000     .3503071     .4347264
        dmay |    .312041    .0197343    15.81    0.000     .2733567     .3507254
        djun |   .2905136    .0195232    14.88    0.000     .2522429     .3287843
        djul |   .2287195    .0205768    11.12    0.000     .1883835     .2690555
        daug |    .259501    .0195992    13.24    0.000     .2210813     .2979206
        dsep |   .2253334    .0196906    11.44    0.000     .1867347     .2639322
        doct |   .1045806    .0225838     4.63    0.000     .0603104     .1488509
        dnov |   .1064037     .022046     4.83    0.000     .0631876     .1496198
        ddec |   .2978994    .0220333    13.52    0.000     .2547083     .3410906
      dboston |   .0080696    .0343592     0.23    0.814    -.0592834     .0754226
      dchatam |    .0125005    .0699778     0.18    0.858    -.1246746     .1496755
   dfairhaven |   .0085377    .0249843     0.34    0.733    -.0404381     .0575136
  dgloucester |   .0551272    .0854265     0.65    0.519    -.1123314     .2225858
  dmarshfield |  -.0245359    .0385227    -0.64    0.524    -.1000506     .0509788
  dnewbedford |    .013353    .0233389     0.57    0.567    -.0323974     .0591035
    dplymouth |   .0003012    .0220417     0.01    0.989    -.0429065     .0435088
 dprovincet~n |   .0009327    .0817928     0.01    0.991    -.1594029     .1612683
   dscituate |   .0155711    .0364002     0.43    0.669    -.0557829     .0869252
     dbeverly |  -.0127243    .0343911    -0.37    0.711      -.08014     .0546913
     deastham |   .0024975     .068126     0.04    0.971    -.1310474     .1360424
   dedgardtown |  -.0169229    .0966941    -0.18    0.861     -.206469     .1726231
```

```
     dharwich |    .0217285    .0431767     0.50    0.615    -.0629092    .1063663
    dwestport |    .0192533    .0197167     0.98    0.329    -.0193967    .0579032
  dmarblehead |   -.0059603    .0416923    -0.14    0.886    -.0876883    .0757677
   dnantucket |    .0228842    .0742901     0.31    0.758    -.1227441    .1685125
 dnewburyport |    -.000106    .0558494    -0.00    0.998    -.1095856    .1093736
    drockport |    .0085147    .0458053     0.19    0.853    -.0812758    .0983052
    dsandwich |    .0154651    .0501976     0.31    0.758    -.0829354    .1138656
       dswamp |   -.0106642    .0369561    -0.29    0.773    -.0831079    .0617794
    dwellfleet |    .0093262    .1127602     0.08    0.934    -.2117135     .230366
    dyarmouth |    .0072285    .0437291     0.17    0.869    -.0784921    .0929491
       dsalem |    .0065124    .0318398     0.20    0.838    -.0559021    .0689268
  dmanchester |    .0200396    .0436937     0.46    0.647    -.0656116    .1056908
     dorleans |    .0149847    .0316955     0.47    0.636    -.0471468    .0771162
        doakb |     .030361    .1147272     0.26    0.791    -.1945346    .2552567
     dtisbury |    .0056361    .0512518     0.11    0.912    -.0948309    .1061031
    ddartmouth |    .0192455    .0309278     0.62    0.534    -.0413811    .0798722
     dtboston |   -.0101575    .0629153    -0.16    0.872    -.1334882    .1131732
     dtchatam |   -.1005223     .111434    -0.90    0.367    -.3189624    .1179178
    dtfairhaven |   -.0298328    .0796338    -0.37    0.708    -.1859361    .1262704
  dtgloucester |    -.106299    .1530262    -0.69    0.487    -.4062709    .1936729
  dtmarshfield |    .0122749    .0685584     0.18    0.858    -.1221177    .1466675
  dtnewbedford |   -.0623755    .0556675    -1.12    0.263    -.1714985    .0467476
    dtplymouth |   -.0045442    .0584039    -0.08    0.938    -.1190313    .1099429
   dtprovince~n |   -.1318013    .2049282    -0.64    0.520    -.5335148    .2699121
    dtscituate |    -.008136    .1223407    -0.07    0.947    -.2479562    .2316841
     dteastham |   -.1078282    .1141751    -0.94    0.345    -.3316416    .1159851
   dtedgardtown |   -.0123594    .1597038    -0.08    0.938    -.3254212    .3007023
     dtharwich |   -.0573084    .0768814    -0.75    0.456    -.2080163    .0933995
    dtwestport |   -.0288465    .0626459    -0.46    0.645    -.1516489     .093956
  dtmarblehead |   -.0482197    .0791236    -0.61    0.542    -.2033228    .1068834
   dtnantucket |   -.0341738    .1119877    -0.31    0.760    -.2536994    .1853518
   dtnewburyp~t |    -.000206     .087964    -0.00    0.998    -.1726388    .1722268
    dtrockport |   -.0750243    .0769183    -0.98    0.329    -.2258045     .075756
    dtsandwich |   -.1035172    .1839523    -0.56    0.574    -.4641124     .257078
       dtswamp |   -.0443804    .0668368    -0.66    0.507    -.1753982    .0866374
    dtwellfleet |   -.0599417    .1841434    -0.33    0.745    -.4209114    .3010279
    dtyarmouth |   -.0177201    .0815462    -0.22    0.828    -.1775722    .1421319
      dtsalem |   -.0192385     .060546    -0.32    0.751    -.1379246    .0994476
  dtmanchester |   -.0889544     .072834    -1.22    0.222    -.2317283    .0538196
     dtorleans |   -.0363421     .072347    -0.50    0.615    -.1781613    .1054771
        dtoakb |   -.1172873    .1949371    -0.60    0.547    -.4994157    .2648411
     dttisbury |   -.0319251    .1237086    -0.26    0.796    -.2744266    .2105764
    dtdartmouth |   -.0891465    .0822059    -1.08    0.278    -.2502918    .0719988
        _cons |   -.1988406    .0287099    -6.93    0.000    -.2551196   -.1425616
--------------------------------------------------------------------------------
```

In reference to the next set of regressions, Tables 2.11-2.13, in Baden and Bianconi
(2006), we restrict the data to the subsample of 29 towns and cities and localities affected
by the fishing industry only, but now include lagged dependent variables.[3] Table AD.1.15
shows that original results are qualitative similar, we observe a negative impact of the
policy intervention on the tax receipts of the 29 coastal towns where fishing is active.
However, the effects are significantly smaller in magnitude, *4.4%* and *2.8%* lower
average and total gross real sales tax receipts for all towns in this subsample as shown in
the shaded rows. Taking into account the facts presented that the share of those fishing
communities on the total gross state tax receipts for the whole State is about *6%* for

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[3] The second lag is not significant in this case.

averages and about *19%* for total, *4.4%* and *2.8%* loss in tax revenues for the fishing
localities could still be a potentially significant amount for the State as a whole.

An approximate dollar value figure for the losses is as follows. For the averages, *4.4%*
represents an approximate *$1,247* monthly loss in average sales tax revenues for unit in
each town in the fishing industry, measured in 1994-1995 US dollars.[4] Given the
confidence intervals of estimation, these measurements could be as large as *$2,168*
monthly loss in average sales tax revenues for each unit in each town in the fishing
industry, and as low as *$354* per month. For the total, *2.8%* represents an approximate
$1,235,000 monthly loss in total gross sales tax revenues for each town in the fishing
industry, measured in 1994-1995 dollars.[5] Given the confidence intervals of estimation,
these measurements could be as large as *$2,691,000* monthly loss in average sales tax
revenues for each town in the fishing industry, and as low as *$176,468* per month.

Table AD.1.15

```
Linear regression                                   Number of obs =      700
                                                    F( 13,   686) =   969.05
                                                    Prob > F      =   0.0000
                                                    R-squared     =   0.9386
                                                    Root MSE      =    .2187

-----------------------------------------------------------------------------
             |               Robust
      lrmst1 |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
      lrmst1 |
         L1. |   .9678651   .0115822    83.56   0.000    .9451243    .990606
       dfyear|  -.0445035   .0162956    -2.73   0.006   -.0764988   -.0125083
        dfeb |    .271082   .0578522     4.69   0.000    .1574933   .3846707
        dmar |   .3451696   .0586529     5.88   0.000    .2300089   .4603304
        dapr |   .5197878   .0602827     8.62   0.000    .4014271   .6381485
        dmay |   .4091118   .0583584     7.01   0.000    .2945292   .5236944
        djun |   .4147587   .0577474     7.18   0.000    .3013758   .5281416
        djul |   .4343466   .0626624     6.93   0.000    .3113135   .5573797
        daug |   .3315244   .0561772     5.90   0.000    .2212246   .4418243
        dsep |   .1696356   .0607863     2.79   0.005    .0502861   .2889851
        doct |   .0203036   .0702322     0.29   0.773   -.1175923   .1581994
        dnov |   .1501365   .0652729     2.30   0.022    .0219778   .2782952
        ddec |   .3887553   .0640009     6.07   0.000    .2630941   .5144164
       _cons |  -.1259374   .0849331    -1.48   0.139   -.2926974   .0408226
-----------------------------------------------------------------------------
```

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[4] This amount is estimated as *4.4%* of the monthly average of gross real tax receipts per fishing town. The
total sum of averages for the fishing towns was $13,147,250 in 1982-1984 US dollars. This divided by 24
gives the monthly average of $547,802, and divided by 29 given the monthly average per town of
approximately $18,889, multiplying by 0.044 gives $831 in 1982-1984 dollars. For 1994-1995, the CPI
index is about 1.5 larger giving the values in the text. For 2005 dollars, the CPI index is about 2 times
larger giving a point estimate of $1,662, with upper bound of $2,890 and lower bound of $472
approximately.

[5] This amount is estimated as *2.8%* of the monthly total of gross real tax receipts per fishing town as above.
For 2005 dollars, gives a point estimate of $1,647,000 with upper bound of $3,588,000 and lower bound of
$2,353,000 approximately.

Table AD.1.15 cont.

```
Linear regression                              Number of obs =     700
                                               F( 13,   686) = 3366.58
                                               Prob > F      =  0.0000
                                               R-squared     =  0.9804
                                               Root MSE      =  .21926

------------------------------------------------------------------------------
             |               Robust
   lrtotst1  |     Coef.   Std. Err.      t     P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   lrtotst1  |
         L1. |   .9915491   .0053815    184.25   0.000     .980983    1.002115
       dfyear |  -.028359    .0165113     -1.72   0.086    -.0607778    .0040597
        dfeb |   .2787191   .0564905      4.93   0.000     .1678041     .389634
        dmar |   .3533206   .0571365      6.18   0.000     .2411372     .465504
        dapr |   .5277049   .0595489      8.86   0.000     .4107849     .644625
        dmay |   .4055934   .0579141      7.00   0.000     .2918832    .5193037
        djun |   .4088393   .0572961      7.14   0.000     .2963424    .5213362
        djul |   .4259688   .0623036      6.84   0.000     .3036401    .5482975
        daug |   .3203066   .0558726      5.73   0.000     .2106048    .4300085
        dsep |   .1581025   .0606941      2.60   0.009     .0389339    .2772711
        doct |   .0122932   .0703206      0.17   0.861    -.1257763    .1503626
        dnov |    .149083   .0645999      2.31   0.021     .0222457    .2759204
        ddec |   .3913467   .0634142      6.17   0.000     .2668374     .515856
       _cons |  -.198506    .0854939     -2.32   0.021    -.3663672   -.0306449
------------------------------------------------------------------------------
```

Finally, in reference to Tables 2.12-2.13 in Baden and Bianconi (2006), Table AD.1.16 includes the lagged dependent variable and we find no statistically significant effect of Amendment 5 on Gloucester, New Bedford and Plymouth relative to all other fishing communities in the State.

Table AD.1.16

```
Linear regression                                   Number of obs =     700
                                                    F( 19,  680) =  732.99
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9388
                                                    Root MSE      =  .2193


--------------------------------------------------------------------------------
             |              Robust
     lrmst1  |    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+------------------------------------------------------------------
     lrmst1  |
         L1. |  .9608389   .0125488    76.57   0.000    .9361999     .985478
      dfyear | -.0476221   .0172572    -2.76   0.006    -.081506   -.0137383
     dglouce |  .0589188   .0956117     0.62   0.538   -.1288107    .2466484
intgloufyear | -.0019097    .148486    -0.01   0.990   -.2934558    .2896365
        dnbed |  .0395326   .0478359     0.83   0.409   -.0543913    .1334565
    intnbfyear |  .0069673   .0561831     0.12   0.901   -.1033459    .1172805
         dply | -.0106288   .0318861    -0.33   0.739   -.0732358    .0519783
   intplyfyear |  .0421625    .045472     0.93   0.354     -.04712    .1314449
         dfeb |   .268958   .0581126     4.63   0.000    .1548563    .3830596
         dmar |  .3428945   .0587735     5.83   0.000     .227495    .4582939
         dapr |  .5181697   .0604235     8.58   0.000    .3995307    .6368087
         dmay |  .4102986   .0581794     7.05   0.000    .2960658    .5245315
         djun |  .4166578   .0576061     7.23   0.000    .3035506     .529765
         djul |  .4369749   .0624419     7.00   0.000    .3143728     .559577
         daug |   .334996   .0561037     5.97   0.000    .2248387    .4451533
         dsep |  .1732009   .0605627     2.86   0.004    .0542885    .2921133
         doct |  .0228222   .0698529     0.33   0.744    -.114331    .1599754
         dnov |  .1505928   .0652632     2.31   0.021    .0224512    .2787343
         ddec |  .3881277   .0641718     6.05   0.000    .2621291    .5141263
        _cons | -.0946608   .0894755    -1.06   0.290   -.2703423    .0810206
--------------------------------------------------------------------------------



Linear regression                                   Number of obs =     700
                                                    F( 19,  680) = 2620.58
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9804
                                                    Root MSE      =  .22014


--------------------------------------------------------------------------------
             |              Robust
    lrtotst1 |    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+------------------------------------------------------------------
    lrtotst1 |
         L1. |  .9904795   .0056634   174.89   0.000    .9793597    1.001599
      dfyear | -.0302459   .0174772    -1.73   0.084   -.0645617    .0040698
     dglouce |  .0215593   .0956223     0.23   0.822   -.1661911    .2093096
intgloufyear | -.0029097   .1532628    -0.02   0.985    -.303835    .2980155
        dnbed |  .0073599   .0438654     0.17   0.867    -.078768    .0934878
    intnbfyear |  .0073726   .0537632     0.14   0.891   -.0981892    .1129343
         dply |   -.00476   .0318288    -0.15   0.881   -.0672545    .0577345
   intplyfyear |  .0411473   .0470702     0.87   0.382   -.0512731    .1335678
         dfeb |  .2783952   .0567002     4.91   0.000    .1670667    .3897237
         dmar |  .3529737   .0572794     6.16   0.000    .2405081    .4654394
         dapr |  .5274645   .0597517     8.83   0.000    .4101446    .6447844
         dmay |  .4057741   .0580224     6.99   0.000    .2918494    .5196988
         djun |  .4091284   .0574222     7.12   0.000    .2963823    .5218745
         djul |  .4263689   .0624089     6.83   0.000    .3038316    .5489061
         daug |  .3208351   .0560194     5.73   0.000    .2108433     .430827
         dsep |  .1586452   .0607997     2.61   0.009    .0392676    .2780228
```

```
      doct |   .0126766    .0704118      0.18    0.857     -.125574     .1509272
      dnov |   .1491525    .0647254      2.30    0.022      .0220668    .2762382
      ddec |   .3912512    .0636576      6.15    0.000      .2662622    .5162402
     _cons |  -.187836     .0883394     -2.13    0.034     -.3612868   -.0143853
----------------------------------------------------------------------------
```

In summary, with the inclusion of lagged effects on sales tax receipts the main qualitative conclusions of Baden and Bianconi (2006) regarding Amendment 5 were not substantively altered: From a quantitative perspective, the best evidence is from Table AD.1.15 [Table 2.11 in Baden and Bianconi (2006)] where the introduction of the amendment is shown to reduce the average sales tax receipts of all fishing towns by about an upper bound of negative 7.6% to a lower bound of 1.2%, a much smaller effect than previously obtained, but still statistically significant.

AD.I.2. Amendment 7: July 1995 to July 1997 Period

First, we provide time series analysis and intervention analysis for the amendment, in Boston, Gloucester, New Bedford, Fairhaven, Plymouth, and Marshfield.

Boston

Figure AD.1.13 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment on July 1, 1996. No specific pattern is observed for Boston.

Figure AD1.13

Table AD.1.16 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a positive effect, but not statistically significant for Boston.

Table AD.1.16

```
Linear regression                              Number of obs =        26
                                               F(  2,    23) =     23.75
                                               Prob > F      =    0.0000
                                               R-squared     =    0.4270
                                               Root MSE      =    .07397


-------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------
       lrmst |
         L1. |   .5912233   .1625185     3.64   0.001     .2550282    .9274183
      dfyear |   .0321508   .0326564     0.98   0.335    -.035404    .0997056
       _cons |   2.822628   1.116103     2.53   0.019     .5137938   5.131463
-------------------------------------------------------------------------
```

Figure AD.1.14 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The dip in the year 1996 for the gross sales tax receipts in Boston is due to tax changes unrelated to Amendment 5.
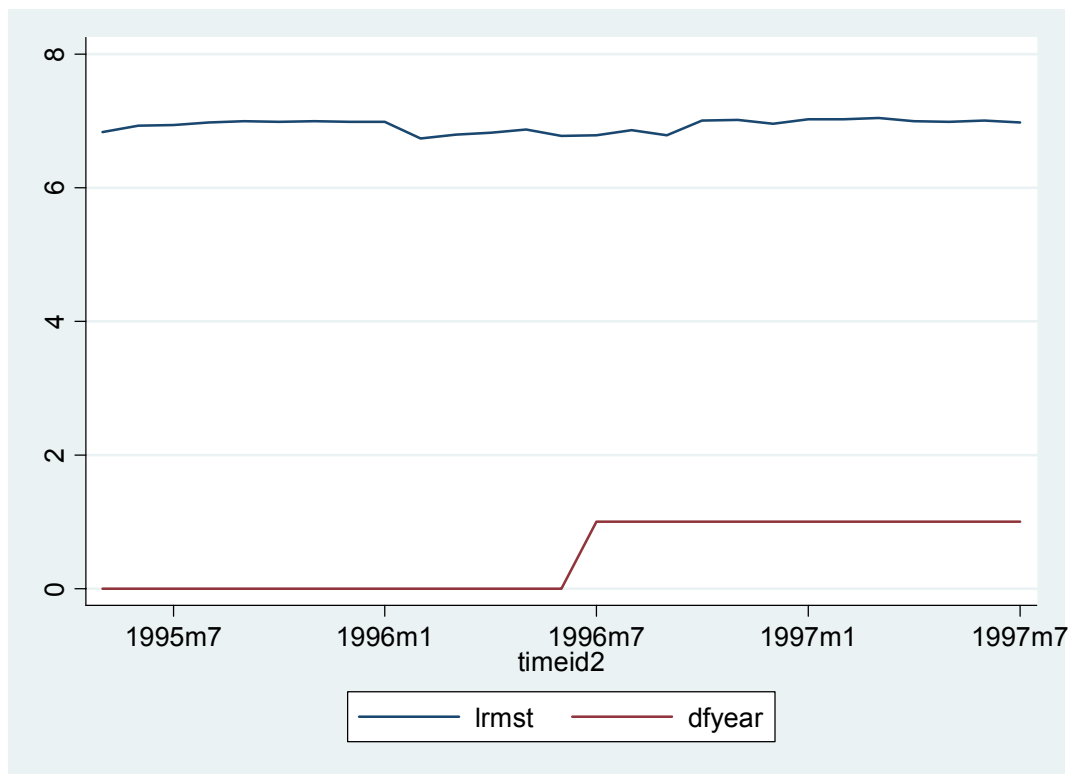
Figure AD.1.14

Table AD.1.17 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a positive effect, but not statistically significant.

Table AD.1.17

```
Linear regression                               Number of obs =      26
                                                F(  2,    23) = 1024.91
                                                Prob > F      =  0.0000
                                                R-squared     =  0.7197
                                                Root MSE      =  1.2348

------------------------------------------------------------------------------
             |               Robust
    lrtotst  |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lrtotst  |
         L1. |   .8687836   .0907512    9.57   0.000     .6810504    1.056517
       dfyear|   .5619575   .4034394    1.39   0.177    -.2726205    1.396536
       _cons |   1.554684   1.135855    1.37   0.184    -.7950106    3.904378
------------------------------------------------------------------------------
```

Gloucester

Figure AD.1.15 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The dip in the year 1996 for the average and total gross sales tax receipts in Gloucester is due to tax changes unrelated to Amendment 5.

Figure AD.1.15

Table AD.1.16 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a positive effect, but not statistically significant.

Table AD.1.16

```
Linear regression                                     Number of obs =      26
                                                      F(  2,    23) =   86.30
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.5885
                                                      Root MSE      =  .87167

------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |   .7780136   .1398916     5.56   0.000     .4886258    1.067401
      dfyear |   .2510289   .2894342     0.87   0.395    -.3477114    .8497691
       _cons |   1.007527   .6502208     1.55   0.135    -.3375568    2.352612
------------------------------------------------------------------------------
```

Figure AD.1.16 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The dip in the year 1996 for the average and total gross sales tax receipts in Gloucester is due to tax changes unrelated to Amendment 5.

Figure AD.1.16

Table AD.1.17 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a positive effect, but not statistically significant.

Table AD.1.17

```
Linear regression                                 Number of obs =       26
                                                  F(  2,    23) =   281.16
                                                  Prob > F      =   0.0000
                                                  R-squared     =   0.6641
                                                  Root MSE      =   1.6366

------------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lrtotst |
         L1. |    .830398   .1143152     7.26   0.000     .5939191    1.066877
      dfyear |   .6039561   .5313726     1.14   0.267     -.495272    1.703184
       _cons |   1.434658   1.058521     1.36   0.188    -.7550583    3.624375
------------------------------------------------------------------------------
```

New Bedford

Figure AD.1.17 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The time series pattern is slightly upwards during the period.
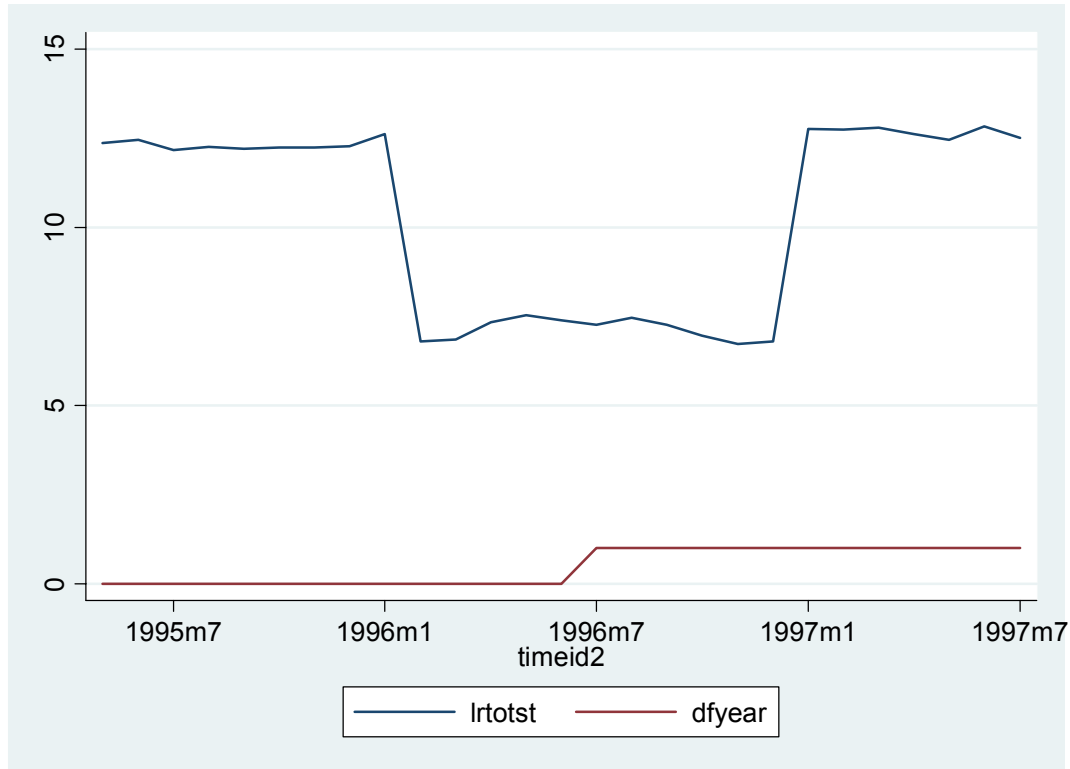
Figure AD.1.17

Table AD.1.18 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find some evidence of a positive effect, about *11%* increase after the amendment, which is statistically significant.

Table AD.1.18

```
Linear regression                                  Number of obs =        26
                                                   F(  2,    23) =      3.90
                                                   Prob > F       =    0.0347
                                                   R-squared      =    0.2092
                                                   Root MSE       =    .09058

------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |  -.1761298   .1905083    -0.92   0.365    -.5702263    .2179667
      dfyear |   .1054451   .0379414     2.78   0.011     .0269572    .1839329
       _cons |   7.266585   1.178586     6.17   0.000     4.828496    9.704675
------------------------------------------------------------------------------
```

Figure AD.1.18 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The time series pattern is slightly upwards during the period.
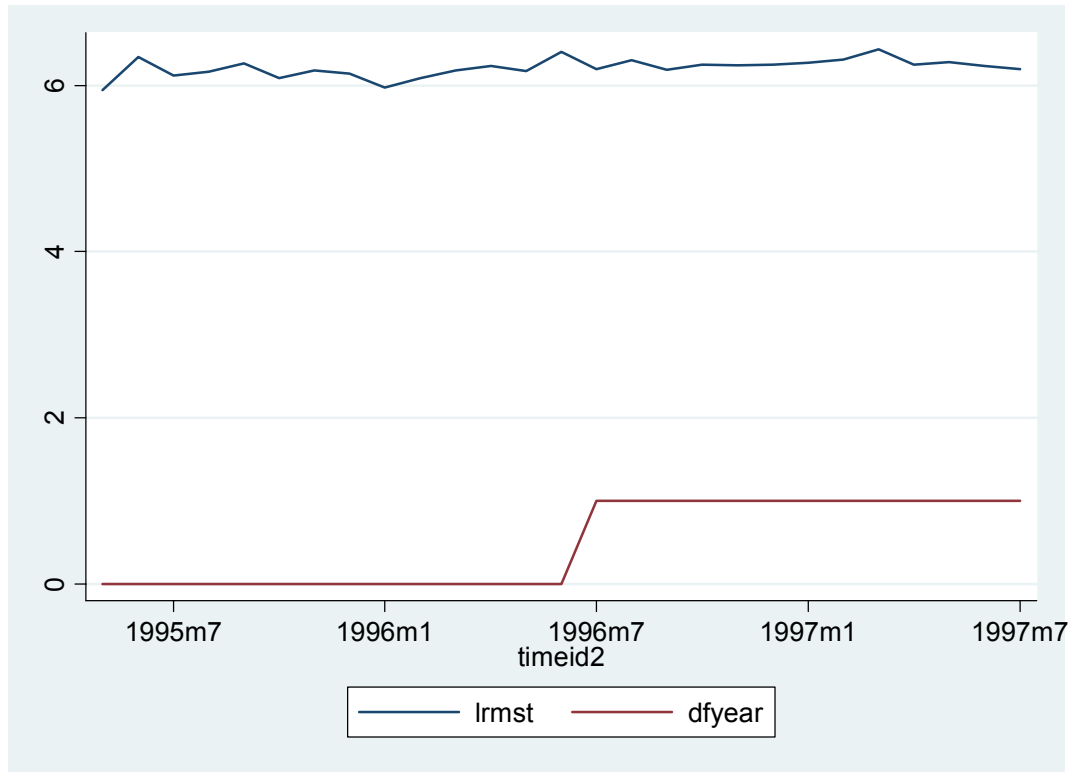
Figure AD.1.18

Table AD.1.19 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find some evidence of a positive effect, about *13%* increase after the amendment, which is statistically significant.

Table AD.1.19

```
Linear regression                               Number of obs =      26
                                                F(  2,    23) =    5.28
                                                Prob > F      =  0.0130
                                                R-squared     =  0.2881
                                                Root MSE      =  .09811

------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------
     lrtotst |
         L1. |  -.0555895   .1987261    -0.28   0.782   -.4666857    .3555067
       dfyear|   .1260532   .0431399     2.92   0.008    .0368115    .2152949
       _cons |   13.98172   2.630406     5.32   0.000     8.54031   19.42313
------------------------------------------------------------------------
```

Note that in Tables AD.1.18, and AD.1.19, the lagged dependent variable is not statistically significant. We also estimated models without lagged dependent variables and obtained similar results in Table AD.1.19a .

Table AD.1.19a

```
Linear regression                               Number of obs =      27
```

```
                                             F(  1,    25) =     6.98
                                             Prob > F      =  0.0140
                                             R-squared     =  0.2110
                                             Root MSE      =  .09941

-------------------------------------------------------------------------------
              |               Robust
       lrmst  |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+----------------------------------------------------------------
       dfyear |  .0989933    .037462     2.64   0.014     .0218389    .1761478
        _cons |  6.166722    .033144   186.06   0.000      6.09846    6.234983
-------------------------------------------------------------------------------


Linear regression                            Number of obs =      27
                                             F(  1,    25) =   11.35
                                             Prob > F      =  0.0025
                                             R-squared     =  0.3054
                                             Root MSE      =  .10501


-------------------------------------------------------------------------------
              |               Robust
      lrtotst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+----------------------------------------------------------------
       dfyear |  .1341148   .0398166     3.37   0.002      .052111    .2161187
        _cons |  13.23013   .0332401   398.02   0.000     13.16167    13.29859
-------------------------------------------------------------------------------
```

Fairhaven

Figure AD.1.19 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The time series pattern now shows a hump in the year 1996, unrelated to the amendment.
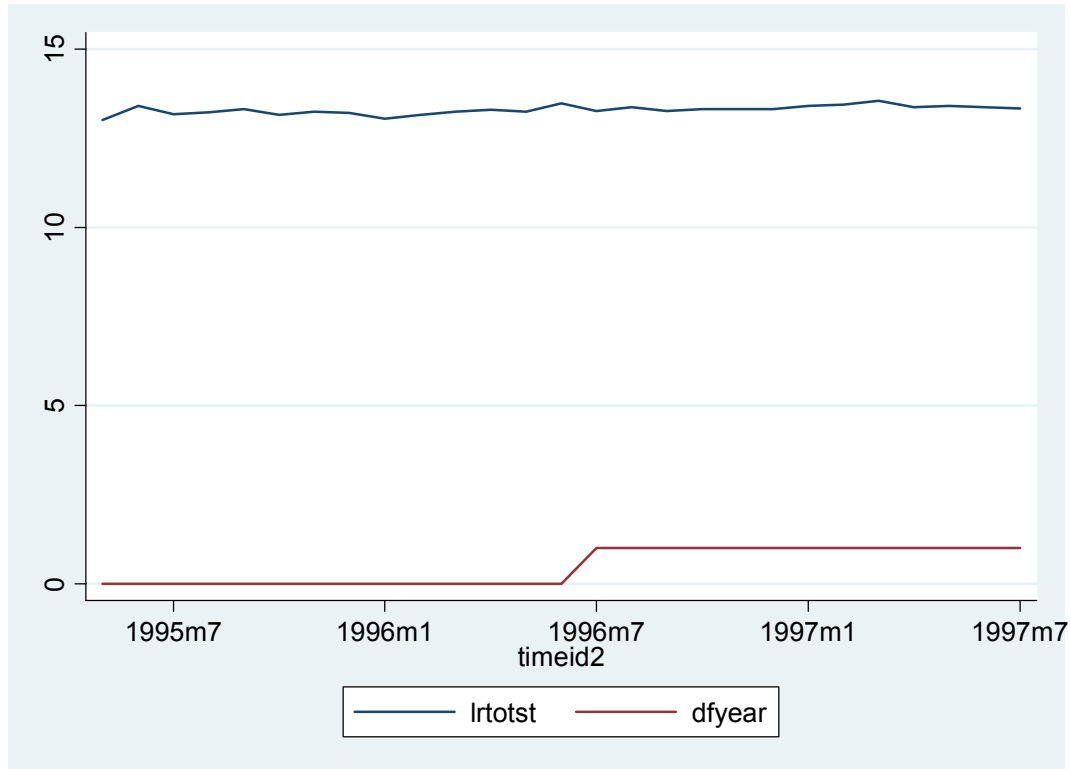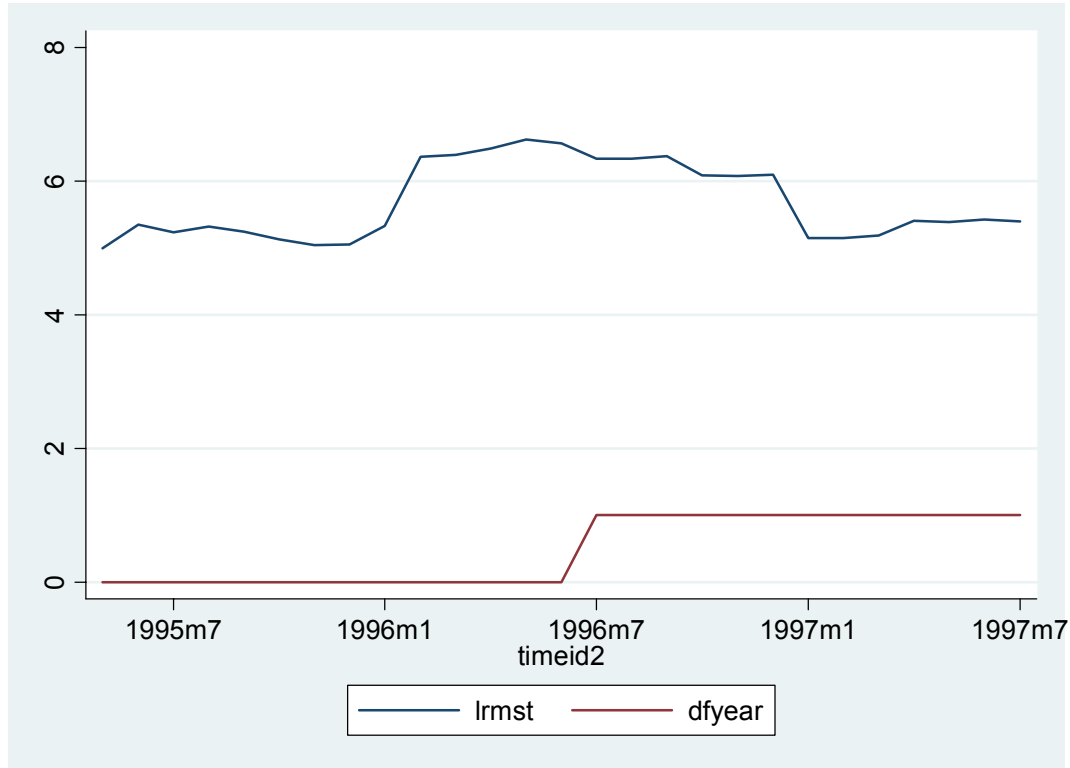
Figure AD.1.19

Table AD.1.20 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find some evidence of a negative effect, about *18%* decline after the amendment, which is statistically significant at the *5%* level.

Table AD.1.20

```
Linear regression                                   Number of obs =       26
                                                    F(  2,    23) =   234.01
                                                    Prob > F      =   0.0000
                                                    R-squared     =   0.7551
                                                    Root MSE      =   .29296

------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |   .8655349   .0611944    14.14   0.000     .7389447    .9921252
      dfyear |  -.1795581   .1044767    -1.72   0.099    -.3956846    .0365685
       _cons |   .8715897   .4001017     2.18   0.040     .0439162    1.699263
------------------------------------------------------------------------------
```

Figure AD.1.20 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The time series pattern now shows a hump in the year 1996, unrelated to the amendment.

Figure AD.1.20

Table AD.1.21 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a negative effect, about *23%* decline after the amendment, but only statistically significant at the *6%* level.

Table AD.1.21

```
Linear regression                                   Number of obs =        26
                                                    F(  2,    23) =    387.62
                                                    Prob > F      =    0.0000
                                                    R-squared     =    0.7492
                                                    Root MSE      =    .41032

------------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lrtotst |
         L1. |   .8701785   .0665211    13.08   0.000     .732569    1.007788
      dfyear |  -.2327624   .1404679    -1.66   0.111    -.5233423    .0578175
       _cons |   1.618184   .8350104     1.94   0.065    -.1091667    3.345535
------------------------------------------------------------------------------
```

Plymouth

Figure AD.1.21 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The time series pattern shows a slight upward trend.
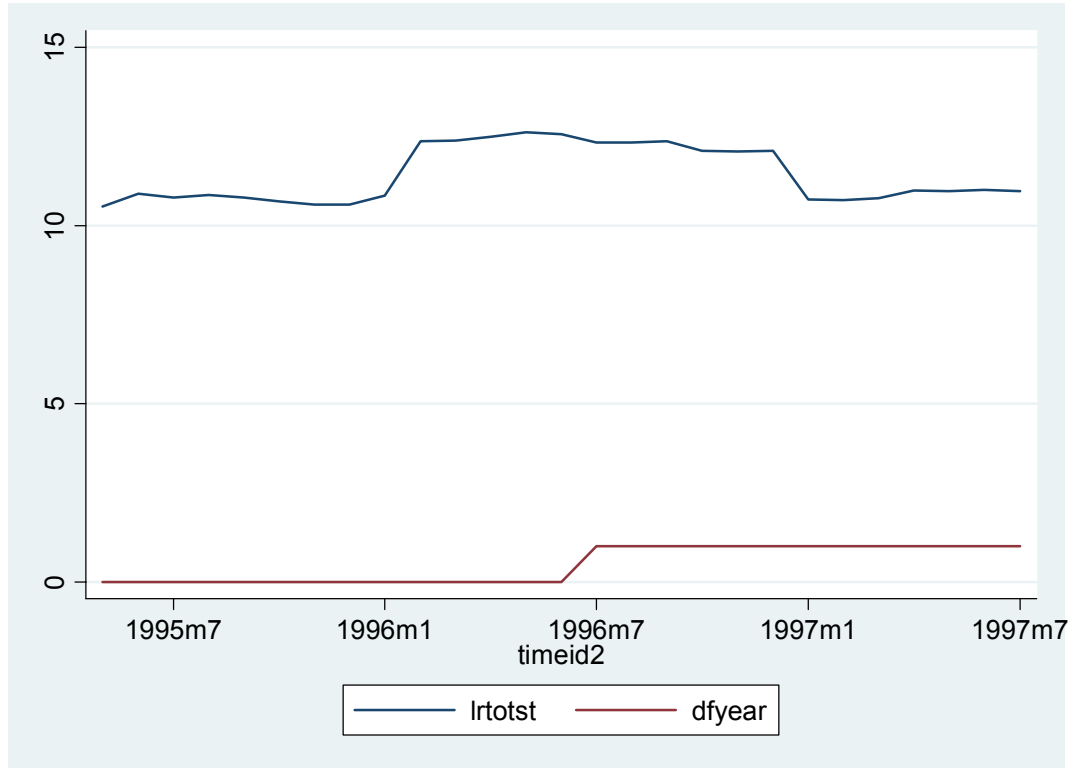
Figure AD.1.21

Table AD.1.22 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find some evidence of a positive effect, about *5%* increase after the amendment, which is statistically significant at the *4.5%* level.

Table AD.1.22

```
Linear regression                                   Number of obs =        26
                                                    F(  2,    23) =      7.55
                                                    Prob > F      =    0.0030
                                                    R-squared     =    0.4963
                                                    Root MSE      =    .07731

------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |   .5045606   .1975244     2.55   0.018     .0959503     .913171
      dfyear |   .0537097   .0299753     1.79   0.086    -.0082989    .1157182
       _cons |   2.498752    1.00285     2.49   0.020     .4241989    4.573306
------------------------------------------------------------------------------
```

Figure AD.1.22 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The time series pattern shows a slight upward trend.
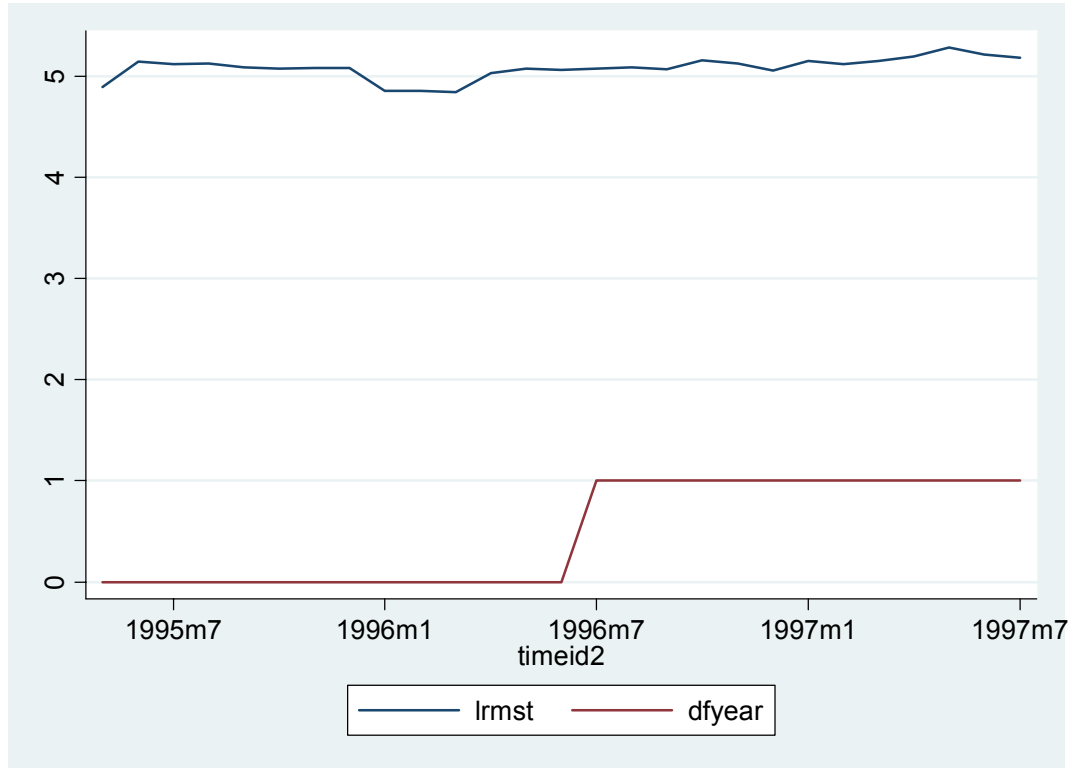
Figure AD.1.22

Table AD.1.23 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find some evidence of a positive effect, about *7.5%* increase after the amendment, which is statistically significant.

Table AD.1.23

```
Linear regression                                      Number of obs =       26
                                                       F(  2,    23) =    15.24
                                                       Prob > F      =   0.0001
                                                       R-squared     =   0.6383
                                                       Root MSE      =   .07644

------------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lrtotst |
         L1. |   .5334875   .1811422     2.95   0.007     .1587664    .9082086
      dfyear |   .0749162   .0330077     2.27   0.033     .0066346    .1431979
       _cons |   5.390903   2.099974     2.57   0.017     1.046776    9.73503
------------------------------------------------------------------------------
```

Marshfield

Figure AD.1.23 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in July 1996. The time series pattern is oscillating in this case.
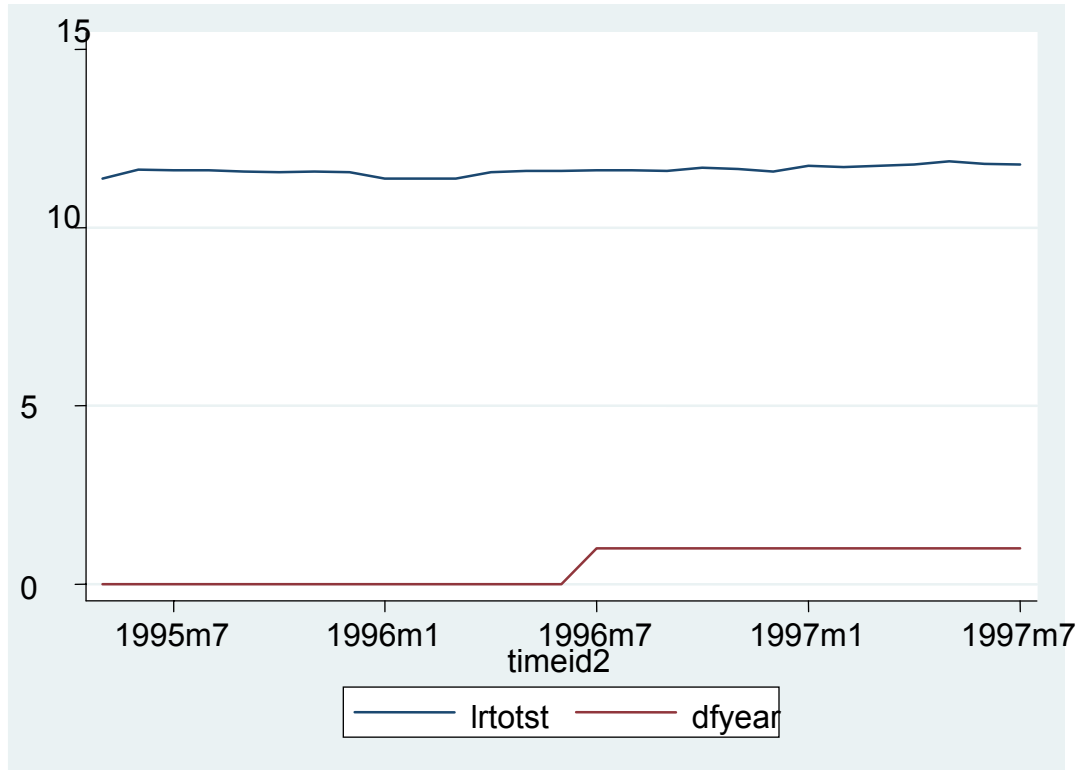
Figure AD.1.23

Table AD.1.24 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a negative effect, but not statistically significant.

Table AD.1.24

```
Linear regression                                    Number of obs =      26
                                                     F(  2,    23) =   42.15
                                                     Prob > F      =  0.0000
                                                     R-squared     =  0.5285
                                                     Root MSE      =  .11148

------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |   .8080046   .1410264     5.73   0.000     .5162692    1.09974
      dfyear |  -.0105543   .0484963    -0.22   0.830    -.1108765   .0897679
       _cons |   .9164949   .6795051     1.35   0.191    -.4891685   2.322158
------------------------------------------------------------------------------
```

Figure AD.1.24 presents the (logarithm of) total real gross sales tax receipts (line above),
the line below represents the introduction of the amendment in July 1996. The time series
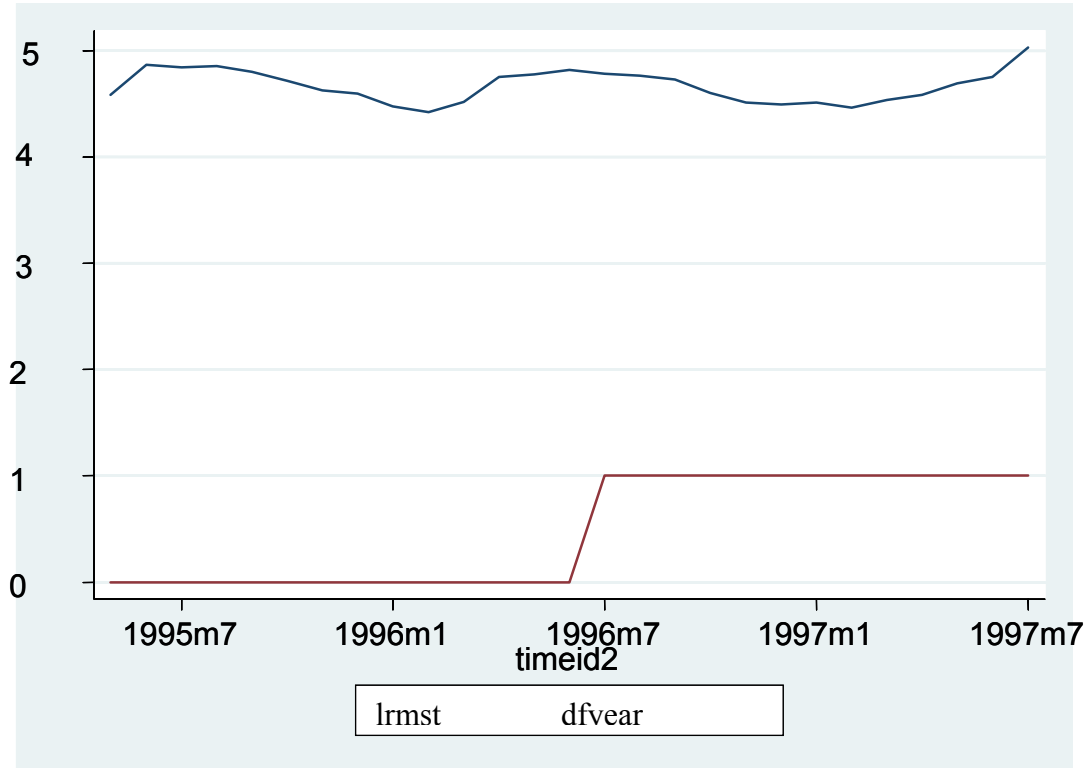pattern is again oscillating in this case.

Figure AD.1.24

Table AD.1.25 presents the time series linear regression of the total real gross sales tax
receipts taking into account the own lagged value and the intervention dummy variable of
the amendment. We do not find any statistically significant effect in this case.

Table AD.1.25

```
Linear regression                                    Number of obs =      26
                                                     F(  2,    23) =   24.21
                                                     Prob > F      =  0.0000
                                                     R-squared     =  0.5245
                                                     Root MSE      =   .1159

------------------------------------------------------------------------------
             |               Robust
     lrtotst |     Coef.   Std. Err.      t     P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lrtotst |
         L1. |  .8488731   .1654079     5.13   0.000    .5067009    1.191045
      dfyear |  .0053244   .0472709     0.11   0.911   -.0924628    .1031116
       _cons |  1.592564   1.742665     0.91   0.370   -2.012414    5.197541
------------------------------------------------------------------------------
```

In summary, the time series intervention evidence for Amendment 7 is as follows:

Table AD.1.25a

	Policy Intervention Variable	Statistically Significant
Boston	Positive	No
Gloucester	Positive	No
New Bedford	Positive	Yes
Fairhaven	Negative	Yes
Plymouth	Positve	Yes
Marshfield	Inconclusive	No

AD.I.2.1. Amendment 7: July 1995 to July 1997 Period - Autocorrelation

We proceed now with estimates of the regressions in Baden and Bianconi (2006), but including lagged dependent variables, and with other assumptions as well.

In reference to Table 2.14 in Baden and Bianconi (2006), Table AD.1.26 shows the simple differences-indifferences estimator without further factors, fixed effects or controls, but with a lagged dependent variable. Note that original results are not changed in any dramatic fashion, but autocorrelation of taxes is statistically significant, with two month history in this case.[6] For the average and total gross real sales receipts and the total gross real sales receipts we find no statistically significant effects of Amendment 7.

Table AD.1.26

```
Linear regression                                 Number of obs =     8355
                                                  F(  5,  8349) =11109.16
                                                  Prob > F      =  0.0000
                                                  R-squared     =  0.9154
                                                  Root MSE      =   .3327


-------------------------------------------------------------------------------
             |               Robust
       lrmst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
       lrmst |
         L1. |  .8947312   .0149434    59.87   0.000     .8654385    .9240239
         L2. |  .0618954   .0142605     4.34   0.000     .0339412    .0898496
       dfyear | -.0029536   .0075332    -0.39   0.695    -.0177205    .0118133
       dtreat |   .004257   .0215278     0.20   0.843    -.0379428    .0464568
   dyeartreat |  -.012471   .0297305    -0.42   0.675    -.0707501    .0458081
        _cons |   .229948   .0227008    10.13   0.000     .1854487    .2744472
-------------------------------------------------------------------------------
```

---

[6] We have performed several other econometric models and tests of fixed and random effects, available upon request. Results are unchanged.

Table AD.1.26 cont.

```
Linear regression                                   Number of obs =    8355
                                                    F(  5,  8349) =17719.58
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9435
                                                    Root MSE      =  .49327

-------------------------------------------------------------------------------
             |              Robust
     lrtotst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     lrtotst |
         L1. |   .9410517   .0096248    97.77   0.000    .9221847    .9599187
         L2. |   .0290144    .009224     3.15   0.002    .0109331    .0470956
      dfyear |   .0031424   .0112291     0.28   0.780   -.0188694    .0251541
      dtreat |    .000656   .0311723     0.02   0.983   -.0604495    .0617615
   dyeartreat|   .0382929   .0428382     0.89   0.371   -.0456806    .1222663
       _cons |   .3124041   .0354667     8.81   0.000    .2428806    .3819277
-------------------------------------------------------------------------------
```

In reference to Tables 2.19-2.22 in Baden and Bianconi (2006), we present in Table
AD.1.27 models with separate difference-in-difference estimators for each town of the
fishing industry group, reflecting changes in each town relative to all other towns in the
state, <u>excluding</u> other fishing towns, and <u>including</u> lagged dependent variables. In Table
AD.1.27, we note that the results previously obtained change only slightly reflecting the
positive trend of sales taxes in the state during this period.

Table AD.1.27

```
Linear regression                                   Number of obs =    8697
                                                    F( 81,  8615) =  897.09
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9158
                                                    Root MSE      =  .33369
-------------------------------------------------------------------------------
             |              Robust
       lrmst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
       lrmst |
         L1. |   .9482882   .0041576   228.09   0.000    .9401383    .9564381
      dfyear |   -.016841   .0075533    -2.23   0.026   -.0316473   -.0020348
      dtreat |  -.0275852   .1520638    -0.18   0.856   -.3256667    .2704962
   dyeartreat|  -.2505017    .160537    -1.56   0.119   -.5651926    .0641892
        dfeb |   .0190607   .0390504     0.49   0.625   -.0574873    .0956088
        dmar |   .0965384   .0285027     3.39   0.001    .0406662    .1524105
        dapr |   .1589843   .0294699     5.39   0.000    .1012164    .2167523
        dmay |   .1104796   .0283961     3.89   0.000    .0548163    .1661428
        djun |   .1841384   .0286515     6.43   0.000    .1279746    .2403022
        djul |   .0577552   .0293241     1.97   0.049     .000273    .1152375
        daug |   .0851464   .0283838     3.00   0.003    .0295073    .1407855
        dsep |   .0462557   .0290676     1.59   0.112   -.0107238    .1032351
        doct |   .0331637   .0300298     1.10   0.269    -.025702    .0920294
        dnov |   .0323544   .0285142     1.13   0.257   -.0235403    .0882492
        ddec |    .076961   .0287898     2.67   0.008    .0205261    .1333959
      dboston|  -.1052317    .124483    -0.85   0.398   -.3492482    .1387848
      dchatam|  -.1681018   .1283599    -1.31   0.190    -.419718    .0835143
    dfairhaven| -.0491751   .1416893    -0.35   0.729     -.32692    .2285698
   dgloucester| -.3545473    .272042    -1.30   0.193   -.8878147    .1787201
   dmarshfield| -.1989392   .1187687    -1.68   0.094   -.4317543    .0338759
   dnewbedford| -.1056484   .1222705    -0.86   0.388   -.3453279     .134031
-------------------------------------------------------------------------------
```

```
    dplymouth |   -.1863631     .1187015    -1.57    0.116    -.4190466     .0463204
 dprovincet~n |   -.1490707     .1374178    -1.08    0.278    -.4184424     .120301
    dscituate |   -.2287004     .1191765    -1.92    0.055    -.4623149     .004914
      dbeverly |   -.0030692     .0928015    -0.03    0.974    -.1849823     .178844
      deastham |    .0784035     .2921083     0.27    0.788    -.4941987     .6510056
   dedgardtown |   -.0828296     .1963572    -0.42    0.673    -.4677368     .3020776
      dharwich |   -.2104031     .1220759    -1.72    0.085    -.4497011     .0288949
     dwestport |   -.1982855     .1186243    -1.67    0.095    -.4308176     .0342465
   dmarblehead |   -.1677714     .1226726    -1.37    0.171     -.408239     .0726962
    dnantucket |   -.1631159     .1247208    -1.31    0.191    -.4075986     .0813668
  dnewburyport |   -.1169423     .1325065    -0.88    0.378    -.3766867     .142802
     drockport |   -.2137384     .1304708    -1.64    0.101    -.4694924     .0420156
     dsandwich |    -.244809     .196418     -1.25    0.213    -.6298352     .1402173
        dswamp |    -.201532     .1205379    -1.67    0.095    -.4378151     .0347512
     dwellfleet |    -.200555     .1474076    -1.36    0.174    -.4895092     .0883991
      dyarmouth |    -.158799     .121361     -1.31    0.191    -.3966955     .0790976
        dsalem |   -.1680783     .1211131    -1.39    0.165     -.405489     .0693324
   dmanchester |   -.1899288     .1195972    -1.59    0.112     -.424368     .0445104
      dorleans |   -.1695441     .1188477    -1.43    0.154    -.4025141     .0634259
         doakb |   -.1642016      .14164     -1.16    0.246     -.44185     .1134468
      dtisbury |   -.1555063     .1212759    -1.28    0.200    -.3932361     .0822235
     ddartmouth |    -.058179     .1578495    -0.37    0.712    -.3676018     .2512437
       dtboston |     .295304     .1729244     1.71    0.088    -.0436693     .6342772
       dtchatam |    .2162007     .1770671     1.22    0.222    -.1308932     .5632946
    dtfairhaven |    .0753425     .1885943     0.40    0.690    -.2943474     .4450325
   dtgloucester |    .5964214     .3884933     1.54    0.125    -.1651186     1.357961
   dtmarshfield |    .2700214     .1655045     1.63    0.103    -.0544071     .5944499
   dtnewbedford |    .2302353     .1719965     1.34    0.181    -.1069189     .5673895
      dtplymouth |    .2765608     .1678077     1.65    0.099    -.0523825      .605504
    dtprovince~n |    .2375492     .1848817     1.28    0.199    -.1248632     .5999617
      dtscituate |    .2926132     .1665843     1.76    0.079    -.0339318     .6191582
       dteastham |   -.1393853     .4341623    -0.32    0.748    -.9904474     .7116768
    dtedgardtown |    .1262386     .2601978     0.49    0.628    -.3838114     .6362886
       dtharwich |    .2976411      .169414     1.76    0.079    -.0344508      .629733
      dtwestport |    .2570216     .1635436     1.57    0.116     -.063563     .5776063
    dtmarblehead |    .2238023     .1703344     1.31    0.189     -.110094     .5576985
     dtnantucket |    .2728596     .1729034     1.58    0.115    -.0660725     .6117917
    dtnewburyp~t |    .2059948     .1859135     1.11    0.268    -.1584402     .5704298
      dtrockport |    .2531954      .175777     1.44    0.150    -.0913697     .5977604
     dtsandwich |    .3206174     .2701631     1.19    0.235     -.208967     .8502018
         dtswamp |    .2367497     .1687364     1.40    0.161     -.094014     .5675135
     dtwellfleet |    .2558057     .2031116     1.26    0.208    -.1423418     .6539531
      dtyarmouth |    .2707676      .16934      1.60    0.110    -.0611793     .6027145
        dtsalem |    .2525934     .1705466     1.48    0.139    -.0817187     .5869056
    dtmanchester |    .2578035     .1731347     1.49    0.137     -.081582     .5971891
      dtorleans |    .2579545     .1640459     1.57    0.116    -.0636146     .5795237
         dtoakb |    .2456666     .1978086     1.24    0.214    -.1420856     .6334188
       dttisbury |    .2739271     .1681411     1.63    0.103    -.0556698     .6035239
     dtdartmouth |    .1299687     .2089198     0.62    0.534    -.2795642     .5395015
      dtreatmay |    .2404329     .1101118     2.18    0.029     .0245875     .4562783
      dtreatjun |    .2594405     .1094439     2.37    0.018     .0449042     .4739768
      dtreatjul |     .297658     .114957      2.59    0.010     .0723147     .5230013
      dtreataug |     .199477     .1092585     1.83    0.068    -.0146957     .4136498
      dtreatsep |    .0763594     .1126448     0.68    0.498    -.1444513     .2971701
      dtreatoct |    .0630099     .1174081     0.54    0.592     -.167138     .2931578
      dtreatnov |    .1444138     .1108582     1.30    0.193    -.0728948     .3617224
      dtreatdec |    .1940715     .1104204     1.76    0.079    -.0223788     .4105219
      dtreatfeb |    .3205467     .1448424     2.21    0.027     .0366208     .6044725
      dtreatmar |    .1790839     .1093451     1.64    0.102    -.0352587     .3934265
      dtreatapr |    .2353698     .1151033     2.04    0.041     .0097397     .4609998
         _cons |    .2129967     .0354727     6.00    0.000     .1434618     .2825316
-------------------------------------------------------------------------------
```

Table AD.1.27 cont.

```
Linear regression                                   Number of obs =    8697
                                                    F( 81,  8615) = 1554.08
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9449
                                                    Root MSE      =  .48968


-------------------------------------------------------------------------------
             |               Robust
     lrtotst |    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     lrtotst |
         L1. |   .9673392   .003182    304.00  0.000    .9611017   .9735768
      dfyear |  -.0118931   .0111832    -1.06  0.288   -.0338149   .0100287
      dtreat |  -.0061984   .176387     -0.04  0.972   -.3519592   .3395624
   dyeartreat|   .0668164   .1029086     0.65  0.516   -.1349091   .2685418
        dfeb |  -.0078312   .0647578    -0.12  0.904   -.134772    .1191096
        dmar |   .0636088   .0458731     1.39  0.166   -.0263134   .1535311
        dapr |   .1253166   .0464884     2.70  0.007    .0341881   .216445
        dmay |   .0749224   .0457983     1.64  0.102   -.0148531   .1646979
        djun |   .1503679   .0452666     3.32  0.001    .0616345   .2391012
        djul |   .0199459   .0470877     0.42  0.672   -.0723572   .112249
        daug |   .0481124   .0457741     1.05  0.293   -.0416159   .1378407
        dsep |   .0088529   .0461881     0.19  0.848   -.0816868   .0993926
        doct |  -.0038477   .0468341    -0.08  0.935   -.0956537   .0879584
        dnov |  -.0040364   .0458693    -0.09  0.930   -.0939512   .0858784
        ddec |   .041174    .0460312     0.89  0.371   -.0490582   .1314063
     dboston |  -.2458017   .3393882    -0.72  0.469   -.9110838   .4194803
     dchatam |  -.0356462   .0954167    -0.37  0.709   -.2226857   .1513934
   dfairhaven|   .1402311   .1435819     0.98  0.329   -.1412238   .4216861
  dgloucester|  -.4170012   .4388835    -0.95  0.342   -1.277318   .4433156
  dmarshfield|  -.026918    .0816722    -0.33  0.742   -.187015    .133179
  dnewbedford|   .0837095   .0885925     0.94  0.345   -.089953    .257372
   dplymouth |   .0089594   .0829666     0.11  0.914   -.1536751   .1715938
  dprovincet~n|  .0297076   .1074413     0.28  0.782   -.180903    .2403183
   dscituate |  -.0578512   .08753       -0.66  0.509   -.2294309   .1137285
     dbeverly|   .0082654   .2163865     0.04  0.970   -.415904    .4324348
     deastham|   .3047961   .3578657     0.85  0.394   -.3967064   1.006299
  dedgardtown|   .1305805   .2253241     0.58  0.562   -.3111087   .5722696
     dharwich|  -.1101575   .102071      -1.08  0.281   -.3102411   .0899262
    dwestport|  -.0211736   .0808759    -0.26  0.793   -.1797097   .1373625
  dmarblehead|   .0146843   .0879306     0.17  0.867   -.1576809   .1870494
   dnantucket|   .0194703   .090652      0.21  0.830   -.1582294   .19717
  dnewburyport|  .0405832   .0971403     0.42  0.676   -.149835    .2310015
    drockport|  -.0419096   .1075886    -0.39  0.697   -.2528091   .1689898
    dsandwich|  -.0683393   .1718742    -0.40  0.691   -.4052538   .2685753
       dswamp|  -.0373036   .0854158    -0.44  0.662   -.2047391   .1301319
    dwellfleet|  -.0363734   .1222474    -0.30  0.766   -.2760076   .2032608
    dyarmouth|   .0155783   .0906195     0.17  0.864   -.1620577   .1932142
       dsalem|   .0071732   .0876562     0.08  0.935   -.1646538   .1790002
   dmanchester|  -.0399721   .0849846    -0.47  0.638   -.2065623   .1266181
     dorleans|  -.0000715   .0842049    -0.00  0.999   -.1651332   .1649902
        doakb|  -.0224733   .1178902    -0.19  0.849   -.2535664   .2086198
     dtisbury|   .0053381   .0857136     0.06  0.950   -.162681    .1733572
    ddartmouth|   .1182555   .148977     0.79  0.427   -.1737752   .4102861
     dtboston|   .605537    .477565      1.27  0.205   -.3306047   1.541679
     dtchatam|  -.0172885   .1307069    -0.13  0.895   -.2735054   .2389284
  dtfairhaven|  -.3135127   .186682      -1.68  0.093   -.6794541   .0524288
  dtgloucester|   .6972392   .6301808     1.11  0.269   -.538066    1.932544
  dtmarshfield|  -.0392394   .1082209    -0.36  0.717   -.2513784   .1728996
  dtnewbedford|  -.0879736   .1195699    -0.74  0.462   -.3223592   .1464121
    dtplymouth|  -.0436674   .1120503    -0.39  0.697   -.2633128   .1759779
```

```
dtprovince~n |   -.0780596    .1366148    -0.57    0.568    -.3458574    .1897381
  dtscituate |   -.0114889    .1139693    -0.10    0.920    -.2348959    .2119182
   dteastham |   -.5971017    .5218788    -1.14    0.253    -1.620109    .4259057
dtedgardtown |   -.2871988    .3002546    -0.96    0.339    -.8757697    .3013721
   dtharwich |    .1109989    .1503215     0.74    0.460    -.1836672    .4056651
  dtwestport |   -.0566638    .1058648    -0.54    0.592    -.2641841    .1508566
dtmarblehead |    -.08423     .1165432    -0.72    0.470    -.3126824    .1442225
 dtnantucket |   -.0413389    .1209429    -0.34    0.733    -.2784159     .195738
dtnewburyp~t |   -.0987766    .1360508    -0.73    0.468    -.3654687    .1679155
  dtrockport |   -.0630208    .1337877    -0.47    0.638    -.3252767    .1992351
  dtsandwich |    .0085781     .236886     0.04    0.971    -.4557753    .4729314
     dtswamp |   -.0806082     .116326    -0.69    0.488    -.3086349    .1474185
  dtwellfleet |   -.0609706    .1629169    -0.37    0.708    -.3803267    .2583854
  dtyarmouth |   -.0457852    .1216496    -0.38    0.707    -.2842475    .1926771
     dtsalem |   -.0601018     .119641    -0.50    0.615    -.2946268    .1744231
dtmanchester |   -.0578276    .1198316    -0.48    0.629    -.2927262     .177071
   dtorleans |    -.055192    .1089223    -0.51    0.612    -.2687058    .1583219
      dtoakb |   -.0637219    .1576914    -0.40    0.686    -.3728348     .245391
   dttisbury |   -.0397855    .1135345    -0.35    0.726    -.2623404    .1827693
  dtdartmouth |   -.2004043    .1886795    -1.06    0.288    -.5702613    .1694528
   dtreatmay |     .074441    .1723753     0.43    0.666    -.2634559    .4123379
   dtreatjun |    .1020969    .1691821     0.60    0.546    -.2295405    .4337344
   dtreatjul |    .1229843    .1779827     0.69    0.490    -.2259043    .4718729
   dtreataug |    .0278946    .1718665     0.16    0.871    -.3090049    .3647942
   dtreatsep |    -.095241    .1745428    -0.55    0.585    -.4373867    .2469047
   dtreatoct |   -.1062627    .1773116    -0.60    0.549    -.4538359    .2413106
   dtreatnov |   -.0223965    .1731167    -0.13    0.897    -.3617466    .3169536
   dtreatdec |    .0280451    .1726882     0.16    0.871    -.3104652    .3665554
   dtreatfeb |    .0041307    .2347749     0.02    0.986    -.4560842    .4643457
   dtreatmar |    .0140555    .1717758     0.08    0.935    -.3226662    .3507772
   dtreatapr |    .0703974     .175925     0.40    0.689    -.2744577    .4152524
       _cons |    .3136446    .0561638     5.58    0.000     .2035502    .4237391
-------------------------------------------------------------------------------
```

In reference to Tables 2-23-2.25 in Baden and Bianconi (2006), Table AD.1.28 presents equivalent regressions with two lags of the dependent variable. Results continue to show that Amendment 7 no significant impact on sales tax receipts, for all towns in the sample.

Table AD.1.28

```
Linear regression                              Number of obs =      700
                                               F( 14,   685) =   140.53
                                               Prob > F      =   0.0000
                                               R-squared     =   0.8342
                                               Root MSE      =   .35944


-------------------------------------------------------------------------------
             |              Robust
      lrmst1 |    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
      lrmst1 |
         L1. |   .9610661    .0349878    27.47    0.000      .89237    1.029762
         L2. |  -.0583819    .0285163    -2.05    0.041    -.1143718   -.0023919
      dfyear |  -.0148705     .026716    -0.56    0.578    -.0673256    .0375847
        dfeb |   .3442359    .1465633     2.35    0.019     .0564685    .6320032
        dmar |    .264477    .1067553     2.48    0.013       .05487     .474084
        dapr |   .3888953    .1108338     3.51    0.000     .1712805      .60651
        dmay |   .3455933    .1077146     3.21    0.001      .134103    .5570837
        djun |   .3508203    .1104889     3.18    0.002     .1338827    .5677579
        djul |   .3515277    .1139129     3.09    0.002     .1278673     .575188
        daug |   .2955607    .1100827     2.68    0.007     .0794206    .5117007
        dsep |    .138962    .1134599     1.22    0.221     -.083809    .3617329
```

Table AD.1.28 Cont.

```
      doct |   .1155303    .1167435     0.99   0.323    -.1136877    .3447484
      dnov |   .1898587    .1095369     1.73   0.083    -.0252097    .4049271
      ddec |   .2756072    .1081004     2.55   0.011     .0633592    .4878552
     _cons |   .2482427    .1528991     1.62   0.105    -.0519645    .5484499
-------------------------------------------------------------------------------
```

```
Linear regression                                   Number of obs =     700
                                                    F( 14,   685) =  157.45
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.8637
                                                    Root MSE      =  .53891


-------------------------------------------------------------------------------
           |             Robust
   lrtotst1 |    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
   lrtotst1 |
       L1. |   .9516706    .0252299    37.72   0.000     .9021333    1.001208
       L2. |  -.0274487    .0192158    -1.43   0.154    -.0651776    .0102803
     dfyear |   .0354684    .0412897     0.86   0.391    -.0456013     .116538
      dfeb |   -.003712    .2371943    -0.02   0.988    -.4694272    .4620032
      dmar |   .0756838    .1732492     0.44   0.662    -.2644794     .415847
      dapr |   .1930019     .175494     1.10   0.272    -.1515689    .5375727
      dmay |   .1500268    .1725216     0.87   0.385    -.1887078    .4887614
      djun |   .1514828    .1733448     0.87   0.382     -.188868    .4918337
      djul |   .1478963    .1778629     0.83   0.406    -.2013257    .4971183
      daug |   .0883436    .1717518     0.51   0.607    -.2488795    .4255668
      dsep |  -.0710678    .1742004    -0.41   0.683    -.4130986     .270963
      doct |  -.0964692    .1767651    -0.55   0.585    -.4435356    .2505972
      dnov |  -.0192453    .1734913    -0.11   0.912    -.3598839    .3213932
      ddec |    .070824    .1731825     0.41   0.683    -.2692082    .4108562
     _cons |   .7537991    .3510737     2.15   0.032     .0644894    1.443109
-------------------------------------------------------------------------------
```

Finally, in reference to Tables 2.24-2.25, we present in Table AD.1.29 results including lagged dependent variables. Results are practically unchanged as well.

Table AD.1.29

```
Linear regression                                   Number of obs =     700
                                                    F( 20,   679) =  229.48
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.8360
                                                    Root MSE      =   .3591

-------------------------------------------------------------------------------
           |             Robust
    lrmst1 |    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
    lrmst1 |
       L1. |   .9501785    .0414349    22.93   0.000     .8688227    1.031534
       L2. |  -.0512124     .033713    -1.52   0.129    -.1174067    .0149819
     dfyear |  -.0292448    .0254185    -1.15   0.250     -.079153    .0206635
    dglouce |  -.1795685    .2708436    -0.66   0.508    -.7113602    .3522232
 intgloufyear |   .3329823    .3706692     0.90   0.369    -.3948132    1.060778
      dnbed |   .1008897    .0542654     1.86   0.063    -.0056585    .2074379
   intnbfyear |   .0134089    .0676648     0.20   0.843    -.1194485    .1462662
      dply |  -.0257251     .030131    -0.85   0.394    -.0848862     .033436
  intplyfyear |    .048667    .0530081     0.92   0.359    -.0554125    .1527465
      dfeb |   .3413644    .1455638     2.35   0.019     .0555552    .6271737
```
Table AD.1.29 Cont.

```
        dmar |   .2645233   .1049882    2.52   0.012    .0583828   .4706638
        dapr |    .388577   .1098944    3.54   0.000    .1728033   .6043506
        dmay |   .3466807   .1064277    3.26   0.001    .1377137   .5556477
        djun |   .3519165    .109267    3.22   0.001    .1373746   .5664583
        djul |   .3536409   .1128805    3.13   0.002    .1320042   .5752776
        daug |   .2973103   .1097366    2.71   0.007    .0818466   .5127741
        dsep |   .1402366   .1135555    1.23   0.217   -.0827255   .3631986
        doct |   .1151052   .1173559    0.98   0.327   -.1153188   .3455292
        dnov |   .1886953   .1097678    1.72   0.086   -.0268299   .4042204
        ddec |   .2748107   .1076785    2.55   0.011    .0633878   .4862336
       _cons |   .2709838   .1499503    1.81   0.071   -.0234381   .5654058
-------------------------------------------------------------------------------


Linear regression                                Number of obs =      700
                                                 F( 20,   679) =   459.39
                                                 Prob > F      =   0.0000
                                                 R-squared     =   0.8665
                                                 Root MSE      =   .53572


-------------------------------------------------------------------------------
             |               Robust
     lrtotst1 |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     lrtotst1 |
          L1. |   .9316355   .0373689   24.93   0.000     .858263   1.005008
          L2. |  -.0132344   .0264081   -0.50   0.616   -.0650858    .038617
        dfyear |   .0103784   .0374273    0.28   0.782   -.0631088   .0838657
       dglouce |  -.4346135   .4750047   -0.91   0.361   -1.367268    .498041
  intgloufyear |   .7157849   .6451185    1.11   0.268   -.5508821   1.982452
         dnbed |   .2041716   .0894727    2.28   0.023    .0284952   .3798481
    intnbfyear |  -.0223763   .0716309   -0.31   0.755    -.163021   .1182683
          dply |   .0568155   .0446909    1.27   0.204   -.0309333   .1445644
    intplyfyear |   .0118402    .055252    0.21   0.830    -.096645   .1203255
          dfeb |  -.0049687   .2329898   -0.02   0.983   -.4624358   .4524985
          dmar |   .0741212   .1714365    0.43   0.666   -.2624881   .4107305
          dapr |   .1928262   .1737161    1.11   0.267   -.1482592   .5339116
          dmay |   .1524012   .1702899    0.89   0.371   -.1819568   .4867592
          djun |   .1537175   .1713871    0.90   0.370   -.1827948   .4902299
          djul |   .1521271   .1762083    0.86   0.388   -.1938517   .4981058
          daug |   .0912979   .1712145    0.53   0.594   -.2448756   .4274713
          dsep |   -.069087   .1744134   -0.40   0.692   -.4115414   .2733675
          doct |   -.097637   .1777943   -0.55   0.583   -.4467296   .2514557
          dnov |  -.0216259   .1738468   -0.12   0.901   -.3629678    .319716
          ddec |   .0692839   .1724443    0.40   0.688   -.2693041    .407872
         _cons |   .8230721    .337338    2.44   0.015     .160721   1.485423
-------------------------------------------------------------------------------
```

The conclusions from Baden and Bianconi (2006) are unchanged even when we take into account correlations across time in this case. For July 1995 to July 1997 period, the effects of Amendment 7 on average and total gross real sales taxes are not statistically significant. However, we note a general positive trend in sales tax receipts in this period, and this is reflected in some of the regressions above.

AD.I.3. Amendment 13: May 2003 to December 2004 Period

First, we provide time series analysis and intervention analysis for the amendment, in
Boston, Gloucester, New Bedford, Fairhaven, Plymouth, and Marshfield.

Boston

Figure AD.1.25 presents the (logarithm of) average real gross sales tax receipts (line
above), the line below represents the introduction of the amendment on May 1, 2004. We
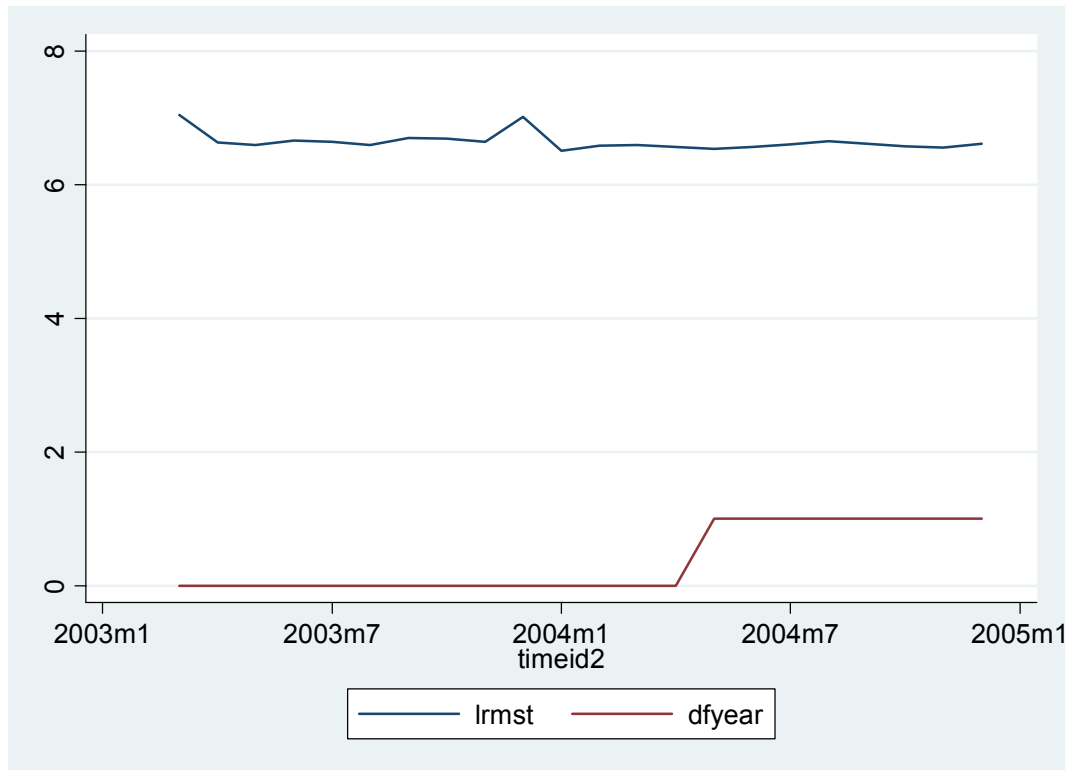observe a slight hump after the amendment.

Figure AD1.25

Table AD.1.30 presents the time series linear regression of the average real gross sales
tax receipts taking into account the own lagged value and the intervention dummy
variable of the amendment. The lagged value is not statistically significant in this case.
We find evidence of a negative effect of the amendment, about *7.3%* decline, with a *6%*
significance level.

Table AD.1.30

```
Linear regression                                    Number of obs =        21
                                                     F(  2,    18) =      1.42
                                                     Prob > F      =    0.2677
                                                     R-squared     =    0.1137
                                                     Root MSE      =    .10036

------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |   -.136279    .1469531    -0.93   0.366    -.4450161    .1724581
      dfyear |  -.0730222    .0433525    -1.68   0.109    -.1641023     .018058
       _cons |    7.56156    .9927025     7.62   0.000      5.47597    9.647151
------------------------------------------------------------------------------
```

Figure AD.1.26 presents the (logarithm of) total gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe a slight hump after the amendment.
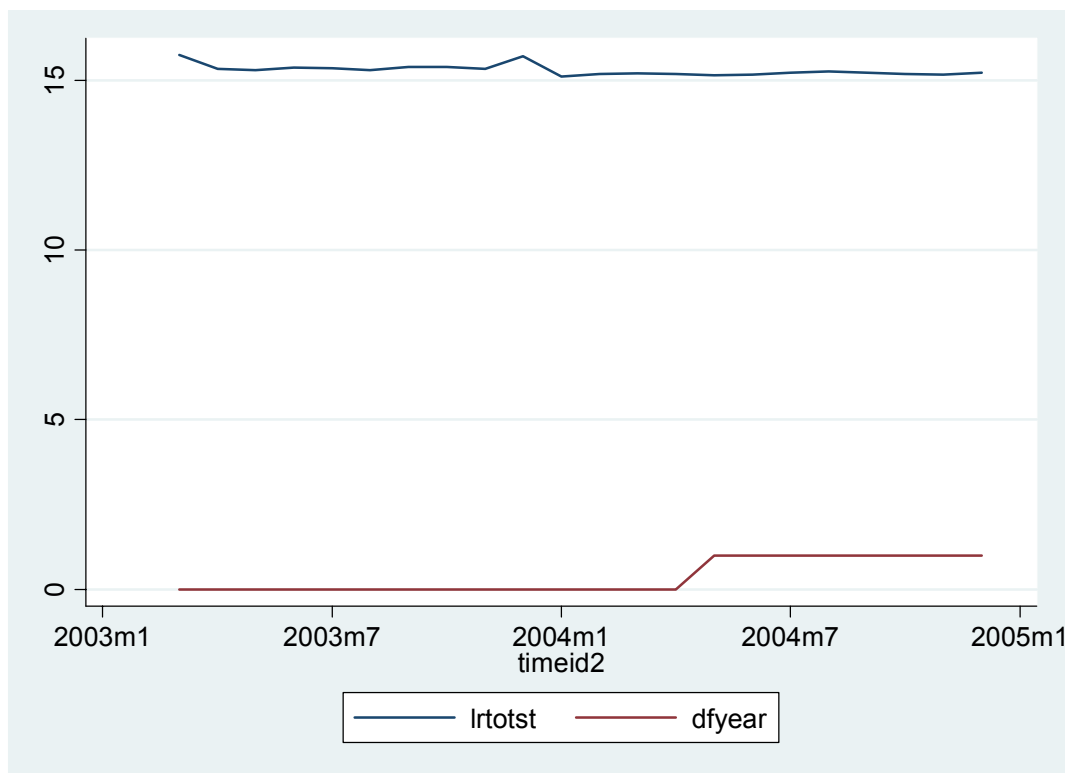
Figure AD1.26

Table AD.1.31presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. The own lagged value is not significant as well. We find some evidence of a negative effect, about *12%* decline, with appropriate statistical significance.

46

Table AD.1.31

```
Linear regression                               Number of obs =      21
                                                F(  2,    18) =    3.94
                                                Prob > F      =  0.0380
                                                R-squared     =  0.2213
                                                Root MSE      =  .12437

------------------------------------------------------------------------------
             |              Robust
     lrtotst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lrtotst |
         L1. | -.0038092   .2324067    -0.02   0.987    -.4920776    .4844592
       dfyear | -.1270651   .0596788    -2.13   0.047    -.2524456   -.0016846
       _cons |  15.39165   3.572212     4.31   0.000     7.886715    22.89659
------------------------------------------------------------------------------
```

Gloucester

Figure AD.1.27 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe a decline in average sales tax receipts since January of 2004, but with a slight increase afterwards.
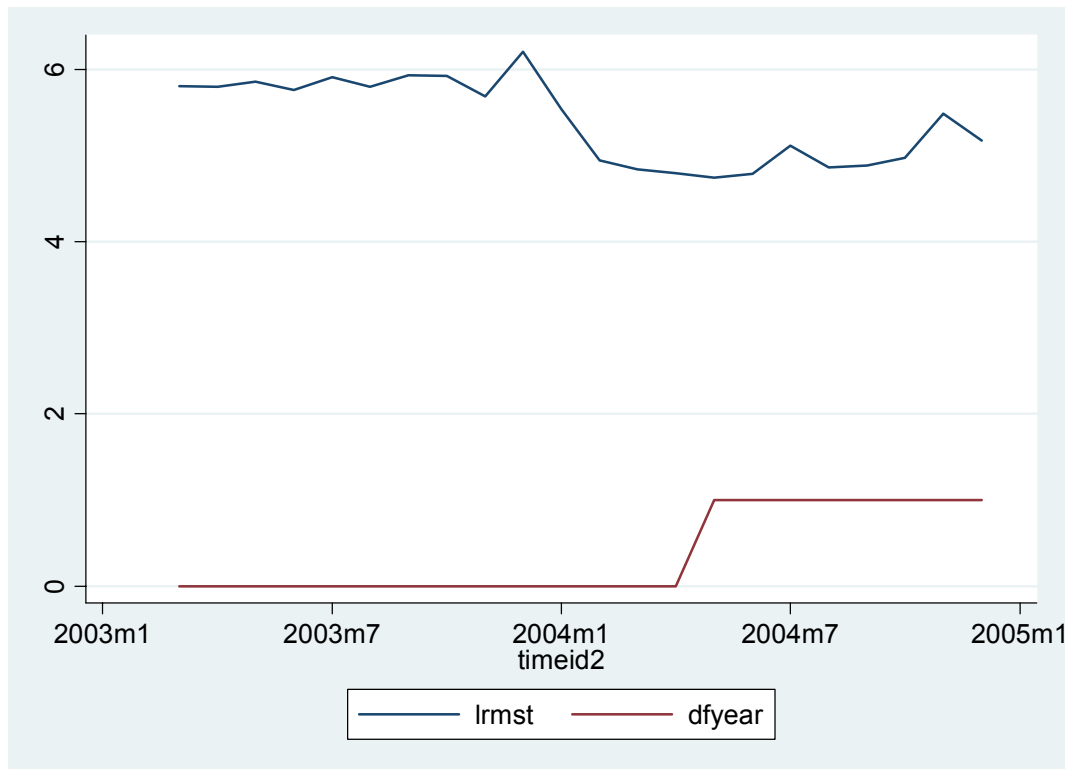
Figure AD.1.27

Table AD.1.31 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a negative effect, but not statistically significant.

Table AD.1.31

```
Linear regression                               Number of obs =      21
                                                F(  2,   18) =   22.88
                                                Prob > F      =  0.0000
                                                R-squared     =  0.6766
                                                Root MSE      =  .29385


-----------------------------------------------------------------------
             |              Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
-------------+---------------------------------------------------------
       lrmst |
         L1. |    .791294   .1729192     4.58   0.000     .4280042    1.154584
       dfyear |  -.0282787  .1807343    -0.16   0.877    -.4079874     .35143
       _cons |   1.110587   .9780127     1.14   0.271    -.9441418    3.165315
-----------------------------------------------------------------------
```

Figure AD.1.28 presents the (logarithm of) total real gross sales tax receipts (line above),
the line below represents the introduction of the amendment in May 2004. We observe a
sharp decline in total sales tax receipts since January of 2004, but with a slight increase
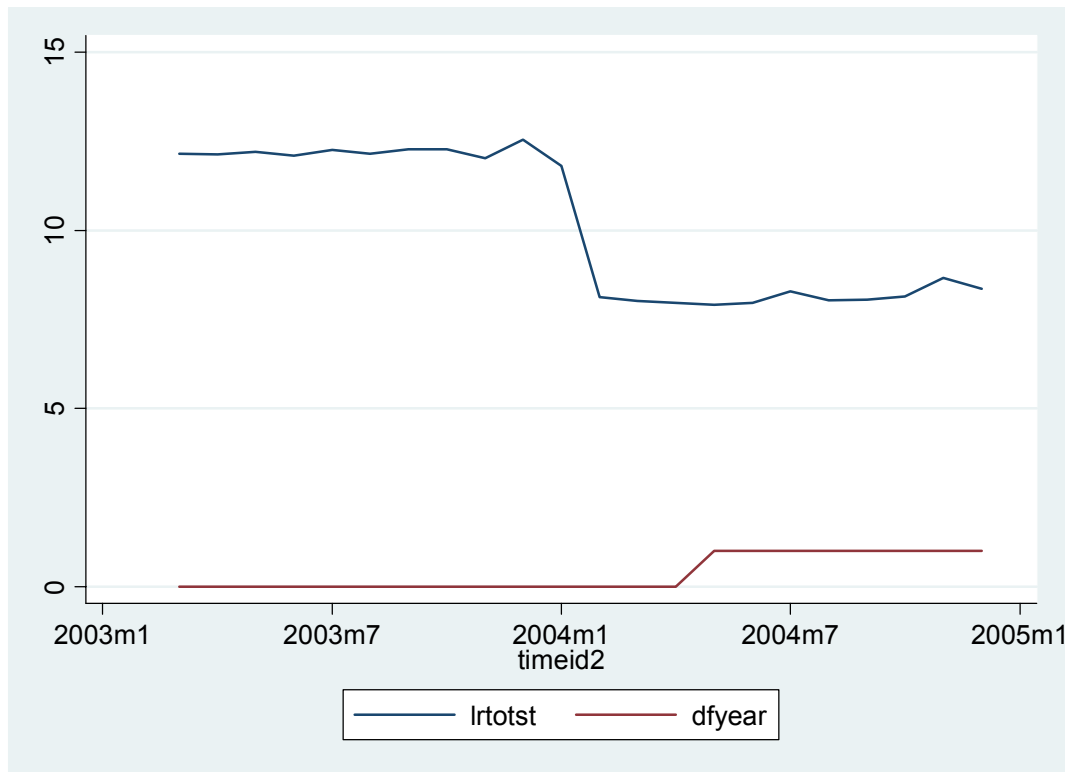afterwards.

Figure AD.1.28

Table AD.1.32 presents the time series linear regression of the total real gross sales tax
receipts taking into account the own lagged value and the intervention dummy variable of
the amendment. We find a positive effect, but not statistically significant.

Table AD.1.32

```
Linear regression                               Number of obs =       21
                                                F(  2,    18) =   237.67
                                                Prob > F      =   0.0000
                                                R-squared     =   0.8417
                                                Root MSE      =   .86983

-----------------------------------------------------------------------------
             |               Robust
     lrtotst |     Coef.   Std. Err.      t     P>|t|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
     lrtotst |
         L1. |   .9549192   .0483907    19.73   0.000     .8532541    1.056584
      dfyear |   .2155243   .2135203     1.01   0.326    -.2330653     .6641138
       _cons |    .199071   .3458614     0.58   0.572    -.5275569     .9256989
-----------------------------------------------------------------------------
```

New Bedford

Figure AD.1.29 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe hump shape in average sales tax receipts since January of 2004, but with a slight increase afterwards.
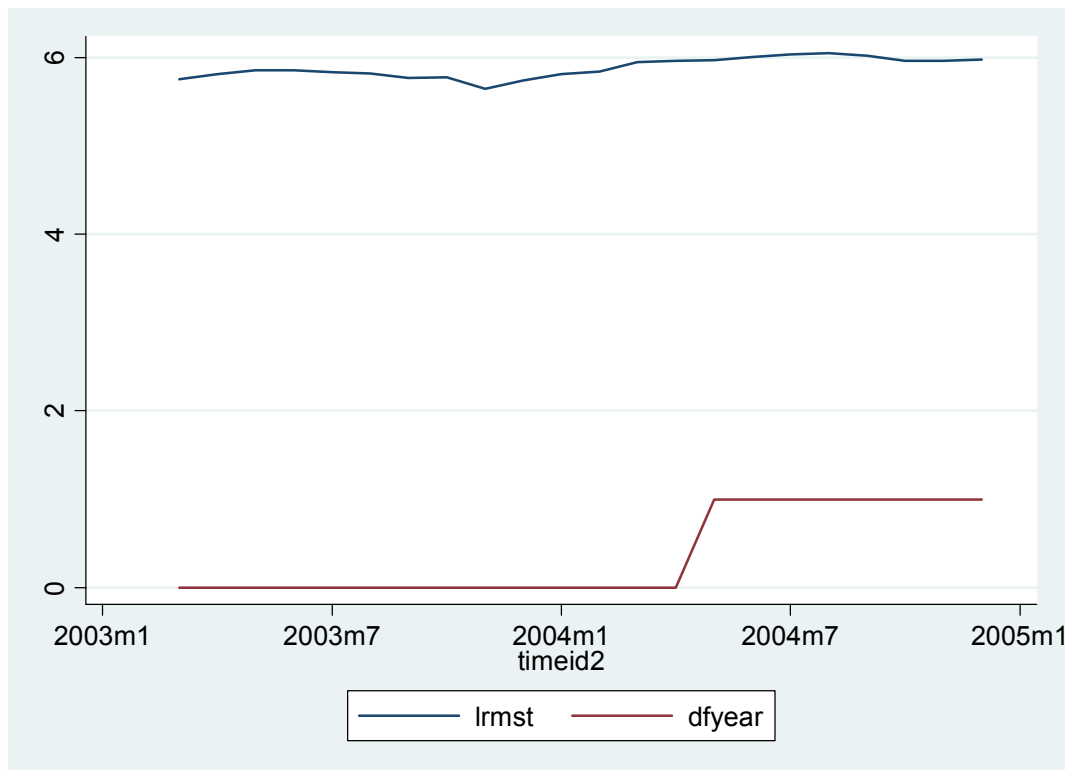
Figure AD.1.29

Table AD.1.33 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a positive effect, but not statistically significant.

Table AD.1.33

```
Linear regression                               Number of obs =      21
                                                F(  2,    18) =   42.19
                                                Prob > F      = 0.0000
                                                R-squared     = 0.7931
                                                Root MSE      = .05332

-------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
-------------+-----------------------------------------------------------
       lrmst |
         L1. |   .7451552   .1582435    4.71   0.000    .4126981   1.077612
      dfyear |    .034077   .0325498    1.05   0.309   -.0343077    .1024616
       _cons |   1.495806   .9222394    1.62   0.122   -.4417475   3.433359
-------------------------------------------------------------------------
```

Figure AD.1.30 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe a slight downward trend in total sales tax receipts, but since about January of 2004 a slight increase.
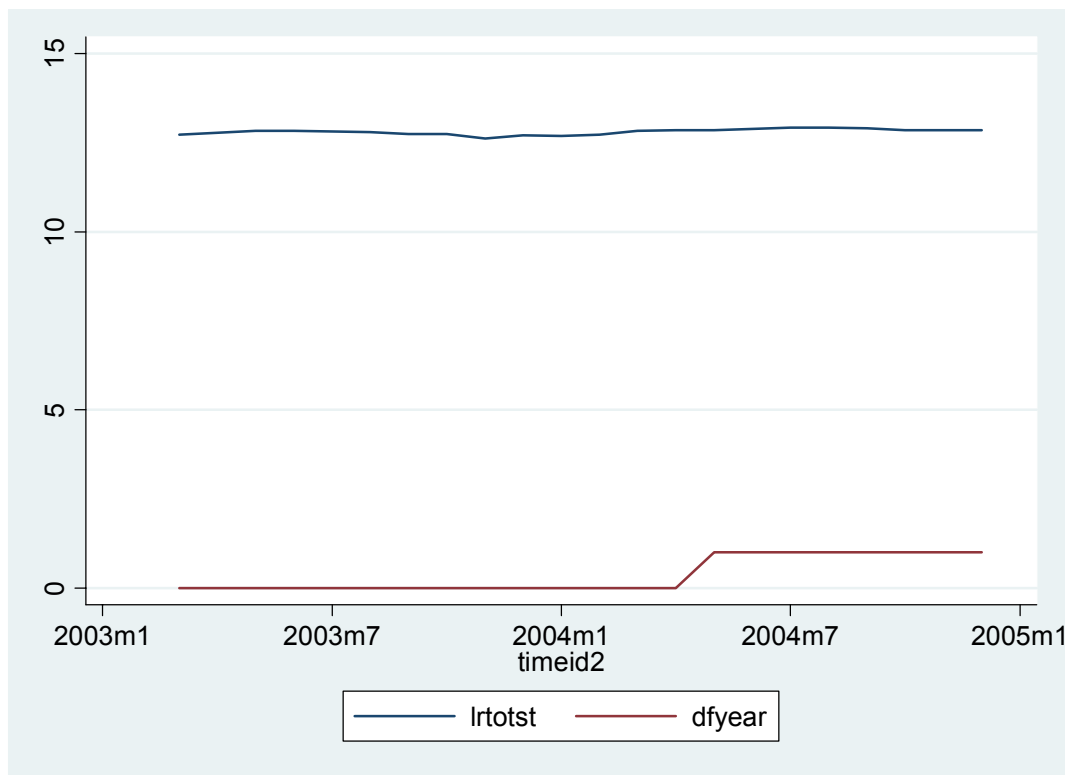
Figure AD.1.30

Table AD.1.34 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find evidence of a positive effect of about *4.2%,* which is statistically significant.

Table AD.1.34

```
Linear regression                              Number of obs =      21
                                               F(  2,    18) =   21.25
                                               Prob > F      =  0.0000
                                               R-squared     =  0.6548
                                               Root MSE      =  .04865


--------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+------------------------------------------------------------
     lrtotst |
         L1. |   .5805591   .1286029     4.51   0.000     .3103745    .8507437
       dfyear |   .0423922   .0197089     2.15   0.045     .0009855     .083799
       _cons |   5.361389   1.645971     3.26   0.004     1.903331    8.819446
--------------------------------------------------------------------------
```

Fairhaven

Figure AD.1.31 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe a downward trend in average sales tax receipts, but an increase since January of 2004.
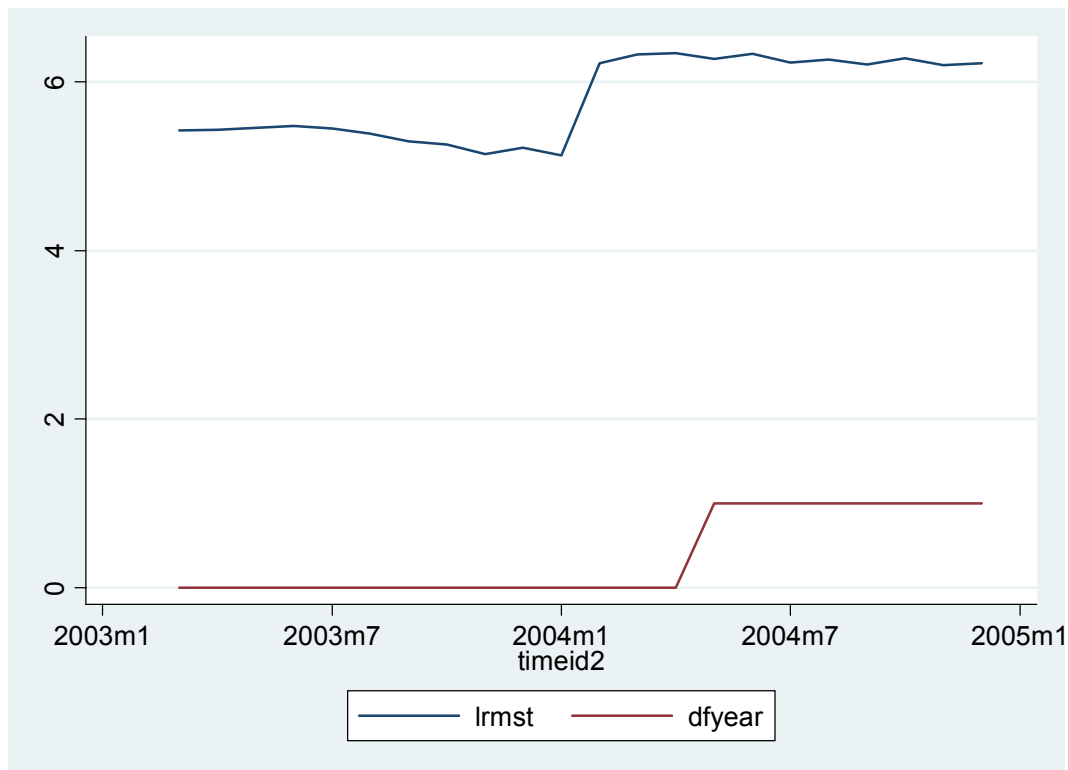
Figure AD.1.31

Table AD.1.35 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a positive effect, but not statistically significant.

Table AD.1.35

```
Linear regression                              Number of obs =      21
                                               F(  2,    18) =   39.55
                                               Prob > F      = 0.0000
                                               R-squared     = 0.7560
                                               Root MSE      = .25534

------------------------------------------------------------------------
             |               Robust
       lrmst |     Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------
       lrmst |
         L1. |  .8379511     .23585     3.55   0.002     .3424486    1.333454
       dfyear |  .0422137   .1237883    0.34   0.737    -.2178559    .3022832
       _cons |  .9581319   1.367101     0.70   0.492    -1.914041    3.830305
------------------------------------------------------------------------
```

Figure AD.1.32 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe a downward trend in total sales tax receipts, but an increase since January of 2004.
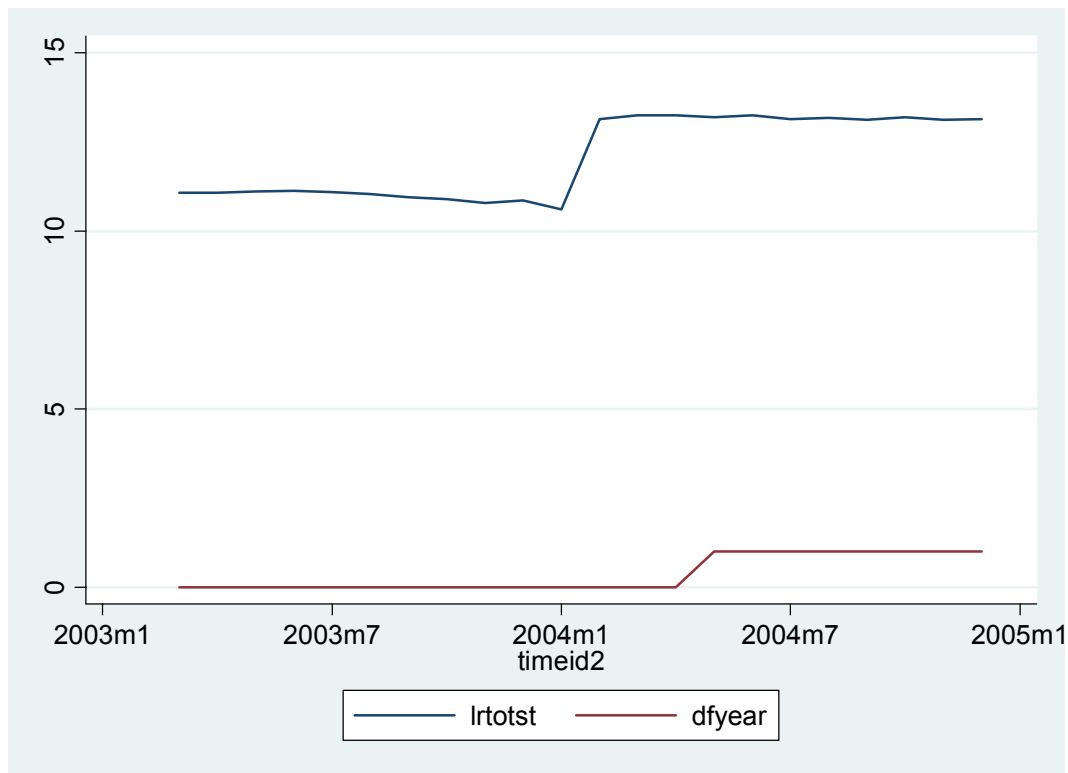
Figure AD.1.32

Table AD.1.36 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find a positive effect, but not statistically significant.

```
Table AD.1.36
Linear regression                                      Number of obs =       21
                                                       F(  2,    18) =    60.82
                                                       Prob > F      =   0.0000
                                                       R-squared     =   0.7729
                                                       Root MSE      =   .57554

-------------------------------------------------------------------------------
             |               Robust
     lrtotst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     lrtotst |
         L1. |   .8375206    .210118     3.99   0.001     .3960792    1.278962
      dfyear |   .1215924   .2339761     0.52   0.610    -.3699731    .6131579
       _cons |   2.005113   2.557376     0.78   0.443    -3.367736    7.377961
-------------------------------------------------------------------------------
```

Plymouth

Figure AD.1.33 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe a downward trend in average sales tax receipts, but an increase since about March of 2004.
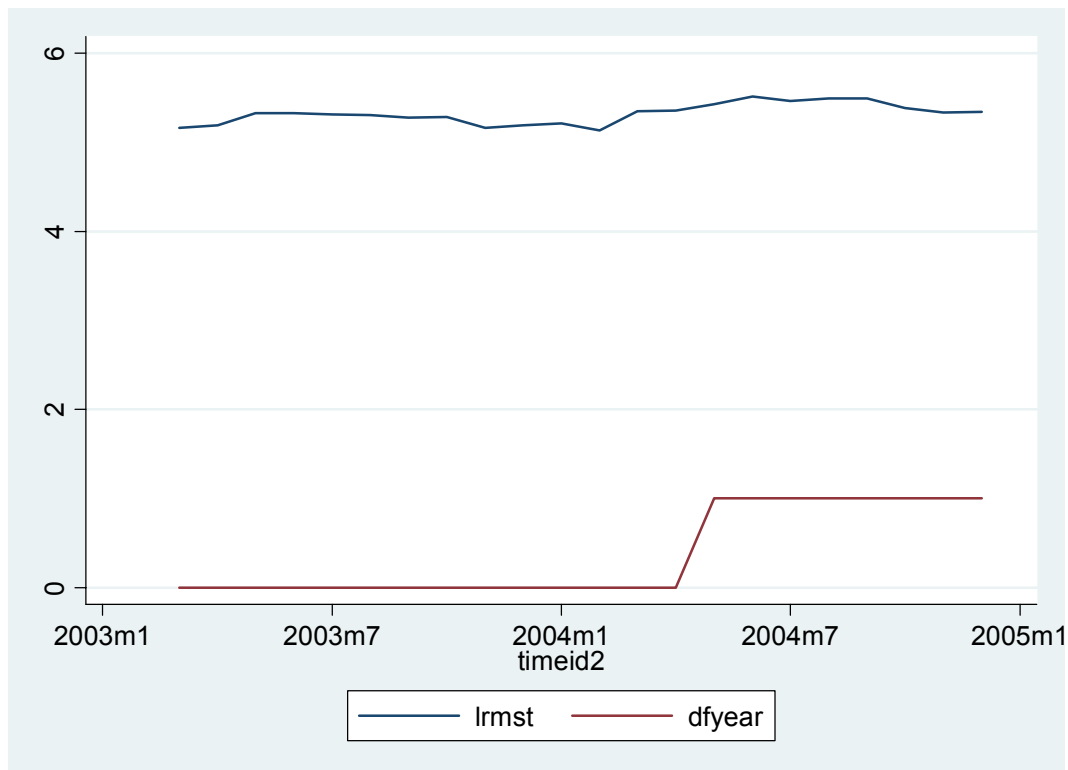
Figure AD.1.33

Table AD.1.37 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find evidence of a positive effect of about *8.7%*, which is statistically significant.

Table AD.1.37

```
Linear regression                              Number of obs =       21
                                               F(  2,    18) =    16.27
                                               Prob > F      =   0.0001
                                               R-squared     =   0.6497
                                               Root MSE      =    .0685

------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |   .4363274   .2207435     1.98   0.064    -.0274376    .9000924
      dfyear |   .0866301   .0414839     2.09   0.051    -.0005244    .1737846
       _cons |   2.973518    1.16915     2.54   0.020     .5172238    5.429811
------------------------------------------------------------------------------
```

Figure AD.1.34 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe a downward trend in total sales tax receipts, but an increase since about March of 2004.
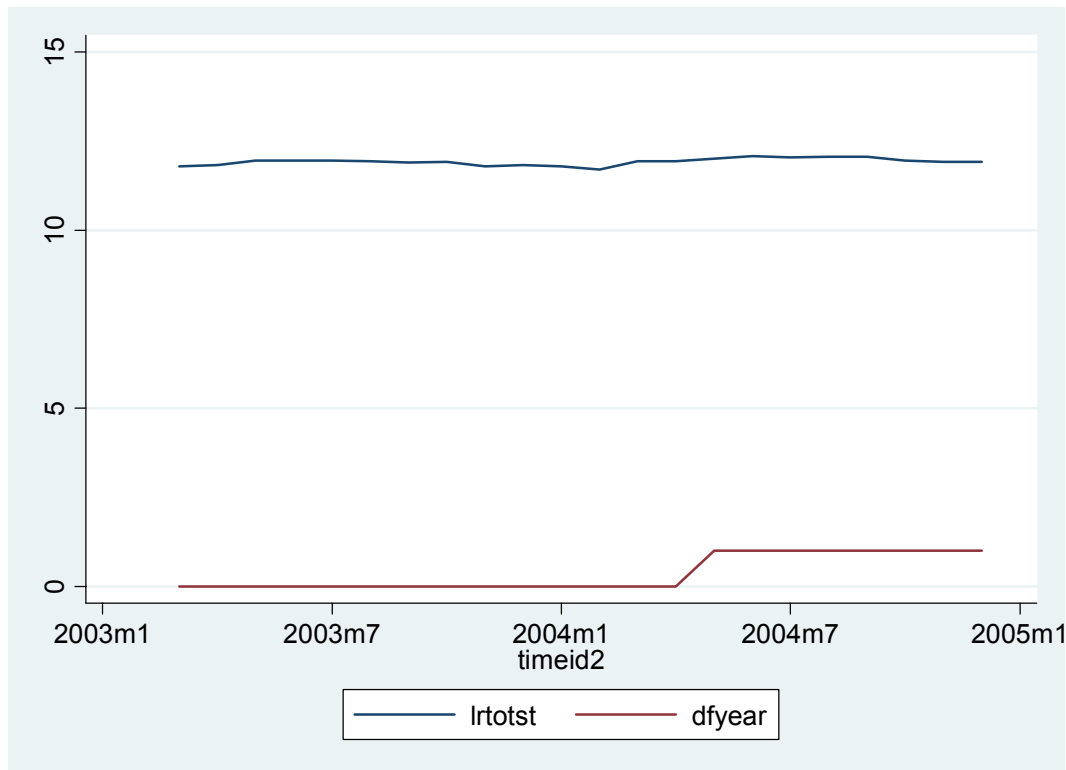
Figure AD.1.34

Table AD.1.38 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find evidence of a positive effect of about *6.2%*, which is statistically significant at the *4%* significance level.

Table AD.1.38

```
Linear regression                              Number of obs =       21
                                               F(  2,    18) =     9.65
                                               Prob > F      =   0.0014
                                               R-squared     =   0.5543
                                               Root MSE      =   .06943

------------------------------------------------------------------------
             |               Robust
     lrtotst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------
     lrtotst |
         L1. |   .4740119   .2394405     1.98   0.063    -.0290339    .9770577
      dfyear |   .0619596   .0348649     1.78   0.092    -.0112889     .135208
       _cons |   6.252633   2.853785     2.19   0.042      .257053   12.24821
------------------------------------------------------------------------
```

Marshfield

Figure AD.1.35 presents the (logarithm of) average real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe a flat average sales tax receipts, but an increase since about January of 2004.
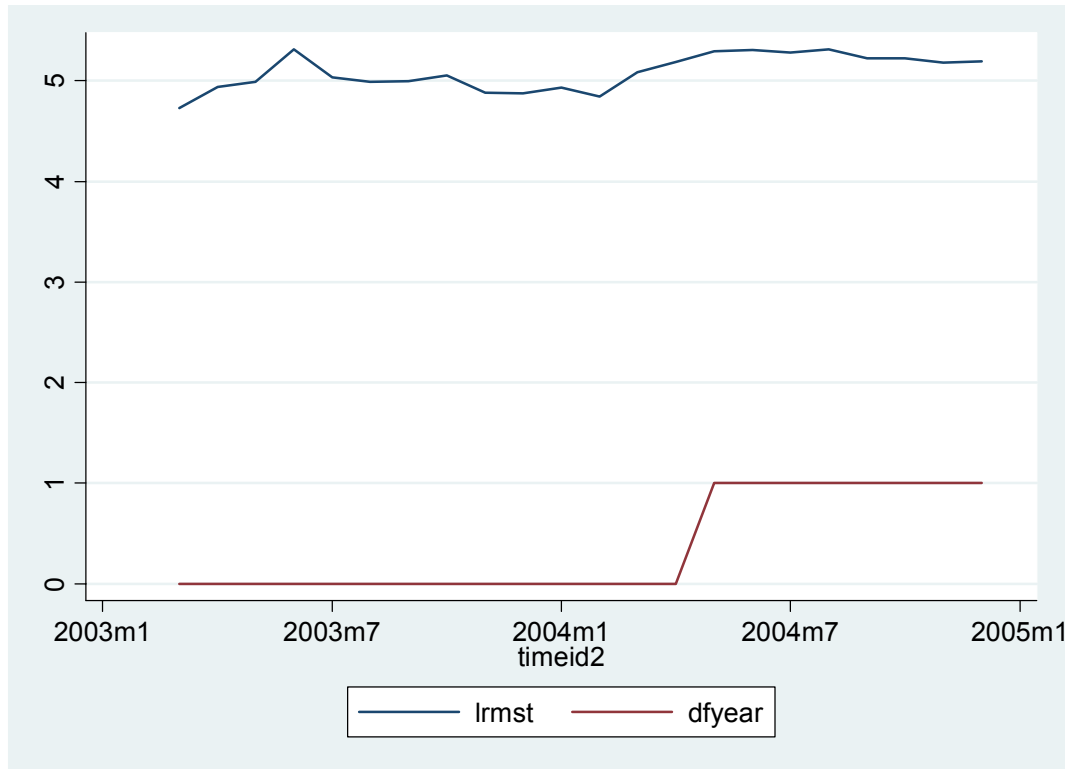
Figure AD.1.35

Table AD.1.39 presents the time series linear regression of the average real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find evidence of a positive effect of about *17%*, which is statistically significant.

Table AD.1.39

```
Linear regression                                    Number of obs =      21
                                                     F(  2,   18) =   22.49
                                                     Prob > F      =  0.0000
                                                     R-squared     =  0.6003
                                                     Root MSE      =  .10774

------------------------------------------------------------------------------
             |               Robust
       lrmst |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |   .2632378   .1506116     1.75   0.098    -.0531854    .579661
      dfyear |   .1709887   .0633141     2.70   0.015     .0379708    .3040067
       _cons |   3.699594   .7430923     4.98   0.000     2.138415    5.260773
------------------------------------------------------------------------------
```

Figure AD.1.36 presents the (logarithm of) total real gross sales tax receipts (line above), the line below represents the introduction of the amendment in May 2004. We observe an increase since about January of 2004.
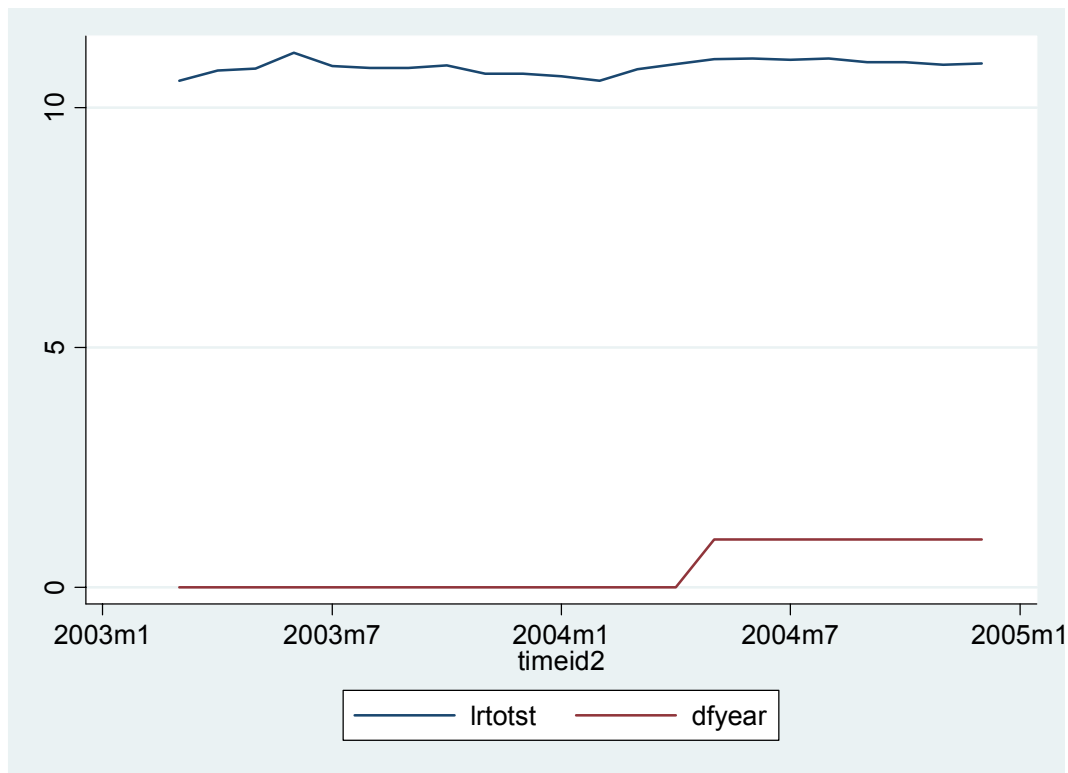
Figure AD.1.36

Table AD.1.40 presents the time series linear regression of the total real gross sales tax receipts taking into account the own lagged value and the intervention dummy variable of the amendment. We find evidence of a positive effect of about *10%*, which is statistically significant at the *4%* significance level.

Table AD.1.40
```
Linear regression                                    Number of obs =      21
                                                     F(  2,    18) =   10.20
                                                     Prob > F      =  0.0011
                                                     R-squared     =  0.4362
                                                     Root MSE      =  .11168

------------------------------------------------------------------------------
             |               Robust
    lrtotst  |    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lrtotst  |
         L1. | .3399782   .1615556     2.10   0.050     .0005625    .6793938
       dfyear| .1016675   .0517821     1.96   0.065    -.0071227    .2104577
       _cons | 7.143547   1.743231     4.10   0.001     3.481154    10.80594
------------------------------------------------------------------------------
```

In summary, the time series intervention evidence for Amendment 13 is as follows:

Table AD.1.40a

	Policy Intervention Variable	Statistically Significant
Boston	Negative	Yes
Gloucester	Inconclusive	No
New Bedford	Positive	Yes*
Fairhaven	Positive	No
Plymouth	Positive	Yes
Marshfield	Positive	Yes

* For total gross tax receipts only

AD.I.3.1. Amendment 13: May 2003 to December 2004 Period - Autocorrelation

We proceed now with estimates of the regressions in Baden and Bianconi (2006), but including lagged dependent variables, and with other assumptions as well.

In reference to Table 2.26 from Baden and Bianconi (2006), Table AD.1.41 shows linear regressions with lagged dependent variables. Results show no statistically significant effect of Amendment 13, in accordance with the original results of Table 2.26. [7]

---

[7] We have performed several other econometric models and tests of fixed and random effects, available upon request. Results are unchanged.

Table AD.1.41

```
Linear regression                                   Number of obs =    7179
                                                    F(  4,  7174) = 1991.64
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9277
                                                    Root MSE      = .30278


--------------------------------------------------------------------------------
             |               Robust
       lrmst |    Coef.    Std. Err.     t     P>|t|    [95% Conf. Interval]
-------------+------------------------------------------------------------------
       lrmst |
         L1. |  .9567674   .0116578   82.07   0.000    .9339148    .9796201
      dfyear |  -.007148     .00641   -1.12   0.265   -.0197135    .0054176
      dtreat | -.0058325   .0133616   -0.44   0.662   -.0320252    .0203601
   dyeartreat|  .0154577   .0198179    0.78   0.435   -.0233911    .0543066
       _cons |  .2439376   .0647044    3.77   0.000    .1170978    .3707773
--------------------------------------------------------------------------------


Linear regression                                   Number of obs =    7179
                                                    F(  4,  7174) = 9662.35
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9663
                                                    Root MSE      = .37304


--------------------------------------------------------------------------------
             |               Robust
     lrtotst |    Coef.    Std. Err.     t     P>|t|    [95% Conf. Interval]
-------------+------------------------------------------------------------------
     lrtotst |
         L1. |  .9792369   .0054409  179.98   0.000    .9685711    .9899026
      dfyear | -.0066206   .0079742   -0.83   0.406   -.0222524    .0090112
      dtreat |   .004971   .0188238    0.26   0.792   -.0319292    .0418711
   dyeartreat|  .0229029   .0243514    0.94   0.347   -.0248329    .0706388
       _cons |  .2256398   .0598882    3.77   0.000    .1082412    .3430384
--------------------------------------------------------------------------------
```

In reference to Tables 2.31-2.35 in Baden and Bianconi (2006), we present in Table AD.1.42 models with separate difference-in-difference estimators for each town of the fishing industry group, reflecting changes in each town relative to all other towns in the state, excluding other fishing towns, and including lagged dependent variables. In Table AD.1.42, we note that the results previously obtained change substantively. We note that the following results are not robust to the change in econometric specification for the effects of Amendment 13:

i. For Boston, Gloucester, Edgardtown and Harwich, no statistically significant decline in average gross sales tax receipts is observed when lagged dependent variables are included;

ii. For Fairhaven and Eastham, no statistically significant increase is observed in average gross sales tax receipts when lagged dependent variables are included;

iii. For Sandwich, a statistically significant increase is observed for average gross sales tax receipts when lagged dependent variables are included.[8]

Hence, we cannot corroborate the previous results of a negative impact of Amendment 13 on Gloucester, Boston, Edgardtown and Harwich, with the alternative econometric specifications presented here.

Table AD.1.42

```
Linear regression                                Number of obs =    6832
                                                 F( 82,  6749) = 1111.38
                                                 Prob > F      =  0.0000
                                                 R-squared     =  0.9499
                                                 Root MSE      =  .25129

--------------------------------------------------------------------------
             |               Robust
       lrmst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+------------------------------------------------------------
       lrmst |
         L1. |   .8875913   .0234331    37.88   0.000     .8416551    .9335274
         L2. |   .0907586   .0228413     3.97   0.000     .0459825    .1355348
      dfyear | -.0004561   .0055365    -0.08   0.934    -.0113093    .0103971
      dtreat | -.0823427   .0500473    -1.65   0.100    -.1804512    .0157657
   dyeartreat | -.0177289   .0273777    -0.65   0.517    -.0713978     .03594
        dfeb | -.0351471   .0444798    -0.79   0.429    -.1223415    .0520473
        dmar |   .1678365   .0271835     6.17   0.000     .1145481    .2211248
        dapr |   .1489909   .0280719     5.31   0.000     .0939611    .2040206
        dmay |   .1526486   .0263295     5.80   0.000     .1010346    .2042627
        djun |   .0918558   .0265764     3.46   0.001     .0397578    .1439539
        djul |   .0557065   .0263219     2.12   0.034     .0041072    .1073058
        daug |   .0506193   .0260753     1.94   0.052    -.0004966    .1017352
        dsep |   .0519211   .0262079     1.98   0.048     .0005453    .1032969
        doct |   .0495282   .0264705     1.87   0.061    -.0023624    .1014187
        dnov | -.0120251   .0262434    -0.46   0.647    -.0634705    .0394202
        ddec |   .1030404   .0267128     3.86   0.000     .0506749     .155406
      dboston | -.0020632   .0550633    -0.04   0.970    -.1100046    .1058782
      dchatam | -.0283026   .0603005    -0.47   0.639    -.1465106    .0899053
    dfairhaven |     .0635    .091148     0.70   0.486    -.1151788    .2421788
   dgloucester | -.1057972   .0866964    -1.22   0.222    -.2757494    .0641551
   dmarshfield |  -.006033   .0542558    -0.11   0.911    -.1123915    .1003255
   dnewbedford |   .0024659   .0377438     0.07   0.948    -.0715238    .0764556
     dplymouth | -.0090719   .0379938    -0.24   0.811    -.0835518     .065408
  dprovincet~n | -.0404712   .0621169    -0.65   0.515      -.16224    .0812976
     dscituate | -.0329913    .033873    -0.97   0.330     -.099393    .0334104
      dbeverly |   .0081747   .0163866     0.50   0.618    -.0239482    .0402975
      deastham |    .079516   .1012961     0.78   0.432    -.1190564    .2780884
   dedgardtown | -.1094412   .0764138    -1.43   0.152    -.2592363    .0403538
      dharwich | -.0347712   .0546292    -0.64   0.524    -.1418618    .0723193
     dwestport |  -.007271   .0360338    -0.20   0.840    -.0779087    .0633666
   dmarblehead | -.0245062   .0405506    -0.60   0.546    -.1039981    .0549857
    dnantucket | -.0089522   .0473664    -0.19   0.850    -.1018053     .083901
  dnewburyport |    .036544   .0509431     0.72   0.473    -.0633205    .1364085
    drockport | -.0782475   .0581344    -1.35   0.178    -.1922094    .0357143
     dsandwich | -.0273355   .0391275    -0.70   0.485    -.1040377    .0493667
        dswamp | -.0222183   .0442271    -0.50   0.615    -.1089173    .0644807
```

---

[8] This result is consistent with previously obtained results. We also found the result for Sandwich to hold in alternative specifications not presented here, but available upon request.

```
   dwellfleet |  -.0520713    .1159226   -0.45   0.653    -.2793161     .1751736
    dyarmouth |  -.0179285    .0528323   -0.34   0.734    -.1214965     .0856394
       dsalem |  -.0190258    .0347246   -0.55   0.584    -.0870969     .0490453
   dmanchester | -.0199126    .0509752   -0.39   0.696    -.1198401     .0800149
      dorleans |  -.0088085    .0316271   -0.28   0.781    -.0708076     .0531907
         doakb |  -.0162866    .0711957   -0.23   0.819    -.1558527     .1232795
      dtisbury |   -.005837    .0408759   -0.14   0.886    -.0859668     .0742927
     ddartmouth | -.0042674    .0443349   -0.10   0.923    -.0911779      .082643
       dtboston |  .0329791    .0653956    0.50   0.614     -.095217     .1611752
       dtchatam |  .0167871    .0788009    0.21   0.831    -.1376876     .1712618
    dtfairhaven | -.0612421    .1023748   -0.60   0.550     -.261929     .1394448
   dtgloucester |  .1513531    .1363373    1.11   0.267    -.1159109     .4186172
   dtmarshfield |  .0047784    .0614298    0.08   0.938    -.1156433     .1252001
   dtnewbedford |  .0120416    .0502558    0.24   0.811    -.0864755     .1105588
     dtplymouth |  .0078547    .0508169    0.15   0.877    -.0917625      .107472
   dtprovince~n |   .035588     .104666    0.34   0.734    -.1695904     .2407664
     dtscituate |  .0351861     .044942    0.78   0.434    -.0529143     .1232865
      dteastham | -.0816473    .1274997   -0.64   0.522     -.331587     .1682923
   dtedgardtown |  .1880899    .1612913    1.17   0.244     -.128092     .5042718
      dtharwich |  .0548597    .0879561    0.62   0.533     -.117562     .2272815
     dtwestport |  .0055966    .0431608    0.13   0.897    -.0790122     .0902054
   dtmarblehead |  .0559152    .0618926    0.90   0.366    -.0654138     .1772441
    dtnantucket |  .0244406     .075732    0.32   0.747     -.124018     .1728992
   dtnewburyp~t |  -.039069    .1036391   -0.38   0.706    -.2422342     .1640963
     dtrockport |  .0752852    .0717251    1.05   0.294    -.0653185      .215889
      dtsandwich |  .2824404    .1652936    1.71   0.088    -.0415872     .6064681
        dtswamp |  .0309843    .0607125    0.51   0.610    -.0880313     .1499998
     dtwellfleet |  .0568438     .184885    0.31   0.759    -.3055891     .4192767
      dtyarmouth |  .0735282    .0734351    1.00   0.317    -.0704277     .2174842
        dtsalem |  .0360986    .0510102    0.71   0.479    -.0638975     .1360947
    dtmanchester | -.0340625    .0849498   -0.40   0.688    -.2005908     .1324659
      dtorleans |  .0073202    .0423428    0.17   0.863     -.075685     .0903254
         dtoakb |  .0083733    .1062242    0.08   0.937    -.1998597     .2166063
       dttisbury |  .0086161    .0553323    0.16   0.876    -.0998526     .1170849
      dtdartmouth | -.0086213    .0642751   -0.13   0.893    -.1346208     .1173782
       dtreatmay |  .1488443     .052502    2.84   0.005      .045924     .2517647
       dtreatjun |  .1527355    .0533214    2.86   0.004     .0482088     .2572622
       dtreatjul |  .2193871    .0567139    3.87   0.000       .10821     .3305643
       dtreataug |  .1088867    .0497334    2.19   0.029     .0113936     .2063798
       dtreatsep | -.0580703    .0601934   -0.96   0.335    -.1760683     .0599277
       dtreatoct |  .0173202    .0524626    0.33   0.741     -.085523     .1201634
       dtreatnov |  .0542545    .0526102    1.03   0.302    -.0488781     .1573871
       dtreatdec |  .1258187    .0511339    2.46   0.014     .0255802     .2260572
       dtreatfeb |  .2284885    .0823521    2.77   0.006     .0670525     .3899245
       dtreatmar |  .0587426    .0529576    1.11   0.267     -.045071     .1625561
       dtreatapr |  .1173108     .053613    2.19   0.029     .0122123     .2224093
          _cons |  .0534427    .0318951    1.68   0.094    -.0090819     .1159672
-------------+----------------------------------------------------------------
```

```
Linear regression                                     Number of obs =    6832
                                                      F( 82,  6749) = 3082.23
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.9740
                                                      Root MSE      =  .32798
```

```
------------------------------------------------------------------------------
             |               Robust
      lrtotst |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lrtotst |
          L1. |  .9451703    .0183559   51.49   0.000     .9091869     .9811536
          L2. |  .0425984    .0181066    2.35   0.019     .0071038      .078093
```

```
       dfyear |  -.0019243    .0055559    -0.35   0.729    -.0128157    .0089671
       dtreat |  -.0519914    .0541941    -0.96   0.337     -.158229    .0542462
   dyeartreat |  -.0249804    .0331985    -0.75   0.452    -.0900599    .0400991
         dfeb |   .0327122    .0696849     0.47   0.639    -.1038923    .1693167
         dmar |   .2389692    .0275998     8.66   0.000     .1848648    .2930735
         dapr |    .209523    .0286237     7.32   0.000     .1534115    .2656346
         dmay |   .2156755    .0268551     8.03   0.000      .163031    .2683199
         djun |   .1539486    .0271283     5.67   0.000     .1007686    .2071286
         djul |   .1205343    .0268491     4.49   0.000     .0679017     .173167
         daug |   .1171054    .0266271     4.40   0.000     .0649079    .1693029
         dsep |   .1186141    .0267477     4.43   0.000     .0661802    .1710479
         doct |   .1162353    .0270106     4.30   0.000     .0632861    .1691845
         dnov |   .0549138    .0267905     2.05   0.040     .0023961    .1074315
         ddec |   .1735094    .0272163     6.38   0.000     .1201568     .226862
      dboston |   .0120816    .0599124     0.20   0.840    -.1053657    .1295289
      dchatam |  -.0278518    .0587004    -0.47   0.635    -.1429231    .0872195
    dfairhaven |   .1673062     .214716     0.78   0.436     -.253605    .5882173
   dgloucester |  -.3819707    .2947879    -1.30   0.195     -.959848    .1959065
   dmarshfield |  -.0159061    .0549059    -0.29   0.772    -.1235389    .0917268
   dnewbedford |   .0009881    .0399624     0.02   0.980    -.0773508    .0793269
     dplymouth |  -.0058865    .0396145    -0.15   0.882    -.0835433    .0717704
   dprovincet~n |  -.0400635    .0621672    -0.64   0.519    -.1619308    .0818038
     dscituate |  -.0384964    .0357698    -1.08   0.282    -.1086166    .0316238
      dbeverly |   .0179738    .0182849     0.98   0.326    -.0178703     .053818
      deastham |   .1251446    .1526453     0.82   0.412    -.1740884    .4243776
   dedgardtown |  -.2582679    .1367572    -1.89   0.059    -.5263552    .0098194
      dharwich |  -.1633683    .0811562    -2.01   0.044    -.3224601   -.0042765
     dwestport |  -.0083064    .0401939    -0.21   0.836    -.0870992    .0704863
    dmarblehead |  -.0291007    .0412262    -0.71   0.480     -.109917    .0517156
     dnantucket |  -.0112155    .0472172    -0.24   0.812    -.1037762    .0813452
   dnewburyport |   .0267109    .0521356     0.51   0.608    -.0754912    .1289131
     drockport |  -.0702711    .0545774    -1.29   0.198      -.17726    .0367179
     dsandwich |  -.0222645    .0411093    -0.54   0.588    -.1028518    .0583227
        dswamp |  -.0300909    .0473669    -0.64   0.525     -.122945    .0627632
     dwellfleet |  -.0607702    .114654    -0.53   0.596    -.2855283    .1639878
      dyarmouth |   -.018342    .0568305    -0.32   0.747    -.1297476    .0930637
        dsalem |  -.0223727     .035811    -0.62   0.532    -.0925735     .047828
    dmanchester |  -.0322864    .0558629    -0.58   0.563    -.1417952    .0772224
      dorleans |  -.0237725     .038613    -0.62   0.538    -.0994662    .0519211
         doakb |  -.0229701    .0704619    -0.33   0.744    -.1610977    .1151575
      dtisbury |  -.0154875    .0427597    -0.36   0.717      -.09931     .068335
     ddartmouth |  -.0057357    .0462147    -0.12   0.901     -.096331    .0848596
      dtboston |   .0304997    .0688229     0.44   0.658    -.1044149    .1654143
      dtchatam |   .0074234    .0764719     0.10   0.923    -.1424857    .1573325
    dtfairhaven |  -.1706495    .2196443    -0.78   0.437    -.6012216    .2599226
   dtgloucester |   .3839028    .3132618     1.23   0.220    -.2301892    .9979947
   dtmarshfield |   .0026913    .0616955     0.04   0.965    -.1182513     .123634
   dtnewbedford |   .0092273    .0517265     0.18   0.858    -.0921729    .1106276
     dtplymouth |   .0021085     .052181     0.04   0.968    -.1001827    .1043997
    dtprovince~n |    .026515      .10293     0.26   0.797    -.1752604    .2282903
     dtscituate |   .0309962    .0462132     0.67   0.502    -.0595961    .1215886
      dteastham |  -.1412109    .1722728    -0.82   0.412      -.47892    .1964982
   dtedgardtown |   .3084098    .1996105     1.55   0.122    -.0828897    .6997094
      dtharwich |   .1621274    .1066387     1.52   0.128    -.0469181    .3711728
     dtwestport |   -.002827    .0464955    -0.06   0.952    -.0939728    .0883189
    dtmarblehead |   .0521814    .0616162     0.85   0.397    -.0686058    .1729685
     dtnantucket |   .0163817    .0743303     0.22   0.826     -.129329    .1620925
    dtnewburyp~t |  -.0456197    .1037601    -0.44   0.660    -.2490222    .1577827
     dtrockport |   .0637771        .0688     0.93   0.354    -.0710925    .1986467
     dtsandwich |   .2564825    .1669249     1.54   0.124     -.070743     .583708
        dtswamp |   .0264643    .0616417     0.43   0.668    -.0943728    .1473014
     dtwellfleet |   .0503726     .180777     0.28   0.781    -.3040074    .4047526
      dtyarmouth |   .0613689     .076938     0.80   0.425    -.0894539    .2121916
```

```
     dtsalem |    .0316396    .0512508     0.62   0.537    -.0688282    .1321074
dtmanchester |   -.0413037    .0879496    -0.47   0.639    -.2137127    .1311053
    dtorleans |    .0056678    .0480624     0.12   0.906    -.0885496    .0998852
       dtoakb |   -.0056789    .1035729    -0.05   0.956    -.2087145    .1973567
    dttisbury |    .0007192    .0561384     0.01   0.990    -.1093299    .1107682
  dtdartmouth |   -.0187407    .0666943    -0.28   0.779    -.1494825    .1120011
    dtreatmay |    .1474071    .0528636     2.79   0.005     .0437778    .2510364
    dtreatjun |    .1496642    .0532379     2.81   0.005     .0453012    .2540272
    dtreatjul |    .2158255    .0567726     3.80   0.000     .1045334    .3271177
    dtreataug |    .1009294    .0497826     2.03   0.043     .0033397    .1985191
    dtreatsep |   -.0603359    .0615174    -0.98   0.327    -.1809295    .0602577
    dtreatoct |     .023999    .0523368     0.46   0.647    -.0785977    .1265957
    dtreatnov |    .0570073    .0524608     1.09   0.277    -.0458324     .159847
    dtreatdec |    .1275086    .0523856     2.43   0.015     .0248164    .2302008
    dtreatfeb |    .0889844    .1834353     0.49   0.628    -.2706067    .4485754
    dtreatmar |    .0437522    .0515939     0.85   0.396    -.0573881    .1448924
    dtreatapr |    .1178678    .0536151     2.20   0.028     .0127652    .2229704
        _cons |   -.0012767    .0389509    -0.03   0.974    -.0776328    .0750794
-------------------------------------------------------------------------------
```

In reference to the regressions in Tables 2.35-2.37 in Baden and Bianconi (2006) where we restrict the data to the subsample of towns affected by the fishing industry only, we present results below including lagged dependent variables. Table AD.1.43 indicates that original results from Table 2.35 are unchanged.

Table AD.1.43

```
Linear regression                              Number of obs =      560
                                               F( 14,   545) =   528.75
                                               Prob > F      =   0.0000
                                               R-squared     =   0.9231
                                               Root MSE      =   .19248


-------------------------------------------------------------------------------
             |               Robust
      lrmst1 |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
       lrmst |
         L1. |   1.120841    .0595882    18.81   0.000     1.00379    1.237892
         L2. |  -.1676363    .0626976    -2.67   0.008    -.290795   -.0444777
      dfyear |   .0150885    .0176966     0.85   0.394    -.0196734    .0498503
        dfeb |   .2630942    .0776244     3.39   0.001     .1106146    .4155738
        dmar |   .2401243    .0538378     4.46   0.000     .1343693    .3458793
        dapr |    .278494    .0503804     5.53   0.000     .1795304    .3774576
        dmay |   .3031628    .0487379     6.22   0.000     .2074258    .3988999
        djun |   .2432679    .0501621     4.85   0.000     .1447332    .3418026
        djul |   .2918845     .052975     5.51   0.000     .1878243    .3959446
        daug |   .1702854    .0484427     3.52   0.000     .0751281    .2654427
        dsep |   .0357809    .0629622     0.57   0.570    -.0878974    .1594593
        doct |   .1446539    .0503478     2.87   0.004     .0457543    .2435534
        dnov |   .0948735    .0515439     1.84   0.066    -.0063756    .1961226
        ddec |   .2870309    .0515534     5.57   0.000     .1857632    .3882986
       _cons |   .0500029    .0798756     0.63   0.532    -.1068989    .2069048
-------------------------------------------------------------------------------


Linear regression                              Number of obs =      560
                                               F( 14,   545) =  1530.16
                                               Prob > F      =   0.0000
                                               R-squared     =   0.9647
                                               Root MSE      =   .28037
```

```
------------------------------------------------------------------------------
             |               Robust
    lrtotst1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lrtotst |
         L1. |   1.152485   .0668278    17.25   0.000     1.021213    1.283756
         L2. |  -.1680243   .0703957    -2.39   0.017    -.3063044   -.0297442
      dfyear |   .0085523   .0175477     0.49   0.626    -.0259171    .0430217
        dfeb |   .1940132   .1788231     1.08   0.278    -.1572537    .5452801
        dmar |   .3254123   .0552459     5.89   0.000     .2168912    .4339333
        dapr |   .3374103   .0514909     6.55   0.000     .2362653    .4385553
        dmay |   .3651465   .0499651     7.31   0.000     .2669988    .4632942
        djun |   .3007874   .0511082     5.89   0.000     .2003942    .4011805
        djul |    .346921   .0538625     6.44   0.000     .2411175    .4527245
        daug |   .2217256    .049252     4.50   0.000     .1249787    .3184726
        dsep |   .0874734   .0634904     1.38   0.169    -.0372426    .2121893
        doct |   .2014407   .0531176     3.79   0.000     .0971003     .305781
        dnov |   .1538309   .0526576     2.92   0.004     .0503941    .2572677
        ddec |   .3491844   .0530047     6.59   0.000      .245066    .4533028
       _cons |  -.0765561   .0973605    -0.79   0.432    -.2678039    .1146917
------------------------------------------------------------------------------
```

Table AD.1.44 presents the results with lagged dependent variables, for the same
subsample, or differences-in-differences estimates for the ports of Gloucester, New
Bedford/Fairhaven and Plymouth/Marshfield in reference to Tables 2-36-2.37 in Baden
and Bianconi (2006). We find that the negative impact for Gloucester and the positive
impact New Bedford/Fairhaven are not robust to this alternative specification.

Table AD.1.44

```
Linear regression                               Number of obs =      560
                                                F( 20,   539) =   392.09
                                                Prob > F      =   0.0000
                                                R-squared     =   0.9233
                                                Root MSE      =    .1933


------------------------------------------------------------------------------
             |               Robust
      lrmst1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lrmst |
         L1. |   1.118025   .0594067    18.82   0.000     1.001328    1.234723
         L2. |  -.1649707   .0625755    -2.64   0.009    -.2878924   -.0420489
      dfyear |   .0143215   .0190784     0.75   0.453    -.0231556    .0517986
      dglouce |  -.0507532   .0830029    -0.61   0.541    -.2138021    .1122956
 intgloufyear |   .0563427   .1412282     0.40   0.690    -.2210825    .3337679
        dnbed |   .0358178   .0321228     1.12   0.265    -.0272834     .098919
    intnbfyear |  -.0146292   .0449813    -0.33   0.745    -.1029892    .0737309
         dply |   .0104679    .035108     0.30   0.766    -.0584973    .0794332
   intplyfyear |  -.0185107   .0506883    -0.37   0.715    -.1180815    .0810602
        dfeb |   .2623061   .0773392     3.39   0.001     .1103829    .4142294
        dmar |   .2399389   .0530984     4.52   0.000     .1356336    .3442441
        dapr |   .2783501   .0496631     5.60   0.000     .1807932    .3759071
        dmay |   .3031289   .0480658     6.31   0.000     .2087097     .397548
        djun |   .2433232   .0493883     4.93   0.000     .1463061    .3403402
        djul |   .2917857   .0523417     5.57   0.000     .1889669    .3946044
        daug |   .1702955    .047516     3.58   0.000     .0769562    .2636348
        dsep |    .035467   .0625226     0.57   0.571    -.0873508    .1582848
        doct |    .143904   .0495222     2.91   0.004     .0466239     .241184
        dnov |   .0943543   .0506818     1.86   0.063    -.0052038    .1939123
```

```
        ddec |   .2864129   .0511053     5.60   0.000      .186023    .3868028
        _cons |   .0512395   .0823285     0.62   0.534    -.1104846    .2129636
-------------------------------------------------------------------------------


Linear regression                                  Number of obs =     560
                                                   F( 20,   539) = 1306.82
                                                   Prob > F      =  0.0000
                                                   R-squared     =  0.9655
                                                   Root MSE      =  .27864


-------------------------------------------------------------------------------
             |               Robust
    lrtotst1 |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     lrtotst |
         L1. |   1.126326   .0641063    17.57   0.000     1.000397    1.252255
         L2. |  -.1411599   .0657189    -2.15   0.032    -.2702565   -.0120633
      dfyear |   .0006379   .0214155     0.03   0.976    -.0414301     .042706
     dglouce |  -.2929291   .2889098    -1.01   0.311    -.8604562     .274598
 intgloufyear |     .27163   .3055986     0.89   0.374    -.3286803    .8719402
       dnbed |   .0285264   .0331028     0.86   0.389    -.0364999    .0935527
   intnbfyear |  -.0145938   .0460106    -0.32   0.751    -.1049759    .0757883
        dply |   .0188489   .0335074     0.56   0.574    -.0469722    .0846701
  intplyfyear |  -.0206073   .0499533    -0.41   0.680    -.1187343    .0775198
        dfeb |   .1848542   .1788174     1.03   0.302    -.1664102    .5361185
        dmar |   .3200572   .0517025     6.19   0.000     .2184941    .4216202
        dapr |   .3362032    .048279     6.96   0.000      .241365    .4310413
        dmay |   .3648949   .0469097     7.78   0.000     .2727467     .457043
        djun |   .3011189   .0478115     6.30   0.000     .2071992    .3950385
        djul |   .3455223   .0515381     6.70   0.000     .2442822    .4467623
        daug |   .2211706   .0458009     4.83   0.000     .1312006    .3111407
        dsep |   .0836672   .0618485     1.35   0.177    -.0378264    .2051608
        doct |   .1935973   .0503431     3.85   0.000     .0947045    .2924901
        dnov |   .1484688   .0496915     2.99   0.003      .050856    .2460817
        ddec |   .3430533   .0513065     6.69   0.000     .2422681    .4438384
        _cons |  -.0723809   .0990117    -0.73   0.465     -.266877    .1221153
-------------------------------------------------------------------------------
```

Finally, in Table AD.1.45 we present an alternative econometric estimation for the group of coastal towns with fishing activities. We estimate a fixed-effects econometric model for the group of coastal towns with fishing activity, an alternative model from Table AD.1.44 in reference to Tables 2-36-2.37 in Baden and Bianconi (2006). In this case, we find that the negative impact for Gloucester is statistically significant with magnitudes of *-17%* for average gross sales tax receipts, with upper/lower bounds of *-35%/0.0%* and *-26%* for total gross sales tax receipts, with upper and lower bounds of *-57%/0.05%*.

Given that average and total gross sales tax receipts in Gloucester have an approximate order of magnitude of *$49,539* and *$20,000,000* respectively on average per month in 2005 US dollars, a *%17* loss in average gross sales taxes represents an average loss of *$8,422* per unit, with an upper bound of *$17,339* and a lower bound of no loss, or zero. For total gross sales tax receipts, the loss of *%26* is of the order of *$5,200,000* with an upper bound of *$11,400,000* and a lower bound of a gain of *$1,000,000* reflecting the wider confidence interval in the estimation.

Table AD.1.45

```
Fixed-effects (within) regression              Number of obs      =        560
Group variable (i): townid1                    Number of groups   =         28

R-sq:  within  = 0.7301                        Obs per group: min =         20
       between = 0.9991                                       avg =       20.0
       overall = 0.9149                                       max =         20

                                               F(17,515)          =      81.95
corr(u_i, Xb)  = 0.8237                         Prob > F           =     0.0000

------------------------------------------------------------------------------
     lrmst1 |     Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
------------+-----------------------------------------------------------------
      lrmst |
        L1. |   1.013167   .042195     24.01   0.000    .9302713    1.096062
        L2. |  -.2826074   .0434574    -6.50   0.000   -.3679829   -.1972319
     dfyear |   .0444369   .0187681     2.37   0.018    .0075654    .0813083
intgloufyear|  -.1705568   .091496     -1.86   0.063   -.3503082    .0091946
 intnbfyear |  -.0167058   .0860948    -0.19   0.846    -.185846    .1524345
 intplyfyear|  -.0229433   .0860974    -0.27   0.790   -.1920886    .1462021
       dfeb |   .2587547   .0507478     5.10   0.000    .1590565    .3584528
       dmar |   .2225425   .0495462     4.49   0.000    .1252049     .31988
       dapr |   .2745721   .0494748     5.55   0.000    .1773748    .3717694
       dmay |   .2952605   .0437043     6.76   0.000    .2093998    .3811212
       djun |   .2641684   .0437814     6.03   0.000    .1781563    .3501805
       djul |   .3378062   .0441654     7.65   0.000    .2510397    .4245727
       daug |   .2377721   .044611      5.33   0.000    .1501302     .325414
       dsep |   .1157406   .0453319     2.55   0.011    .0266824    .2047988
       doct |   .2065156   .0460148     4.49   0.000    .1161158    .2969154
       dnov |   .1306181   .0446909     2.92   0.004    .0428192     .218417
       ddec |   .3036934   .044721      6.79   0.000    .2158353    .3915515
      _cons |   1.165055   .1524511     7.64   0.000    .8655523    1.464557
------------+-----------------------------------------------------------------
    sigma_u |  .16491157
    sigma_e |   .1849485
        rho |  .44291595   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(27, 515) =    2.78             Prob > F = 0.0000



Fixed-effects (within) regression              Number of obs      =        560
Group variable (i): townid1                    Number of groups   =         28

R-sq:  within  = 0.8174                        Obs per group: min =         20
       between = 0.9996                                       avg =       20.0
       overall = 0.9637                                       max =         20

                                               F(17,515)          =     135.58
corr(u_i, Xb)  = 0.8891                         Prob > F           =     0.0000

------------------------------------------------------------------------------
   lrtotst1 |     Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
------------+-----------------------------------------------------------------
    lrtotst |
        L1. |   1.063128   .0427124    24.89   0.000    .9792162     1.14704
        L2. |  -.2213974   .0452011    -4.90   0.000   -.3101987   -.1325962
     dfyear |   .0041678   .027083      0.15   0.878   -.0490389    .0573745
intgloufyear|   -.26196    .1590624    -1.65   0.100   -.5744511     .050531
 intnbfyear |   -.015094   .127175     -0.12   0.906   -.2649395    .2347516
 intplyfyear|  -.0179733   .1271783    -0.14   0.888   -.2678255    .2318788
       dfeb |   .1799881   .0744532     2.42   0.016    .0337187    .3262575
       dmar |   .2912896   .0736667     3.95   0.000    .1465653    .4360138
```

```
      dapr |    .3045784    .0732452     4.16    0.000      .1606821     .4484746
      dmay |    .3598683     .064546     5.58    0.000      .2330624     .4866741
      djun |     .314491    .0645824     4.87    0.000      .1876136     .4413684
      djul |    .3753983    .0647894     5.79    0.000      .2481143     .5026824
      daug |    .2647273    .0649888     4.07    0.000      .1370514     .3924031
      dsep |     .136007    .0654754     2.08    0.038      .0073753     .2646387
      doct |    .2352311    .0661592     3.56    0.000       .105256     .3652061
      dnov |    .1727186    .0652477     2.65    0.008      .0445343      .300903
      ddec |    .3552028    .0653111     5.44    0.000      .2268938     .4835118
      _cons |    1.491582    .2781164     5.36    0.000         .9452     2.037964
-------------+----------------------------------------------------------------
   sigma_u |   .22337473
   sigma_e |   .27320664
       rho |   .40065051    (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(27, 515) =      2.18              Prob > F = 0.0006
```

Hence, the main conclusion for the period of Amendment 13, May 2003-December 2004,
is that we find some statistically significant evidence of a decline in sales tax receipts in
the port city of Gloucester in the North Shore relative to all towns in the fishing industry.

AD.I.4. Summary of Results for Sales Tax Data

The time series properties and intervention analysis of policy interventions for sales tax
receipts data were presented and complement the previous analysis of Baden and
Bianconi (2006). There is evidence of important correlations of monthly sales tax receipts
over time. Measuring those effects and including those effects in the regressions do
strengthen some of our previous results, and also change our previous results in some
important dimensions:

- Separate time series and intervention analysis for Boston, Gloucester, New
  Bedford, Fairhaven, Plymouth and Marshfield show the following results for the
  effects of statistical evidence of Amendments 5, 7 and 13:

Table AD.1.46

Amendment 5	Policy Intervention Variable	Statistically Significant
Boston	Negative	Yes
Gloucester	Negative	No
New Bedford	Negative	No
Fairhaven	Negative	No
Plymouth	Negative	No
Marshfield	Negative	No
Amendment 7	Policy Intervention Variable	Statistically Significant
Boston	Positive	No
Gloucester	Positive	No
New Bedford	Positive	Yes
Fairhaven	Negative	Yes
Plymouth	Positve	Yes
Marshfield	Inconclusive	No
Amendment 13	Policy Intervention Variable	Statistically Significant
Boston	Negative	Yes
Gloucester	Inconclusive	No
New Bedford	Positive	Yes*
Fairhaven	Positive	No
Plymouth	Positive	Yes
Marshfield	Positive	Yes

While the effects of Amendment 5 are all negative in magnitude, only Boston has a statistically significant effect.

- Amendment 5 had a negative effect for all towns in the fishing industry as shown in Table 2.11 of Baden and Bianconi (2006). Table AD.1.15 confirms those results, but magnitudes are smaller when autocorrelation of dependent variables is taken into account. The negative impact of the policy intervention is *-4.4%* and *-2.8%* lower average and total gross real sales tax receipts respectively. An approximate dollar value figure for those losses is a *$1,247* monthly loss in average sales tax revenues for each town in the fishing industry, the *%4.4* point estimate measured in 1994-1995 dollars with an upper/lower bound of *$2,168/$354* monthly loss in average sales tax revenues. For the totals, *2.8%* represents an approximate *$1,235,000* monthly loss in total gross sales tax revenues for each town in the fishing industry, measured in 1994-1995 dollars with an upper/lower bound of *$2,691,000/$176,468* per month quoted in 1994-1995 US dollars.

- Amendment 7 had no identified statistically significant effects.

- Amendment 13: Under the alternative specifications, relative to all other towns in the State, Boston, Gloucester, Edgardtown and Harwich, no statistically significant decline in average gross sales tax receipts is observed when lagged

dependent variables are included; and in Fairhaven and Eastham, no statistically significant increase is observed in average gross sales tax receipts when lagged dependent variables are included. Table AD.1.45 shows that Amendment 13 had a negative effect in Gloucester in the North Shore relative to the other fishing towns in the State only, the magnitude of the effect is of the order of *-17%* for average gross sales tax receipts and *-26%* for total gross sales tax receipts, smaller than previously obtained. Given that average and total gross sales tax receipts in Gloucester have an approximate order of magnitude of *$49,539* and *$20,000,000* respectively on average per month in 2005 US dollars, a *%17* loss in average gross sales taxes represents an average loss of *$8,422* per unit, with an upper/lower bound of *$17,339/$0*. For total gross sales tax receipts, the loss is *%26* and of the order of *$5,200,000* with an upper/lower bound of *$11,400,000/+$1,000,000* reflecting the wider confidence interval in the estimation.

Further analysis of these data is important in two dimensions: (i) Relaxing the lagged dependent variables assumption that the effect is identical across all units in the State; (ii) Constructing a data set across all time spectrum, from 1992 to 2005, and examining intervention analysis in the whole time series sample for different towns in the State.

AD II. Addendum to Employment Effects Section

This addendum clarifies the results from Section 3.2 of Baden and Bianconi (2006). This addendum also re-interprets the coefficient significance levels presented in Baden and Bianconi (2006) as one-sided tests (whether the coefficients are negative or not). A confidence interval (range) for lost jobs and wages is provided for the entire New England fishery.

AD.II.1 Amendment 13 and Employment

Traditionally, significance levels for regression coefficients are interpreted according to a t-test test of a null hypothesis of no difference from zero against an alternative hypothesis of different than (greater than or less than) zero – this is the t-statistic generated automatically by the regression analysis software. While this is sufficient in many cases, for the specific test of whether jobs have been lost or not, it is more appropriate to use a 1-tailed t-test, which tests the null hypothesis of no difference in percentage employment to the alternative hypothesis of a decrease in percentage employment. For n >30, this t-statistic is 1.64 for statistical significance at the 95% confidence level, and 1.28 for statistical significance at the 90% confidence level.

Under this test of non-negative coefficient values, several of the results that were marginally significant for 2-tailed tests (of inequality) become significant for the 1-tailed test (of non-negativity). This test is actually more appropriate than a 2-tailed test because the conceptual model behind this analysis posits that the implementation of Amendment 13 could have negative effects on fisheries employment. There is no postulation that Amendment 13 should increase fisheries employment.

For the difference in difference models a 1 tail test is also used. This test assesses whether the difference between employment percentage in manufacturing and employment percentage in fishing is greater than zero. A greater than zero value indicates that the difference between the two percentages increased, which means that employment percentage in fishing fell relative to manufacturing.

- *Results: All Towns and Counties*

Upon re-interpreting the t-statistic values for a one-tailed test of negative values, the regression results for percentage employment in fishing for all fishing areas (the same fixed effects panel model with lagged variables) results in a statistically significant decrease in fisheries employment across all towns at the 90% confidence level.

Regression 3.2.1a: All Places % Fishing

```
Regression with robust standard errors              Number of obs =     455
                                                    F( 14,   441) = 1207.28
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9767
                                                    Root MSE      = .29415


-------------------------------------------------------------------------------
            |              Robust
      pctf  |    Coef.    Std. Err.      t     P>|t|     [95% Conf. Interval]
------------+------------------------------------------------------------------
  pctf_lag1 |  .4204863   .0833628     5.04    0.000     .2566486    .5843241
       qtr2 |  .0670156   .0443749     1.51    0.132    -.0201971    .1542282
       qtr3 |  .0801494    .040558     1.98    0.049     .0004384    .1598604
       qtr4 |  .1690242   .0443273     3.81    0.000     .0819053    .2561432
          t |   .001725   .0017235     1.00    0.317    -.0016622    .0051122
        a13 | -.0817846   .0546813    -1.50    0.135    -.1892529    .0256838
     boston | -.0963192   .0532932    -1.81    0.071    -.2010594    .0084211
         BC | -.0538152    .051707    -1.04    0.299     -.155438    .0478075
         FH |  1.605183   .2527948     6.35    0.000     1.108351    2.102015
         GL |   1.07981   .1737805     6.21    0.000     .7382692    1.421351
         NB |   1.61928   .2428367     6.67    0.000     1.142019    2.096541
         PC | -.1154694   .0652346    -1.77    0.077    -.2436789     .01274
         RP |  1.008272   .1703155     5.92    0.000     .6735414    1.343003
         WP |  .8788293   .1482549     5.93    0.000     .5874553    1.170203
-------------------------------------------------------------------------------
```

This regression includes a lagged dependent variable to reduce the effects of serial auto-correlation, quarterly dummies (qtr2, etc), a linear time trend variable (t), and town/county fixed effects (Boston, BC, etc.). The effects of Amendment 13 (a13, indicated in gray), are -.08% which represents a decrease of 41% in fisheries employment across all towns and counties. For a one-tailed test, this result is significant at the 93% confidence level.

Table AD 2.1 provides the estimated wages lost per worker across all towns for this regression which takes the average effects. A 90% confidence interval for this result is between a wage loss of $15,315,000 (175 jobs lost) and a wage gain of $700,000 (8 jobs gained). To make this calculation, the weekly wage data from the Massachusetts Department of Workforce Development are averaged per year for all towns and adjusted by the consumer price index. All dollar values are in April 2006 constant dollars.

Table AD 2.1: Fishing Employment Changes in All Places

Town	Change in % Employment in Fishing	% Change in Fishing Employment Levels	Wage Change Lower Bound (# of Jobs)	Wage Change (# of Jobs)	Wage Change Upper Bound (# of Jobs)
All Places	- 0.08%	- 5.6 %	-$15,315,000 (-175)	-$7,351,000 (-84)	+$700,000 (+8)

The difference in difference estimator also shows an effect associated with the imposition of Amendment 13, as shown in Regression 3.2.1b. For the 1-tailed test of a positive difference, the coefficient is significant at the 92% confidence level, which indicates that

overall, among Massachusetts fishing towns for which data were available, fishing employment shrunk relative to manufacturing employment.

Regression 3.2.1b: All Places %Manufacturing - % Fishing

```
Regression with robust standard errors              Number of obs =     454
                                                    F( 15,  439) = 6702.37
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9935
                                                    Root MSE      =  1.1487

------------------------------------------------------------------------------
             |               Robust
      diff_  |    Coef.    Std. Err.      t     P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      diff_1 |  .5746526   .1400694     4.10   0.000     .2993628    .8499425
      diff_2 | -.1427101   .0511507    -2.79   0.006    -.2432408   -.0421794
        qtr2 | -.6443001   .1732501    -3.72   0.000    -.9848028   -.3037975
        qtr3 | -.7616543   .2600682    -2.93   0.004    -1.272788   -.250521
        qtr4 | -.5726569   .2297334    -2.49   0.013    -1.024171   -.121143
           t | -.0293859   .0143821    -2.04   0.042    -.0576522   -.0011197
         a13 |   .408303   .2877125     1.42   0.157    -.1571621    .9737681
      boston |  2.957284   1.013263     2.92   0.004     .9658337    4.948734
          BC |  3.071578   1.039828     2.95   0.003     1.027918    5.115238
          FH |  8.748645   2.816808     3.11   0.002     3.212541    14.28475
          GL |  16.99719    5.55469     3.06   0.002     6.080098    27.91428
          NB |  13.50254   4.368039     3.09   0.002     4.917672    22.08741
          PC |  6.463784   2.162224     2.99   0.003     2.214187    10.71338
          RP |  2.953175   1.036853     2.85   0.005     .9153619    4.990988
          WP |  3.368106   1.137766     2.96   0.003     1.131961     5.60425
------------------------------------------------------------------------------
```

The a13 variable (highlighted in gray) indicates that the relative share of employment in fisheries relative to manufacturing increased during this period.

The results of considering all towns together show some indication of a decline in the fisheries industry associated with the imposition of Amendment 13.

The next section provides estimates for the percentage employment and difference in difference models for each city or county separately.[9]

- *Results: Boston and Cape Ann*

The results for % Fishing in Boston are presented below in Regression 3.2.2a:

---

[9] Estimation of the separate city and county regressions as a Seemingly Unrelated Regression system of equations provided no significant efficiency gains.

Regression 3.2.2a: Boston % Fishing

```
Regression with robust standard errors               Number of obs =      56
                                                     F(  6,   49) =   25.67
                                                     Prob > F      =  0.0000
                                                     R-squared     =  0.6630
                                                     Root MSE      =  .00197


------------------------------------------------------------------------------
             |              Robust
      pctfB  |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    pctfB_1  |     .76078   .0906867     8.39   0.000     .5785384    .9430217
       qtr2  |  -.0006047   .0007789    -0.78   0.441    -.0021699    .0009604
       qtr3  |   -.000578   .0009751    -0.59   0.556    -.0025374    .0013815
       qtr4  |  -.0002039   .0006871    -0.30   0.768    -.0015847    .0011769
          t  |   3.43e-06   .0000208     0.16   0.870    -.0000384    .0000453
        a13  |  -.0009358   .0008094    -1.16   0.253    -.0025624    .0006907
       _cons |   .0021562   .0012233     1.76   0.084    -.0003021    .0046145
------------------------------------------------------------------------------
```

Fishing employment fell in Boston, but not in a statistically significant sense.

The results for the difference in difference model for Boston are unchanged. For Boston, the percentage of fishing employment fell relative to the percentage of manufacturing employment.

Regression 3.2.2b: Boston %Manufacturing - %Fishing

```
Regression with robust standard errors               Number of obs =      56
                                                     F(  6,   49) = 1064.97
                                                     Prob > F      =  0.0000
                                                     R-squared     =  0.9930
                                                     Root MSE      =  .02604


------------------------------------------------------------------------------
             |              Robust
      diff_B |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     diffB_1 |   .7945303   .0686334    11.58   0.000     .6566062    .9324543
       qtr2  |  -.0156774   .0103656    -1.51   0.137    -.0365078    .0051531
       qtr3  |   .0022391    .010335     0.22   0.829    -.0185299     .023008
       qtr4  |  -.0164696   .0099512    -1.66   0.104    -.0364672    .0035281
          t  |  -.0044608   .0016349    -2.73   0.009    -.0077462   -.0011754
        a13  |   .0449555   .0197362     2.28   0.027     .0052941    .0846169
       _cons |   .7286995   .2506177     2.91   0.005     .2250644    1.232335
------------------------------------------------------------------------------
```

The results for Gloucester (Regression 3.2.3a) are unchanged:

Regression 3.2.3a: Gloucester % Fishing

```
Regression with robust standard errors            Number of obs =       57
                                                  F(  5,    51) =    10.09
                                                  Prob > F      =   0.0000
                                                  R-squared     =   0.4870
                                                  Root MSE      =   .20369

------------------------------------------------------------------------------
             |               Robust
      pctfGL |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        qtr2 |  -.2157478   .0954511    -2.26   0.028    -.4073738   -.0241218
        qtr3 |     -.0346   .0597442    -0.58   0.565    -.1545414    .0853414
        qtr4 |   .1704469   .0661806     2.58   0.013     .0375838     .30331
           t |   .0116001   .0030042     3.86   0.000      .005569    .0176312
         a13 |  -.3336981   .1068932    -3.12   0.003    -.5482952   -.1191011
        _cons |  1.847392   .1008418    18.32   0.000     1.644944    2.049841
------------------------------------------------------------------------------
```

These results show that the percentage employment in fishing in Gloucester fell 0.33%, which is a 16% decrease in fishing employment levels (Average percentage fishing employment was 2.05%; 0.33 is 16% of 2.05). For the period studied, this amounts to a layoff of 32 employees for 39 weeks in 2004 and 39 weeks in 2005 during the study period. Average wages per week were $879 in 2004 and $953 in 2005.[10] This amounts to $ 71,448 lost wages per worker, and an aggregate loss of approximately $2,286,000. Table AD2.2 summarizes these calculations for Gloucester and provides the 90% confidence interval for the calculated wage changes.

Table AD2.2: Fishing Employment Changes in Gloucester

Town	Change in % Employment in Fishing	% Change in Fishing Employment Levels	Wage Change Lower Bound (# of Jobs)	Wage Change (# of Jobs)	Wage Change Upper Bound (# of Jobs)
Gloucester	- 0.33%	- 16.0 %	-$3,501,000 (-49)	-$2,286,000 (-32)	-$1,072,000 (-15)

The results for the difference in difference estimator for Gloucester are unchanged.

---

[10] All dollar figures are expressed in April 2006 constant dollars. Average wage data are provided with employment data by the Massachusetts Department of Workforce Development.

Regression 3.2.3b: Gloucester %Manufacturing - %Fishing

```
Regression with robust standard errors                Number of obs =      56
                                                      F(  6,   49) =   73.87
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.9034
                                                      Root MSE      =  .72778

------------------------------------------------------------------------------
             |               Robust
     diff_GL |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    diffGL_1 |   .821762   .0774532    10.61   0.000     .6661139    .9774101
        qtr2 | -1.593567   .3348431    -4.76   0.000     -2.26646   -.9206751
        qtr3 | -.9373232   .4051015    -2.31   0.025    -1.751405   -.1232412
        qtr4 | -.3170561   .3257915    -0.97   0.335    -.9717586    .3376463
           t | -.0035634   .0125412    -0.28   0.778     -.028766    .0216391
         a13 |  .3639424   .4125939     0.88   0.382    -.4651961    1.193081
       _cons |  5.532008   2.476649     2.23   0.030     .5549962    10.5090
------------------------------------------------------------------------------
```

Regression 3.2.4a indicates a decrease of 0.26% employment in fisheries in Rockport
associated with Amendment 13. This decrease represents a 13% decrease in total
fisheries employment. For a test of non-negativity of the coefficient, these results are
significant at the 93% confidence level. Table AD2.3 displays the confidence interval
and point estimate for lost wages in Rockport.

Regression 3.2.4a: Rockport % Fishing

```
Regression with robust standard errors                Number of obs =      57
                                                      F(  5,   51) =   25.86
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.6461
                                                      Root MSE      =  .36267

------------------------------------------------------------------------------
             |               Robust
      pctfRP |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        qtr2 |  -.809443   .1607451    -5.04   0.000    -1.132152   -.4867337
        qtr3 | -.6506105    .161118    -4.04   0.000    -.9740684   -.3271527
        qtr4 |  .2753294   .1686449     1.63   0.109    -.0632393    .6138982
           t |  .0034188   .0045049     0.76   0.451     -.005625    .0124627
         a13 | -.2559688   .1678485    -1.52   0.133    -.5929386     .081001
       _cons |  2.197503   .1669278    13.16   0.000     1.862381    2.532624
------------------------------------------------------------------------------
```

Table AD2.3: Fishing Employment Changes in Gloucester

Town	Change in % Employment in Fishing	% Change in Fishing Employment Levels	Wage Change Lower Bound (# of Jobs)	Wage Change (# of Jobs)	Wage Change Upper Bound (# of Jobs)
Rockport	- 0.26%	- 13.8 %	-$278,000 (6)	-$139,000 (-3)	-$46,000 (+1)

The results and interpretation for the difference in difference estimator for Rockport are
unchanged:

Regression 3.2.4b: Rockport %Manufacturing - %Fishing

```
Regression with robust standard errors              Number of obs =      56
                                                    F(  6,   49) =   35.55
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.8182
                                                    Root MSE      = .45216


------------------------------------------------------------------------------
             |               Robust
     diff_RP |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     diffRP_1 |   .7759133   .1009706     7.68   0.000     .5730052    .9788213
         qtr2 |  -.6786383    .240514    -2.82   0.007    -1.161969   -.1953073
         qtr3 |  -.5757476   .1992679    -2.89   0.006    -.9761915   -.1753037
         qtr4 |  -.7367625   .1974918    -3.73   0.000    -1.133637   -.3398878
            t |   .0069145   .0058223     1.19   0.241    -.0047858    .0186148
          a13 |   .1624593   .2367103     0.69   0.496    -.3132278    .6381464
        _cons |   .9420086   .3348403     2.81   0.007     .2691219    1.614895
------------------------------------------------------------------------------
```

- *Results: Cape Cod*

The regression results and interpretation for Barnstable County are unchanged.

Regression 3.2.5a: Barnstable County % Fishing

```
Regression with robust standard errors              Number of obs =      56
                                                    F(  6,   49) =   15.42
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.6840
                                                    Root MSE      = .00929


------------------------------------------------------------------------------
             |               Robust
      pctfBC |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     pctfBC_1 |   .3250908   .1065449     3.05   0.004     .1109808    .5392008
         qtr2 |   .0166916   .0037413     4.46   0.000     .0091732    .0242099
         qtr3 |   .0235195   .0035358     6.65   0.000     .0164141    .0306249
         qtr4 |   .0211679   .0038871     5.45   0.000     .0133564    .0289794
            t |  -.0001816   .0001358    -1.34   0.187    -.0004545    .0000913
          a13 |   .0036443   .0045151     0.81   0.423    -.0054291    .0127177
        _cons |   .0408571   .0099711     4.10   0.000     .0208194    .0608948
------------------------------------------------------------------------------
```

Regression 3.2.5b indicates that the difference between the share of fisheries and manufacturing employment has increased, but not at a statistically significant level.

Regression 3.2.5b: Barnstable County %Manufacturing - %Fishing

```
Regression with robust standard errors              Number of obs =      56
                                                    F(  6,   49) =  419.64
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.9780
                                                    Root MSE      =   .0816

------------------------------------------------------------------------------
             |               Robust
     diff_BC |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    diffBC_1 |    .837439   .0658617    12.72   0.000     .7050849    .9697932
        qtr2 |  -.1888387   .0297494    -6.35   0.000    -.2486224   -.1290549
        qtr3 |  -.0795056   .0495342    -1.61   0.115    -.1790482     .020037
        qtr4 |   .0630207   .0352893     1.79   0.080    -.0078958    .1339373
           t |  -.0051215   .0024485    -2.09   0.042     -.010042   -.0002009
         a13 |   .0477714    .045946     1.04   0.304    -.0445606    .1401034
        _cons |   .6945896   .2924715     2.37   0.022     .1068461    1.282333
------------------------------------------------------------------------------
```

Taken together, the results do not show a substantial influence of Amendment 13 upon fisheries employment for Barnstable County.

- *Results: Plymouth County*

Exclusive fishing data are unavailable for the municipalities of Plymouth and Marshfield, but such data are available for Plymouth County. The implementation of Amendment 13 coincides with both a substantial decrease in fishing employment and a decrease in the share of fishing relative to manufacturing.

The regression results from Regression 3.2.6a show the effect of Amendment 13 regulations on fishing employment in Plymouth County. The timing of Amendment 13 is highly significant.

Regression 3.2.6a: Plymouth County %Fishing

```
Regression with robust standard errors                Number of obs =      55
                                                      F(  7,   47) =   20.79
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.7991
                                                      Root MSE      =  .00266

------------------------------------------------------------------------------
             |               Robust
      pctfPC |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    pctfPC_1 |   .4778169   .1198128     3.99   0.000     .2367846    .7188492
    pctfPC_2 |   .1932644   .1286625     1.50   0.140    -.0655712    .4520999
        qtr2 |   .0043763   .0014261     3.07   0.004     .0015074    .0072453
        qtr3 |   .0036768    .001213     3.03   0.004     .0012366    .0061169
        qtr4 |   .0028255   .0013851     2.04   0.047      .000039     .005612
           t |   .0001539   .0000484     3.18   0.003     .0000566    .0002513
         a13 |  -.0042596   .0015026    -2.83   0.007    -.0072823   -.0012368
        _cons |  -.0009775   .0019736    -0.50   0.623    -.0049479    .0029929
------------------------------------------------------------------------------
```

Table AD2.4 shows the lost employment and wage estimates as well as the 90%
confidence interval for these estimates.

Table AD2.4: Fishing Employment Changes in Plymouth County

Town	Change in % Employment in Fishing	% Change in Fishing Employment Levels	Wage Change Lower Bound (# of Jobs)	Wage Change (# of Jobs)	Wage Change Upper Bound (# of Jobs)
Plymouth County	- 0.004%	- 28.6 %	-$589,000 (-10)	-$353,000 (-6)	-$118,000 (2)

The difference in difference estimator is unchanged.

Regression 3.2.6b: Plymouth County %Manufacturing - %Fishing

```
Regression with robust standard errors                Number of obs =      56
                                                      F(  6,   49) =  353.00
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.9637
                                                      Root MSE      =  .12408

------------------------------------------------------------------------------
             |               Robust
      diff_PC |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    diffPC_1 |    .805747   .0701139    11.49   0.000     .6648478    .9466461
        qtr2 |  -.2245758   .0621541    -3.61   0.001    -.3494792   -.0996725
        qtr3 |  -.1560215   .0907387    -1.72   0.092    -.3383678    .0263248
        qtr4 |  -.0811653   .0702724    -1.16   0.254     -.222383    .0600524
           t |  -.0055712   .0039944    -1.39   0.169    -.0135983    .0024559
         a13 |   .0774788   .1001482     0.77   0.443    -.1237765    .2787342
        _cons |   2.031294   .7916691     2.57   0.013     .4403754    3.622213
------------------------------------------------------------------------------
```

- *Results: New Bedford Area*

The results for Fairhaven are unchanged.

Regression 3.2.7a: Fairhaven %Fishing

```
Regression with robust standard errors                Number of obs =      56
                                                      F(  6,    49) =   12.14
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.5765
                                                      Root MSE      = .34889


-------------------------------------------------------------------------------
             |              Robust
      pctfFH |    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
    pctfFH_1 | -.1364672   .1247292   -1.09   0.279    -.38712     .1141855
        qtr2 |  1.012236   .1431545    7.07   0.000    .7245564    1.299916
        qtr3 |  .8959443   .1781806    5.03   0.000     .537877    1.254012
        qtr4 |  .4732682   .1540333    3.07   0.003    .1637267    .7828097
           t |  .0041742   .0048543    0.86   0.394   -.0055808    .0139292
         a13 |  .0702211   .1909397    0.37   0.715   -.3134866    .4539288
        _cons |  2.540868   .3484191    7.29   0.000    1.840693    3.241042
-------------------------------------------------------------------------------
```

Regression 3.2.7b: Fairhaven %Manufacturing - %Fishing

```
Regression with robust standard errors                Number of obs =      56
                                                      F(  6,    49) =   66.04
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.8618
                                                      Root MSE      =  1.1879


-------------------------------------------------------------------------------
             |              Robust
     diff_FH |    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
    diffFH_1 |  .5618228   .1819314    3.09   0.003     .196218    .9274277
        qtr2 | -.0098569     .43872   -0.02   0.982   -.8914978    .8717839
        qtr3 | -.1275381   .5578513   -0.23   0.820   -1.248582    .993506
        qtr4 |  .3589172    .530379    0.68   0.502   -.7069194    1.424754
           t | -.0113483   .0199423   -0.57   0.572   -.0514238    .0287272
         a13 |  -2.14924   1.260754   -1.70   0.095   -4.682819    .3843393
        _cons |  6.699502   2.790863    2.40   0.020    1.091054    12.30795
-------------------------------------------------------------------------------
```

Table AD 2.5 provides the 90% confidence interval around job and wage losses for New Bedford.

Regression 3.2.8a: New Bedford %Fishing

```
Regression with robust standard errors              Number of obs =      56
                                                    F(  6,    49) =   21.97
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.6089
                                                    Root MSE      =  .25912


------------------------------------------------------------------------------
             |               Robust
      pctfNB |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    pctfNB_1 |   .1796623   .1405425     1.28   0.207    -.1027686    .4620931
        qtr2 |    .412374   .1294099     3.19   0.003     .1523151    .6724328
        qtr3 |   .3716062   .1166649     3.19   0.003     .1371594     .606053
        qtr4 |   .4570343   .1219105     3.75   0.000     .2120459    .7020227
           t |   .0152875   .0040154     3.81   0.000     .0072183    .0233567
         a13 |  -.2243452   .1137599    -1.97   0.054    -.4529543    .0042638
        _cons |   1.747051    .299221     5.84   0.000     1.145744    2.348358
------------------------------------------------------------------------------
```

This decrease amounts to a 0.22 decrease in percentage fisheries employment, which is an over-all decline of 7.5%. Table 3.4 displays the calculated effects.

Table AD2.5: Fishing Employment Changes in New Bedford

Town	Change in % Employment in Fishing	% Change in Fishing Employment Levels	Wage Change Lower Bound (# of Jobs)	Wage Change (# of Jobs)	Wage Change Upper Bound (# of Jobs)
New Bedford	- 0.22%	- 7.5 %	-$12,992,000 (-127)	-$7,058,000 (-69)	-$1,228,000 (-12)

The results for the difference in difference estimator for New Bedford are unchanged.

Regression 3.2.8b: New Bedford %Manufacturing - %Fishing

```
Regression with robust standard errors              Number of obs =      56
                                                    F(  6,    49) =  100.48
                                                    Prob > F      =  0.0000
                                                    R-squared     =  0.8459
                                                    Root MSE      =  .82598


------------------------------------------------------------------------------
             |               Robust
     diff_NB |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    diffNB_1 |   .8102661   .0690704    11.73   0.000     .6714638    .9490683
        qtr2 |  -.9827944   .4134447    -2.38   0.021    -1.813643   -.1519463
        qtr3 |  -.8449193   .4575356    -1.85   0.071    -1.764372    .0745329
        qtr4 |  -.7629715   .4587783    -1.66   0.103    -1.684921    .1589779
           t |  -.0052374    .011566    -0.45   0.653    -.0284801    .0180053
         a13 |    .259074   .3860363     0.67   0.505     -.516695    1.034843
        _cons |   4.744393   1.851263     2.56   0.014      1.02414    8.464646
------------------------------------------------------------------------------
```

Regression 3.2.8b does not indicate a statistically significant change in the relative share of fishing employment (to manufacturing) associated with Amendment 13.

The results for Westport are unchanged

Regression 3.2.9a: Westport %Fishing

```
Regression with robust standard errors          Number of obs =      56
                                                F(  6,    49) =   49.57
                                                Prob > F      =  0.0000
                                                R-squared     =  0.7400
                                                Root MSE      = .21093

------------------------------------------------------------------------------
             |               Robust
      pctfWP |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    pctfWP_1 |  .4338808   .1140125     3.81   0.000     .2047641    .6629974
        qtr2 |  .0565791   .0941256     0.60   0.551    -.1325734    .2457317
        qtr3 |   .129947   .0904153     1.44   0.157    -.0517493    .3116433
        qtr4 |  .1342256   .0862733     1.56   0.126    -.0391471    .3075982
           t | -.0078699   .0042961    -1.83   0.073    -.0165033    .0007635
         a13 | -.1377447   .1141996    -1.21   0.234    -.3672374    .0917481
        _cons |  1.147227   .3100528     3.70   0.001     .5241523    1.770301
------------------------------------------------------------------------------
```

This result is not statistically significant.

The share of fisheries employment in Westport (relative to manufacturing) does significantly fall after Amendment 13 is implemented, however, as indicated in Regression 3.2.9b:

Regression 3.2.9b: Westport %Manufacturing - %Fishing

```
Regression with robust standard errors          Number of obs =      56
                                                F(  6,    49) =   39.49
                                                Prob > F      =  0.0000
                                                R-squared     =  0.8698
                                                Root MSE      = .29816

------------------------------------------------------------------------------
             |               Robust
     diff_WP |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    diffWP_1 |  .4927644   .1047118     4.71   0.000     .2823381    .7031906
        qtr2 | -.4807443   .1186322    -4.05   0.000    -.7191446    -.242344
        qtr3 | -.5296778   .1269372    -4.17   0.000    -.7847677   -.2745878
        qtr4 | -.5624399   .1432728    -3.93   0.000    -.8503575   -.2745224
           t | -.0251751   .0076931    -3.27   0.002    -.0406349   -.0097153
         a13 |  .3645817   .1780013     2.05   0.046     .0068748    .7222887
        _cons |  2.905633   .5812416     5.00   0.000     1.737585    4.073682
------------------------------------------------------------------------------
```

This decrease in the relative share of fisheries employment occurs despite a decrease in manufacturing employment of 36% over the study period.

AD.II.2 Summary of Results and Importance to the Study

Table 3.8 summarizes the results of this chapter. The results for unemployment show higher rates for Gloucester and New Bedford relative to both the US and Massachusetts. The results for Amendment 13 show statistically significant and insignificant results for losses in percentage employment in fishing and the share of employment in fishing.

These results show a preponderance of effects due to Amendment 13. The results for
Amendments 5 and 7 also show employment and share losses (though these results are
not as methodologically strong as for Amendment 13).

Table 3.8 Results Summary

UNEMPLOYMENT			
Town	**US Comparison**	**MA Comparison**	
Gloucester	Higher than US average	Higher than MA average	
New Bedford	Higher than US average	Higher than MA average	
Plymouth	Lower than US average	Close to MA average	

AMENDMENT 13					
Town/County	**Employment Loss**	**Statistically Significant**	**Wages Lost**	**Share Loss**	**Statistically Significant**
Boston	Yes	No	--	Yes	Yes
Gloucester	Yes	Yes	$ 2,286,000	Yes	No
Rockport	Yes	Yes	$ 139,000	Yes	No
Barnstable County	No	No	--	Yes	No
Plymouth County	Yes	Yes	$ 353,000	Yes	No
Fairhaven	No	No	--	No	No
New Bedford	Yes	Yes	$ 7,058,000	Yes	No
Westport	Yes	No	--	Yes	Yes

AMENDMENTS 5 AND 7		
Town	**Employment Loss**	**Share Loss**
Gloucester	Yes	Yes
New Bedford	Yes	Yes
Plymouth	Yes	Yes

The towns of Gloucester and New Bedford have had higher unemployment rates than the
rest of Massachusetts and the nation as a whole. Plymouth experienced higher
unemployment rates in the 1990s but this trend appears to have reversed itself. These
results do not directly show the impact of fishing but indicate that these towns are
particularly susceptible to economic distress.

The analysis of fishing employment specifically indicates a loss of fishing jobs in
Gloucester, Rockport, and Plymouth County coincident with the implementation of
Amendment 13. This lost wage revenue constitutes almost $10 million, or roughly $6.5
million per year.[11]

If this loss value is multiplied by a "multiplier effect" wherein the indirect effects of
money entering a community are disseminated and spur further investment and

---

[11] The wage estimates for New Bedford may be biased upwards. New Bedford includes the scallop
industry which is a high value industry, and as such may offer higher wages than the groundfish industry.
However, no groundfish specific wage data are available. In addition, no estimates of lost wages are made
for towns that have apparent (though not statistically significant) job losses – this omission would tend to
bias the value of foregone wages downward.

consumption, the estimated impact will be greater. A conservative multiplier of 1.7 would result in an estimated loss of $16.5 million dollars ($11 million annually) in community impact across the three towns for who the effects are estimated.[12]

Taken as a whole, the indications are that Amendment 13 affected all 8 of the study areas except Fairhaven (though Barnstable County experienced negligible effects). Boston and Westport lost share in fisheries employment relative to manufacturing. Boston, Rockport, and Westport all experienced some decrease in fisheries employment, though these effects were not significant at the 95% confidence level.

The analysis of aggregated fishing employment data (including agriculture and hunting) for the decennial census of 1990 and 2000 show that employment in these areas decreased in Gloucester, New Bedford, and Plymouth. Difference in difference estimation also indicated that, relative to the share of employment in manufacturing, the share of employment in fishing decreased.

These decreases in fishing employment show that there have been quantifiable losses to the Massachusetts economy. Other losses are harder to quantify due to either a lack of data (data not available earlier in time or in specific towns) or the inability of data to address specific issues. One such issue involves part time fishing. Many former full-time fishers have resorted to fishing part-time. Other former part-time fishers, who may not have appeared as employed in fishing in the official statistics have either had to diversify their activities further or stop fishing entirely. Due to data limitations, the estimated fishing employment effects should be seen as a minimum bound on lost value in employment due to fishing employment foregone.

Should future regulations curtail employment further, some ports (such as Gloucester and Plymouth) could see groundfish fishing cease altogether. As tables 3.2 and 3.3 indicate, relatively modest job losses account for large portions of employment in these fisheries and result in substantial wage losses.

In sum, the results of this chapter indicate that Massachusetts' fishing communities have:
• experienced higher rates of unemployment,
• lost employment in fishing after the passage of Amendment 13, and
• lost employment in fishing during the 1990s.

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[12] This multiplier is the lowest multiplier value suggested in Hughes, David (2003) "Policy Uses of Economic Multiplier and Impact Analysis," *Choices*, an online magazine of the American Agricultural Economics Association, vol. 18, no. 2.

AD.III. Economic Models of Fisheries Activities - Addendum

AD.III.I. The Production Function for a Fishing Unit - Addendum

In chapter V of Baden and Bianconi (2006), we presented simulations of a production model for fisheries. Here, we extend those simulations in two directions. First, we consider simulations in reference to Tables 5.1 and 5.2 in Baden and Bianconi (2006), with the alternative assumption that the base set for comparisons remains fixed across different levels of risk taking. Second, we implement a more restrictive policy of 50% reduction in sea space and labor input to show cases where expected profits can become negative, reflecting the possibility for the unit to abandon the productive activity.

Table AD.3.1 present simulations of the original model with the alternative assumption that the base set remain fixed at the no risk level. In reference to the original Table 5.2, we note that changes are smaller in magnitude. This reflects the main point that when a restriction is imposed, it is in a one-size-fits-all fashion, i.e. it applies uniformly to market participants taking alternative levels of risk. Hence, to some participants, the regulation has a much smaller impact since, with different levels of risk, those participants may be more close to the bounds imposed by the restriction.

Tables AD.3.2 and AD.3.3 present simulations of the model with the alternative assumption that the base set remain fixed at the no risk level, but in addition, the restriction on sea level and labor input is set at the higher *50%* rate. The shaded boxes illustrate the cases where short run expected profits become negative, because of the imposed regulation. A productive unit could eventually face negative returns in the short run that would make it choose an alternate activity, in effect taking the unit out of business. In this case, again we observe that some changes are negligible reflecting the main point that when a restriction is imposed, it is in a one-size-fits-all fashion. Hence, to some participants, the regulation has a much smaller impact.

Table AD.3.1:

Model Simulations – Percent Changes from Base Set – Revised - Addendum

	Probability of Good State: 1 (No Risk)	Probability of Good State: 0.85 (Moderate Risk)	Probability of Good State: 0.5 (Maximum Risk)
	All % Changes From Base Set		
30% Reduction of Sea Space: Short Run with Physical Capital Fixed			
Capital/Labor	*4.8%*	*15.1%*	*-4.8%*
Effort/Labor	*0.0%*	*0.0%*	*0.0%*
Expected Profit/Output	*0.0%*	*0.0%*	*-12.5%*
Expected Profit/Labor	*8.3%*	*-8.3%*	*-10.0%*
Expected Output/Labor	*0.0%*	*0.0%*	*0.0%*
30% Reduction of Sea Space: Long Run with Physical Capital Variable			
Capital/Labor	*0.0%*	*0.0%*	*0.0%*
Effort/Labor	*0.0%*	*0.0%*	*0.0%*
Expected Profit/Output	*10.0%*	*22.2%*	*-12.5%*
Expected Profit/Labor	*16.7%*	*16.7%*	*-10.0%*
Expected Output/Labor	*0.0%*	*0.0%*	*0.0%*
30% Reduction of Sea Space and 30% Reduction of Work Activity: Short Run with Physical Capital Fixed			
Capital/Labor	*44.9%*	*167.9%*	*-29.5%*
Effort/Labor	*33.3%*	*46.7%*	*-11.3%*
Expected Profit/Output	*10.0%*	*-66.7%*	*-25.0%*
Expected Profit/Labor	*33.3%*	*-58.3%*	*-40.0%*
Expected Output/Labor	*13.6%*	*36.8%*	*-10.4%*
30% Reduction of Sea Space and 30% Reduction of Work Activity: Long Run with Physical Capital Variable			
Capital/Labor	*5.1%*	*8.3%*	*-2.6%*
Effort/Labor	*33.3%*	*20.0%*	*-3.8%*
Expected Profit/Output	*30.0%*	*55.6%*	*-25.0%*
Expected Profit/Labor	*41.7%*	*58.3%*	*-20.0%*
Expected Output/Labor	*4.8%*	*8.0%*	*-2.4%*

Table AD.3.2: Model Simulations-Addendum

	Probability of Good State: 1 (No Risk)	Probability of Good State: 0.85 (Moderate Risk)	Probability of Good State: 0.5 (Maximum Risk)
Base Set			
Capital/Labor	*3.12*	*3.12*	*3.12*
Effort/Labor	*0.03*	*0.15*	*0.53*
Expected Profit/Output	*0.10*	*0.10*	*0.08*
Expected Profit/Labor	*0.12*	*0.12*	*0.10*
Expected Output/Labor	*1.25*	*1.25*	*1.25*
50% Reduction of Sea Space: Short Run with Physical Capital Fixed			
Capital/Labor	*3.40*	*3.75*	*3.11*
Effort/Labor	*0.03*	*0.15*	*0.53*
Expected Profit/Output	*0.10*	*0.08*	*0.08*
Expected Profit/Labor	*0.12*	*0.10*	*0.10*
Expected Output/Labor	*1.25*	*1.25*	*1.25*
50% Reduction of Sea Space: Long Run with Physical Capital Variable			
Capital/Labor	*3.12*	*3.12*	*3.12*
Effort/Labor	*0.03*	*0.16*	*0.53*
Expected Profit/Output	*0.12*	*0.12*	*0.08*
Expected Profit/Labor	*0.15*	*0.15*	*0.10*
Expected Output/Labor	*1.25*	*1.25*	*1.25*
50% Reduction of Sea Space and 50% Reduction of Work Activity: Short Run with Physical Capital Fixed			
Capital/Labor	*6.32*	*11.70*	*3.07*
Effort/Labor	*0.06*	*0.25*	*0.53*
Expected Profit/Output	*0.10*	*-0.04*	*0.08*
Expected Profit/Labor	*0.15*	*-0.09*	*0.10*
Expected Output/Labor	*1.60*	*1.91*	*1.25*
50% Reduction of Sea Space and 50% Reduction of Work Activity: Long Run with Physical Capital Variable			
Capital/Labor	*3.44*	*3.49*	*3.13*
Effort/Labor	*0.06*	*0.20*	*0.53*
Expected Profit/Output	*0.16*	*0.16*	*0.08*
Expected Profit/Labor	*0.21*	*0.22*	*0.10*
Expected Output/Labor	*1.36*	*1.40*	*1.25*

Table AD.3.3: Model Simulations – Percent Changes from Base Set-addendum

	Probability of Good State: 1 (No Risk)	Probability of Good State: 0.85 (Moderate Risk)	Probability of Good State: 0.5 (Maximum Risk)
	All % Changes From Base Set		
50% Reduction of Sea Space: Short Run with Physical Capital Fixed			
Capital/Labor	*9.0%*	*20.2%*	*-0.3%*
Effort/Labor	*0.0%*	*0.0%*	*0.0%*
Expected Profit/Output	*0.0%*	*-20.0%*	*0.0%*
Expected Profit/Labor	*0.0%*	*-16.7%*	*0.0%*
Expected Output/Labor	*0.0%*	*0.0%*	*0.0%*
50% Reduction of Sea Space: Long Run with Physical Capital Variable			
Capital/Labor	*0.0%*	*0.0%*	*0.0%*
Effort/Labor	*0.0%*	*6.7%*	*0.0%*
Expected Profit/Output	*20.0%*	*20.0%*	*0.0%*
Expected Profit/Labor	*25.0%*	*25.0%*	*0.0%*
Expected Output/Labor	*0.0%*	*0.0%*	*0.0%*
50% Reduction of Sea Space and 50% Reduction of Work Activity: Short Run with Physical Capital Fixed			
Capital/Labor	*102.6%*	*275.0%*	*-1.6%*
Effort/Labor	*100.0%*	*66.7%*	*0.0%*
Expected Profit/Output	*0.0%*	*-140.0%*	*0.0%*
Expected Profit/Labor	*25.0%*	*-175.0%*	*0.0%*
Expected Output/Labor	*28.0%*	*52.8%*	*0.0%*
50% Reduction of Sea Space and 50% Reduction of Work Activity: Long Run with Physical Capital Variable			
Capital/Labor	*10.3%*	*11.9%*	*0.3%*
Effort/Labor	*100.0%*	*33.3%*	*0.0%*
Expected Profit/Output	*60.0%*	*60.0%*	*0.0%*
Expected Profit/Labor	*75.0%*	*83.3%*	*0.0%*
Expected Output/Labor	*8.8%*	*12.0%*	*0.0%*

AD.VI. Concluding Remarks

- The wide and in depth econometric analysis of sales tax data does show some negative impact of Amendments on coastal towns where fishing is active. Main dollar value results are summarized in Table AD.4.1. For Amendment 5, in 1994-1995 US dollars, in the worst case scenario, costal towns had average losses of *$2,168* per month and a total loss of *$2,691,000.* In the best case scenario, costal towns had average losses of *$354* per month and a total loss of *$176,468.* For Amendment 13, the effect on the Port of Gloucester is in 2005 US dollars, in the worst case scenario, an average loss of *$17,339* per month per business unit and a total loss of *$11,400,000* across the town. In the best case scenario, the town had average of no losses, of *$0* per month per business unit, and a total gain of *$1,000,000* across the town. Hence, the predictive power of future fisheries regulations may have further impacts on gross sales tax receipts that lie within the worst and best case scenarios obtained here.

Table AD.4.1

	Average Gross Sales Tax Receipts	*95% Confidence Interval*	*Total Gross Sales Tax Receipts*	*95% Confidence Interval*
Amendment 5: Impact on all 29 Coastal Towns of MA State - 1994-1995 US Dollars	Receipts Loss per Month per Town *$1,247*	Receipts Loss per Month per Town *$2,168↔$354*	Receipts Loss per Month per Town *$1,235,000*	Receipts Loss per Month per Town *$2,691,000 ↔ $176,468*
Amendment 13: Impact on the Port of Gloucester - 2005 US Dollars	Receipts Loss per Month per Unit *$8,422*	Receipts Loss per Month per Unit *$17,339↔$0*	Receipts Loss per Month *$5,200,000*	Receipts Loss (+ Gain) per Month *$11,400,000 ↔ +$1,000,000*

- The employment results in section AD.II show that Massachusetts' fishing communities have:
    - experienced higher rates of unemployment,
    - lost employment in fishing after the passage of Amendment 13, and
    - lost employment in fishing during the 1990s.

- In theory, large restrictions can impose negative expected profits which may take a productive unit out of the business activity as seen in Tables AD.3.2 and AD.3.3.

BIBLIOGRAPHY

Baden, Brett and Marcelo Bianconi (2006) *Economic Impact of Regulations on the Marine Fisheries Industry in the State of Massachusetts*. The Massachusetts Fisheries Recovery Commission, Gloucester, MA, June 30.

AD.V. June 30, 2006-August 15, 2006: Report of Activities

1. Dates of all meetings, major participants, purpose

   i. Monday, July 10, 2006 – 2:30-5:30pm, Goucester, 30 Emerson Ave.: Presentation of Baden and Bianconi (2006), present Marcelo Bianconi, Brett Baden (via phone), Senator Bruce Tarr, Representative Anthony Verga, Paul Diodati, Dr. Brian Rothschild, Vito Calomo, Ann-Margaret Ferrante, and others.

   ii. Wednesday, July 10, 2006, Noon: Meeting with Paul Diodati and David Pierce at Boston's Causeway St. office. Marcelo Bianconi and Brett Baden.

   iii. Thursday, July 27, 2006, meeting with Dr. Brian Rothschild at UMass Dartmouth SMF, with Vito Calomo, Marcelo Bianconi and Brett Baden.

   iii. Tuesday, August 1, 2006, meeting with Senator Bruce Tarr at Massachusetts State House, with Vito Calomo, Marcelo Bianconi and Brett Baden.

Baden and Bianconi, August 27, 2006