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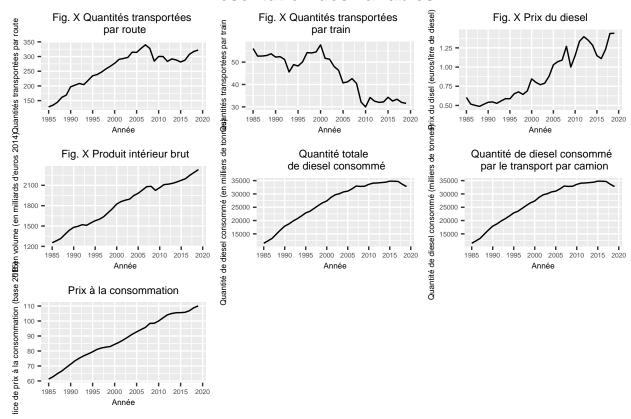
## 1 Introduction

#Présentation des données

Table 1: Consommation de gazole des camions

|      |          |          |           |       |                  |           | camion    | volume (en<br>milliards<br>d'euros |
|------|----------|----------|-----------|-------|------------------|-----------|-----------|------------------------------------|
|      |          |          |           |       |                  |           |           | 2014)                              |
| 1985 | 128.4177 | 56.05900 | 0.6036981 | 11467 | 7.576890e + 11   | 61.27793  | 7999.565  | 1253.767                           |
| 1986 | 134.5980 | 52.68600 | 0.5168022 | 12364 | $8.145960e{+11}$ | 62.83349  | 8377.997  | 1283.071                           |
| 1987 | 144.5150 | 52.70700 | 0.5015573 | 13309 | $8.559830e{+11}$ | 64.90002  | 8874.912  | 1315.942                           |
| 1988 | 161.1093 | 52.94600 | 0.4878369 | 14903 | $9.252150e{+11}$ | 66.65285  | 10083.360 | 1378.359                           |
| 1989 | 168.6379 | 53.71200 | 0.5152777 | 16472 | 9.971210e+11     | 68.98456  | 11026.464 | 1438.233                           |
| 1990 | 197.0160 | 52.24000 | 0.5411940 | 17908 | 1.053546e+12     | 71.18813  | 12847.488 | 1480.286                           |
| 1991 | 202.6669 | 52.43001 | 0.5457675 | 18729 | 1.091705e+12     | 73.47569  | 13088.602 | 1495.802                           |
| 1992 | 208.3424 | 51.18059 | 0.5274736 | 19824 | 1.130983e+12     | 75.21248  | 13520.352 | 1519.725                           |
| 1993 | 204.2418 | 45.58251 | 0.5594879 | 20711 | $1.142119e{+12}$ | 76.79530  | 13736.333 | 1510.171                           |
| 1994 | 219.2725 | 48.87126 | 0.5884532 | 21735 | 1.179867e + 12   | 78.06666  | 13944.659 | 1545.786                           |
| 1995 | 234.5019 | 48.26607 | 0.5869287 | 22869 | $1.218273e{+}12$ | 79.46911  | 14175.760 | 1578.351                           |
| 1996 | 238.5483 | 50.11300 | 0.6524818 | 23489 | $1.252266e{+}12$ | 81.04489  | 14106.159 | 1600.653                           |
| 1997 | 246.9545 | 54.24600 | 0.6768736 | 24566 | 1.292777e + 12   | 82.02062  | 14718.880 | 1638.049                           |
| 1998 | 257.6484 | 54.09952 | 0.6433349 | 25667 | $1.351896e{+}12$ | 82.55468  | 15658.433 | 1696.833                           |
| 1999 | 266.8618 | 54.53802 | 0.6890696 | 26667 | 1.400999e + 12   | 82.99812  | 16588.176 | 1754.888                           |
| 2000 | 276.8614 | 57.72575 | 0.8460920 | 27355 | 1.478585e+12     | 84.38913  | 16920.644 | 1823.744                           |
| 2001 | 290.4301 | 51.71830 | 0.8000000 | 28684 | $1.538200e{+12}$ | 85.76871  | 16846.184 | 1859.922                           |
| 2002 | 293.3823 | 51.28819 | 0.7700000 | 29670 | 1.587829e + 12   | 87.41840  | 17155.587 | 1881.042                           |
| 2003 | 296.9908 | 48.05727 | 0.7900000 | 30081 | 1.630666e+12     | 89.25285  | 17034.634 | 1896.526                           |
| 2004 | 314.9008 | 46.34837 | 0.8800000 | 30762 | 1.704019e+12     | 91.16472  | 17539.546 | 1950.193                           |
| 2005 | 314.1489 | 40.70118 | 1.0300000 | 31048 | 1.765905e + 12   | 92.75634  | 17707.320 | 1982.629                           |
| 2006 | 327.6145 | 41.17892 | 1.0700000 | 31891 | 1.848151e + 12   | 94.31012  | 18073.350 | 2031.190                           |
| 2007 | 339.9549 | 42.61186 | 1.0900000 | 32958 | 1.941360e + 12   | 95.71346  | 17911.820 | 2080.441                           |
| 2008 | 327.4415 | 40.43613 | 1.2700000 | 32827 | 1.992380e + 12   | 98.40574  | 17474.790 | 2085.745                           |
| 2009 | 284.4028 | 32.12917 | 1.0000000 | 32881 | 1.936422e+12     | 98.49197  | 16954.370 | 2025.815                           |
| 2010 | 300.3987 | 29.96475 | 1.1500000 | 33588 | 1.995289e + 12   | 100.00000 | 17245.840 | 2065.307                           |
| 2011 | 300.1641 | 34.18300 | 1.3354000 | 34049 | 2.058369e+12     | 102.11160 | 17561.670 | 2110.593                           |
| 2012 | 283.4498 | 32.55166 | 1.3958000 | 34120 | 2.088804e+12     | 104.10706 | 17591.768 | 2117.202                           |
| 2013 | 292.0000 | 32.00000 | 1.3500000 | 34272 | 2.117189e + 12   | 105.00625 | 17653.770 | 2129.404                           |
| 2014 | 288.5000 | 32.20000 | 1.2850000 | 34407 | 2.149765e + 12   | 105.53943 | 17703.040 | 2149.765                           |
| 2015 | 281.5000 | 34.30000 | 1.1490000 | 34803 | 2.198432e+12     | 105.57902 | 17757.190 | 2173.690                           |
| 2016 | 287.7000 | 32.60000 | 1.1100000 | 34777 | 2.234129e+12     | 105.77258 | 17809.400 | 2197.502                           |
| 2017 | 307.7000 | 33.42000 | 1.2320000 | 34690 | 2.297242e+12     | 106.86445 | 18328.210 | 2247.856                           |
| 2018 | 317.3000 | 31.98000 | 1.4370000 | 33626 | 2.363306e+12     | 108.84232 | 17270.020 | 2289.780                           |
| 2019 | 322.3000 | 31.58400 | 1.4400000 | 32770 | 2.437635e+12     | 110.04857 | 16344.300 | 2331.980                           |

### Présentation des variables



|               | Estimate | Std. Error | t value | $\Pr(> t )$ |
|---------------|----------|------------|---------|-------------|
| (Intercept)   | 1767     | 790.8      | 2.235   | 0.03277     |
| x1            | -378013  | 120267     | -3.143  | 0.003667    |
| $\mathbf{x2}$ | 4.242    | 1.423      | 2.98    | 0.005559    |
| x3            | 36.89    | 5.615      | 6.57    | 2.449e-07   |

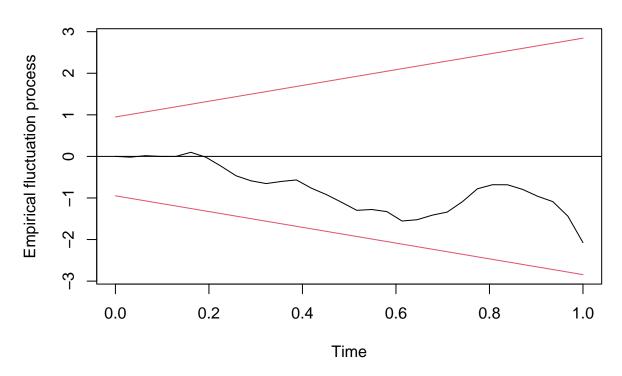
Table 3: Fitting linear model:  $y \sim x$ 

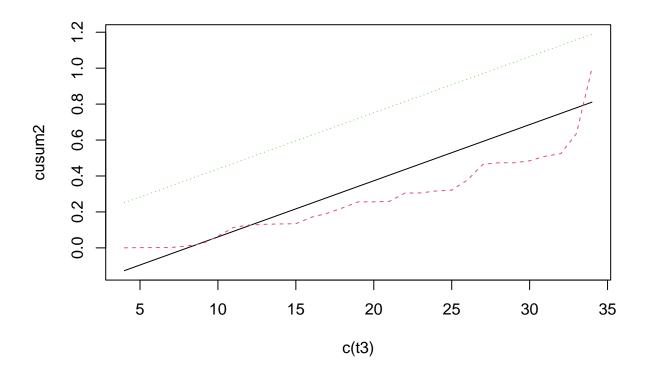
| Observations | Residual Std. Error | $R^2$  | Adjusted $\mathbb{R}^2$ |
|--------------|---------------------|--------|-------------------------|
| 35           | 721.2               | 0.9475 | 0.9424                  |

## [,1] ## [1,] 0.5667082

Econométrie II 3

## **Recursive CUSUM test**





|               | Estimate | Std. Error | t value | $\Pr(> t )$ |
|---------------|----------|------------|---------|-------------|
| (Intercept)   | 117.4    | 1670       | 0.07026 | 0.9445      |
| $\mathbf{x}1$ | -294623  | 141025     | -2.089  | 0.04528     |
| $\mathbf{x2}$ | -365083  | 120331     | -3.034  | 0.004947    |
| $\mathbf{x3}$ | 4.871    | 1.525      | 3.195   | 0.003283    |
| x4            | 37.35    | 5.607      | 6.661   | 2.231e-07   |

Table 5: Fitting linear model: y  $\sim$  x

| Observations | Residual Std. Error | $R^2$  | Adjusted $R^2$ |
|--------------|---------------------|--------|----------------|
| 35           | 718.3               | 0.9496 | 0.9429         |

## [,1] ## [1,] 0.5232029