



# **REPORT ON THE BACKCASTING OF CONSUMER CONFIDENCE INDEX AND INDICES BASED ON INDIVIDUAL QUESTIONS**

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**SAMPLING AND ANALYSIS TECHNIQUES DEPARTMENT**

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**ANKARA**

## BACKCASTING OF CONSUMER CONFIDENCE INDEX SERIES

The Consumer Confidence Index (CCI) series, being collected and published monthly since 2004, has shifted beginning from 2012 (the area inside the dotted frame) because of changes based on questions.

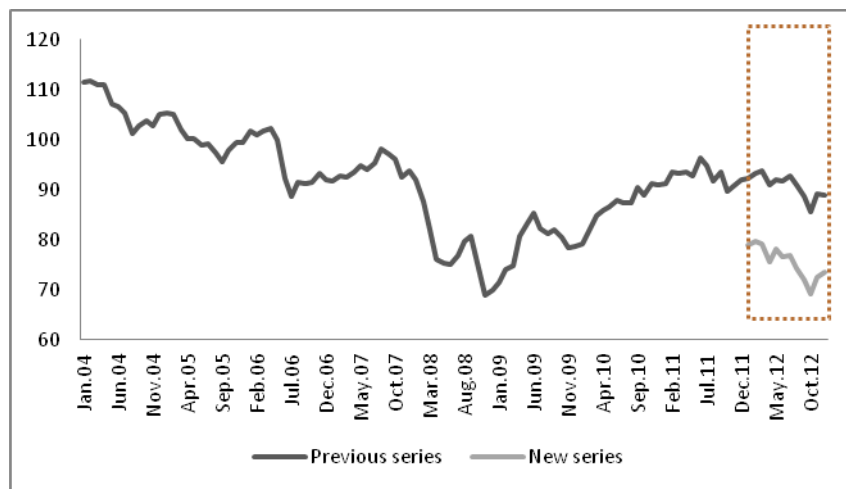


Figure 1. Consumer Confidence Index (Effect of new definitions)

It is obvious that the level shift beginning from 2012 would definitely damage the comparability with the values before 2012. As the factor that changed the new index is “changes in definitions of questions” a micro based backcasting is considered unreasonable. Therefore, being referenced in handbooks and guidelines of both European Union and IMF, backcasting with model based macro approach has been adopted.

Reg-ARIMA model has been selected as the baseline of model based approach. In addition to this approach, considering the effect of changes in definition, concept and classification on the trend and seasonal components of the series, the breaks in the trend and seasonal (if applicable) components of the previous series have been adjusted. Thus, a new series compatible with the new definition has been obtained<sup>1</sup>. At this point it is important to state that the conventional approach

<sup>1</sup> Mazzi, G.L., F. Moauro and R. R. Cannata (2010), Back-calculation of European aggregates: some general considerations, Presentations of European Conference on Quality in Official Statistics, Helsinki.

Di Fonzo, T. (2003), Constrained retropolation of high-frequency data using related series. A simple dynamic model approach, Statistical Methods & Applications, 12, pp. 109-119.

Caporin, M. and D. Sartore (2006), Methodological aspects of time series back-calculation, University Ca' Foscari of Venice, Dept. of Economics Research Paper Series, No. 56/06.

Buono, D. and Koçak, N.A. (2012) Backward recalculation of seasonal series affected by economic crisis: a Model-Based-Link method for the case of Turkish GDP, Luxembourg: Publications Office of the European Union, 2012. Doi: 10.2901/1977-3331.2011.005

called “backcasting based on growth rates” is basically a “chaining” method rather than a “backcasting” approach. Because the series cannot be considered backcasted with the sense of carrying the new definition backwards, as the growth rate of the chained series at the dates before chaining does not change.

In Figure 2 CCI with the old definition, CCI backcasted based on growth rates and CCI backcasted with model based approach have been given all together in order to compare them with each other. As it can be seen, the difference in level relative to the previous series has been eliminated with both approaches. The point to be taken into account in Figure 2 is the difference between CCI backcasted based on growth rates and CCI backcasted with model based approach particularly in years 2004-2005 and 2008-2009. As CCI does not include seasonality and thereby the seasonal break is not adjusted by the model based approach, the differences between the growth rate based approach are not dramatic. However, as many economic series include seasonality, this finding cannot take away the requirement to backcast on a macro level with a generic model.

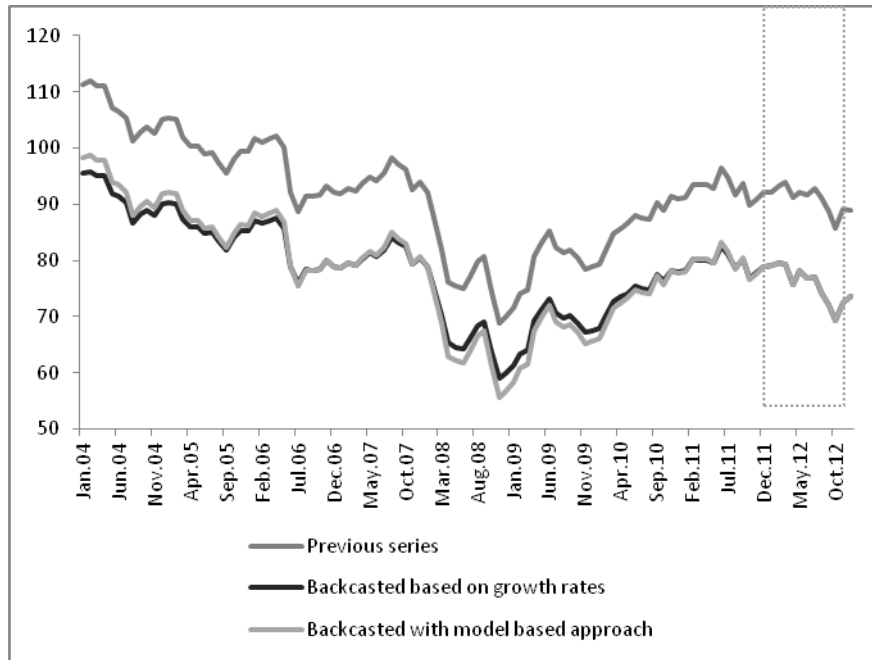


Figure 2. Consumer Confidence Index

Even though monthly growth rates do not differ much as it can be seen on Figure 3, annual growth rates differ significantly in 2008 and after (Figure 4). All results originating in Figures 1, 2, 3, 4 and the CCI series withdrawn by macro approach and model-based method are given in Table1.

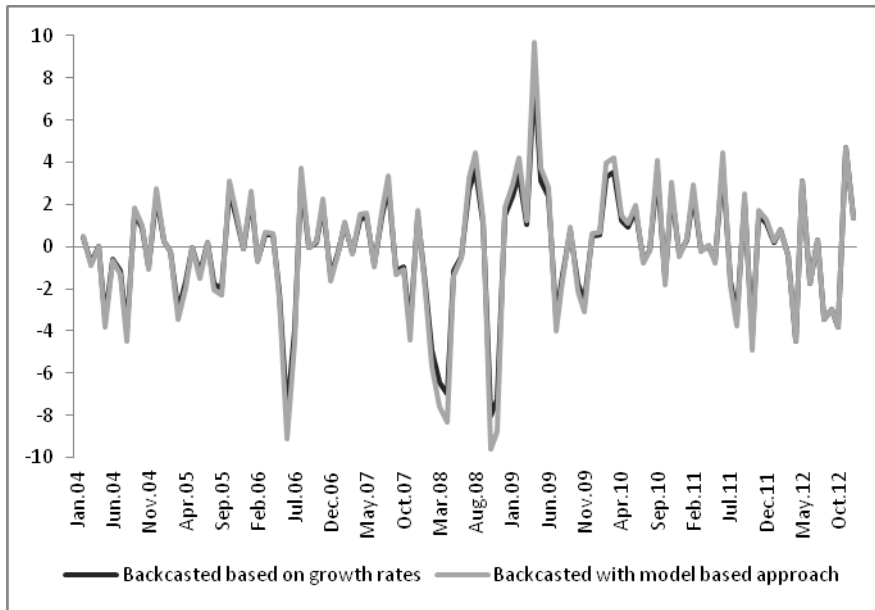


Figure 3. Backcasted Consumer Confidence Index (Monthly change,%)

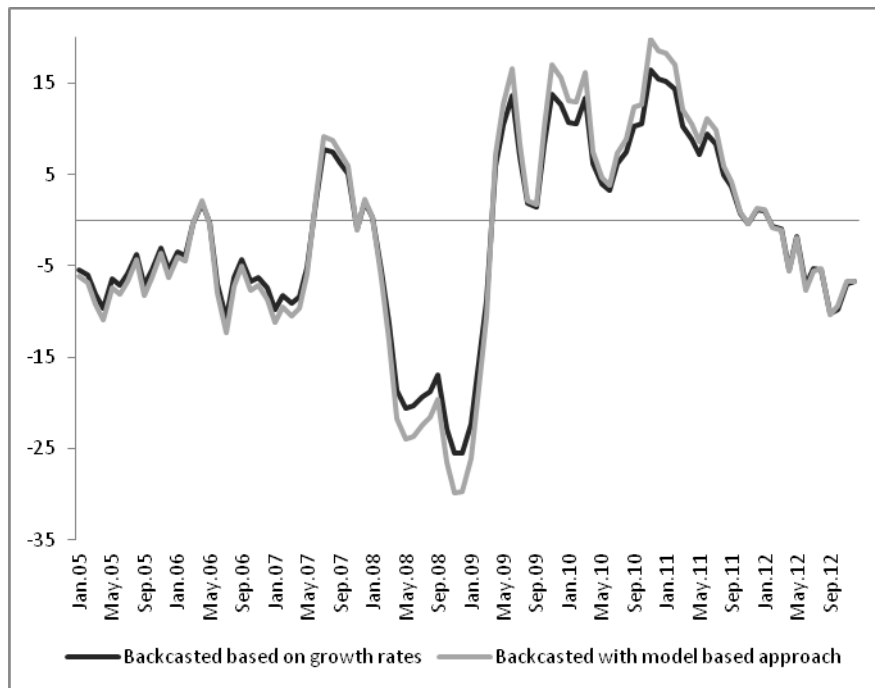


Figure 4. Backcasted Consumer Confidence Index (Annual change,%)

Table 1. Backcasting Results for Consumer Confidence Index

|        | CONSUMER CONFIDENCE INDEX |                                  |                                      | MONTHLY CHANGE  |                                  |                                      | ANNUAL CHANGE   |                                  |                                      |
|--------|---------------------------|----------------------------------|--------------------------------------|-----------------|----------------------------------|--------------------------------------|-----------------|----------------------------------|--------------------------------------|
|        | Previous series           | Backcasted based on growth rates | Backcasted with model based approach | Previous series | Backcasted based on growth rates | Backcasted with model based approach | Previous series | Backcasted based on growth rates | Backcasted with model based approach |
| Jan.04 | 111,40                    | 95,46                            | 98,18                                |                 |                                  |                                      |                 |                                  |                                      |
| Feb.04 | 111,90                    | 95,88                            | 98,68                                | 0,45            | 0,45                             | 0,51                                 |                 |                                  |                                      |
| Mar.04 | 111,00                    | 95,11                            | 97,78                                | -0,80           | -0,80                            | -0,91                                |                 |                                  |                                      |
| Apr.04 | 111,00                    | 95,11                            | 97,78                                | 0,00            | 0,00                             | 0,00                                 |                 |                                  |                                      |
| May.04 | 107,25                    | 91,90                            | 94,03                                | -3,38           | -3,38                            | -3,83                                |                 |                                  |                                      |
| Jun.04 | 106,62                    | 91,36                            | 93,40                                | -0,59           | -0,59                            | -0,67                                |                 |                                  |                                      |
| Jul.04 | 105,39                    | 90,31                            | 92,17                                | -1,15           | -1,15                            | -1,32                                |                 |                                  |                                      |
| Aug.04 | 101,24                    | 86,75                            | 88,02                                | -3,94           | -3,94                            | -4,50                                |                 |                                  |                                      |
| Sep.04 | 102,85                    | 88,13                            | 89,63                                | 1,59            | 1,59                             | 1,82                                 |                 |                                  |                                      |
| Oct.04 | 103,71                    | 88,87                            | 90,48                                | 0,84            | 0,84                             | 0,96                                 |                 |                                  |                                      |
| Nov.04 | 102,70                    | 88,00                            | 89,48                                | -0,97           | -0,97                            | -1,11                                |                 |                                  |                                      |
| Dec.04 | 105,17                    | 90,12                            | 91,94                                | 2,41            | 2,41                             | 2,76                                 |                 |                                  |                                      |
| Jan.05 | 105,43                    | 90,34                            | 92,20                                | 0,25            | 0,25                             | 0,28                                 | -5,36           | -5,36                            | -6,08                                |
| Feb.05 | 105,21                    | 90,15                            | 91,99                                | -0,21           | -0,21                            | -0,23                                | -5,98           | -5,98                            | -6,77                                |
| Mar.05 | 102,05                    | 87,44                            | 88,83                                | -3,00           | -3,00                            | -3,44                                | -8,06           | -8,06                            | -9,15                                |
| Apr.05 | 100,36                    | 86,00                            | 87,13                                | -1,66           | -1,66                            | -1,91                                | -9,59           | -9,59                            | -10,89                               |
| May.05 | 100,34                    | 85,98                            | 87,12                                | -0,02           | -0,02                            | -0,02                                | -6,44           | -6,44                            | -7,35                                |
| Jun.05 | 99,05                     | 84,87                            | 85,83                                | -1,29           | -1,29                            | -1,48                                | -7,10           | -7,10                            | -8,10                                |
| Jul.05 | 99,23                     | 85,03                            | 86,00                                | 0,18            | 0,18                             | 0,20                                 | -5,84           | -5,84                            | -6,69                                |
| Aug.05 | 97,46                     | 83,51                            | 84,24                                | -1,78           | -1,78                            | -2,05                                | -3,73           | -3,73                            | -4,30                                |
| Sep.05 | 95,51                     | 81,84                            | 82,28                                | -2,00           | -2,00                            | -2,32                                | -7,14           | -7,14                            | -8,19                                |
| Oct.05 | 98,06                     | 84,02                            | 84,83                                | 2,67            | 2,67                             | 3,10                                 | -5,45           | -5,45                            | -6,24                                |
| Nov.05 | 99,53                     | 85,28                            | 86,31                                | 1,50            | 1,50                             | 1,74                                 | -3,09           | -3,09                            | -3,54                                |
| Dec.05 | 99,45                     | 85,22                            | 86,23                                | -0,08           | -0,08                            | -0,10                                | -5,44           | -5,44                            | -6,22                                |
| Jan.06 | 101,74                    | 87,18                            | 88,52                                | 2,30            | 2,30                             | 2,65                                 | -3,50           | -3,50                            | -4,00                                |
| Feb.06 | 101,10                    | 86,63                            | 87,88                                | -0,63           | -0,63                            | -0,72                                | -3,91           | -3,91                            | -4,47                                |
| Mar.06 | 101,70                    | 87,14                            | 88,47                                | 0,59            | 0,59                             | 0,67                                 | -0,34           | -0,34                            | -0,40                                |
| Apr.06 | 102,27                    | 87,63                            | 89,04                                | 0,56            | 0,56                             | 0,65                                 | 1,90            | 1,90                             | 2,19                                 |
| May.06 | 100,07                    | 85,75                            | 86,85                                | -2,15           | -2,15                            | -2,47                                | -0,27           | -0,27                            | -0,31                                |
| Jun.06 | 92,17                     | 78,98                            | 78,95                                | -7,89           | -7,89                            | -9,10                                | -6,95           | -6,95                            | -8,02                                |
| Jul.06 | 88,60                     | 75,92                            | 75,38                                | -3,87           | -3,87                            | -4,52                                | -10,71          | -10,71                           | -12,36                               |
| Aug.06 | 91,40                     | 78,32                            | 78,18                                | 3,16            | 3,16                             | 3,72                                 | -6,22           | -6,22                            | -7,19                                |
| Sep.06 | 91,36                     | 78,28                            | 78,14                                | -0,04           | -0,04                            | -0,06                                | -4,35           | -4,35                            | -5,04                                |
| Oct.06 | 91,56                     | 78,45                            | 78,34                                | 0,22            | 0,22                             | 0,26                                 | -6,63           | -6,63                            | -7,65                                |
| Nov.06 | 93,35                     | 79,99                            | 80,12                                | 1,96            | 1,96                             | 2,27                                 | -6,21           | -6,21                            | -7,17                                |
| Dec.06 | 92,04                     | 78,87                            | 78,82                                | -1,40           | -1,40                            | -1,63                                | -7,45           | -7,45                            | -8,59                                |

|               | CONSUMER CONFIDENCE INDEX |                                  |                                      | MONTHLY CHANGE  |                                  |                                      | ANNUAL CHANGE   |                                  |                                      |
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|               | Previous series           | Backcasted based on growth rates | Backcasted with model based approach | Previous series | Backcasted based on growth rates | Backcasted with model based approach | Previous series | Backcasted based on growth rates | Backcasted with model based approach |
| <b>Jan.07</b> | 91,80                     | 78,66                            | 78,58                                | -0,26           | -0,26                            | -0,30                                | -9,77           | -9,77                            | -11,22                               |
| <b>Feb.07</b> | 92,74                     | 79,47                            | 79,52                                | 1,02            | 1,02                             | 1,19                                 | -8,27           | -8,27                            | -9,51                                |
| <b>Mar.07</b> | 92,44                     | 79,21                            | 79,22                                | -0,32           | -0,32                            | -0,38                                | -9,11           | -9,11                            | -10,46                               |
| <b>Apr.07</b> | 93,66                     | 80,25                            | 80,44                                | 1,32            | 1,32                             | 1,54                                 | -8,42           | -8,42                            | -9,66                                |
| <b>May.07</b> | 94,96                     | 81,37                            | 81,73                                | 1,39            | 1,39                             | 1,61                                 | -5,11           | -5,11                            | -5,89                                |
| <b>Jun.07</b> | 94,17                     | 80,69                            | 80,95                                | -0,83           | -0,83                            | -0,96                                | 2,17            | 2,17                             | 2,54                                 |
| <b>Jul.07</b> | 95,49                     | 81,82                            | 82,27                                | 1,40            | 1,40                             | 1,63                                 | 7,78            | 7,78                             | 9,15                                 |
| <b>Aug.07</b> | 98,25                     | 84,19                            | 85,02                                | 2,89            | 2,89                             | 3,35                                 | 7,49            | 7,49                             | 8,75                                 |
| <b>Sep.07</b> | 97,11                     | 83,21                            | 83,89                                | -1,16           | -1,16                            | -1,34                                | 6,29            | 6,29                             | 7,35                                 |
| <b>Oct.07</b> | 96,20                     | 82,43                            | 82,98                                | -0,94           | -0,94                            | -1,08                                | 5,07            | 5,07                             | 5,92                                 |
| <b>Nov.07</b> | 92,52                     | 79,28                            | 79,30                                | -3,83           | -3,83                            | -4,43                                | -0,89           | -0,89                            | -1,03                                |
| <b>Dec.07</b> | 93,89                     | 80,45                            | 80,67                                | 1,48            | 1,48                             | 1,73                                 | 2,01            | 2,01                             | 2,34                                 |
| <b>Jan.08</b> | 92,12                     | 78,93                            | 78,89                                | -1,89           | -1,89                            | -2,20                                | 0,35            | 0,35                             | 0,40                                 |
| <b>Feb.08</b> | 87,60                     | 75,06                            | 74,38                                | -4,91           | -4,91                            | -5,72                                | -5,54           | -5,54                            | -6,47                                |
| <b>Mar.08</b> | 81,96                     | 70,23                            | 68,74                                | -6,44           | -6,44                            | -7,58                                | -11,34          | -11,34                           | -13,23                               |
| <b>Apr.08</b> | 76,24                     | 65,33                            | 63,01                                | -6,98           | -6,98                            | -8,33                                | -18,60          | -18,60                           | -21,66                               |
| <b>May.08</b> | 75,36                     | 64,57                            | 62,14                                | -1,15           | -1,15                            | -1,39                                | -20,64          | -20,64                           | -23,97                               |
| <b>Jun.08</b> | 75,01                     | 64,27                            | 61,79                                | -0,46           | -0,46                            | -0,56                                | -20,35          | -20,35                           | -23,67                               |
| <b>Jul.08</b> | 77,01                     | 65,99                            | 63,79                                | 2,67            | 2,67                             | 3,23                                 | -19,35          | -19,35                           | -22,47                               |
| <b>Aug.08</b> | 79,85                     | 68,42                            | 66,63                                | 3,69            | 3,69                             | 4,45                                 | -18,73          | -18,73                           | -21,64                               |
| <b>Sep.08</b> | 80,72                     | 69,17                            | 67,50                                | 1,09            | 1,09                             | 1,31                                 | -16,88          | -16,88                           | -19,54                               |
| <b>Oct.08</b> | 74,24                     | 63,61                            | 61,02                                | -8,03           | -8,03                            | -9,60                                | -22,83          | -22,83                           | -26,46                               |
| <b>Nov.08</b> | 68,88                     | 59,02                            | 55,66                                | -7,22           | -7,22                            | -8,78                                | -25,55          | -25,55                           | -29,81                               |
| <b>Dec.08</b> | 69,90                     | 59,90                            | 56,68                                | 1,48            | 1,48                             | 1,83                                 | -25,55          | -25,55                           | -29,74                               |
| <b>Jan.09</b> | 71,56                     | 61,32                            | 58,33                                | 2,37            | 2,37                             | 2,93                                 | -22,32          | -22,32                           | -26,06                               |
| <b>Feb.09</b> | 74,01                     | 63,42                            | 60,78                                | 3,42            | 3,42                             | 4,20                                 | -15,51          | -15,51                           | -18,28                               |
| <b>Mar.09</b> | 74,77                     | 64,07                            | 61,55                                | 1,03            | 1,03                             | 1,26                                 | -8,77           | -8,77                            | -10,46                               |
| <b>Apr.09</b> | 80,75                     | 69,19                            | 67,53                                | 8,00            | 8,00                             | 9,72                                 | 5,92            | 5,92                             | 7,17                                 |
| <b>May.09</b> | 83,28                     | 71,36                            | 70,05                                | 3,13            | 3,13                             | 3,73                                 | 10,51           | 10,51                            | 12,74                                |
| <b>Jun.09</b> | 85,27                     | 73,07                            | 72,05                                | 2,39            | 2,39                             | 2,84                                 | 13,68           | 13,68                            | 16,60                                |
| <b>Jul.09</b> | 82,37                     | 70,58                            | 69,15                                | -3,40           | -3,40                            | -4,03                                | 6,96            | 6,96                             | 8,40                                 |
| <b>Aug.09</b> | 81,30                     | 69,66                            | 68,08                                | -1,30           | -1,30                            | -1,54                                | 1,82            | 1,82                             | 2,18                                 |
| <b>Sep.09</b> | 81,92                     | 70,19                            | 68,70                                | 0,76            | 0,76                             | 0,91                                 | 1,49            | 1,49                             | 1,78                                 |
| <b>Oct.09</b> | 80,46                     | 68,94                            | 67,24                                | -1,78           | -1,78                            | -2,13                                | 8,38            | 8,38                             | 10,19                                |
| <b>Nov.09</b> | 78,38                     | 67,16                            | 65,16                                | -2,59           | -2,59                            | -3,10                                | 13,79           | 13,79                            | 17,06                                |
| <b>Dec.09</b> | 78,79                     | 67,51                            | 65,57                                | 0,52            | 0,52                             | 0,63                                 | 12,72           | 12,72                            | 15,69                                |

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| <b>Jan.10</b> | 79,24                     | 67,90                            | 66,01                                | 0,57            | 0,57                             | 0,68                                 | 10,73           | 10,73                            | 13,16                                |
| <b>Feb.10</b> | 81,85                     | 70,13                            | 68,63                                | 3,29            | 3,29                             | 3,96                                 | 10,59           | 10,59                            | 12,90                                |
| <b>Mar.10</b> | 84,74                     | 72,61                            | 71,52                                | 3,53            | 3,53                             | 4,22                                 | 13,33           | 13,33                            | 16,20                                |
| <b>Apr.10</b> | 85,80                     | 73,52                            | 72,57                                | 1,25            | 1,25                             | 1,47                                 | 6,25            | 6,25                             | 7,47                                 |
| <b>May.10</b> | 86,58                     | 74,19                            | 73,36                                | 0,91            | 0,91                             | 1,08                                 | 3,96            | 3,96                             | 4,72                                 |
| <b>Jun.10</b> | 88,04                     | 75,44                            | 74,82                                | 1,69            | 1,69                             | 1,99                                 | 3,25            | 3,25                             | 3,84                                 |
| <b>Jul.10</b> | 87,48                     | 74,96                            | 74,25                                | -0,64           | -0,64                            | -0,75                                | 6,20            | 6,20                             | 7,39                                 |
| <b>Aug.10</b> | 87,35                     | 74,85                            | 74,13                                | -0,15           | -0,15                            | -0,17                                | 7,44            | 7,44                             | 8,89                                 |
| <b>Sep.10</b> | 90,41                     | 77,47                            | 77,18                                | 3,50            | 3,50                             | 4,12                                 | 10,36           | 10,36                            | 12,35                                |
| <b>Oct.10</b> | 89,02                     | 76,28                            | 75,79                                | -1,54           | -1,54                            | -1,80                                | 10,64           | 10,64                            | 12,73                                |
| <b>Nov.10</b> | 91,34                     | 78,27                            | 78,12                                | 2,61            | 2,61                             | 3,06                                 | 16,53           | 16,53                            | 19,89                                |
| <b>Dec.10</b> | 90,99                     | 77,97                            | 77,77                                | -0,38           | -0,38                            | -0,45                                | 15,48           | 15,48                            | 18,60                                |
| <b>Jan.11</b> | 91,29                     | 78,22                            | 78,06                                | 0,33            | 0,33                             | 0,38                                 | 15,21           | 15,21                            | 18,25                                |
| <b>Feb.11</b> | 93,56                     | 80,17                            | 80,34                                | 2,49            | 2,49                             | 2,92                                 | 14,31           | 14,31                            | 17,07                                |
| <b>Mar.11</b> | 93,43                     | 80,06                            | 80,18                                | -0,14           | -0,14                            | -0,20                                | 10,25           | 10,25                            | 12,11                                |
| <b>Apr.11</b> | 93,46                     | 80,08                            | 80,24                                | 0,03            | 0,03                             | 0,07                                 | 8,93            | 8,93                             | 10,56                                |
| <b>May.11</b> | 92,85                     | 79,56                            | 79,63                                | -0,65           | -0,65                            | -0,76                                | 7,24            | 7,24                             | 8,55                                 |
| <b>Jun.11</b> | 96,42                     | 82,62                            | 83,19                                | 3,84            | 3,84                             | 4,48                                 | 9,52            | 9,52                             | 11,20                                |
| <b>Jul.11</b> | 94,83                     | 81,26                            | 81,61                                | -1,65           | -1,65                            | -1,90                                | 8,40            | 8,40                             | 9,91                                 |
| <b>Aug.11</b> | 91,74                     | 78,61                            | 78,52                                | -3,26           | -3,26                            | -3,79                                | 5,03            | 5,03                             | 5,93                                 |
| <b>Sep.11</b> | 93,70                     | 80,29                            | 80,47                                | 2,14            | 2,14                             | 2,49                                 | 3,64            | 3,64                             | 4,26                                 |
| <b>Oct.11</b> | 89,73                     | 76,89                            | 76,51                                | -4,24           | -4,24                            | -4,93                                | 0,80            | 0,80                             | 0,94                                 |
| <b>Nov.11</b> | 91,04                     | 78,01                            | 77,82                                | 1,46            | 1,46                             | 1,71                                 | -0,33           | -0,33                            | -0,38                                |
| <b>Dec.11</b> | 92,04                     | 78,87                            | 78,82                                | 1,10            | 1,10                             | 1,29                                 | 1,15            | 1,15                             | 1,36                                 |
| <b>Jan.12</b> | 92,23                     | 79,03                            | 79,03                                | 0,21            | 0,21                             | 0,26                                 | 1,03            | 1,03                             | 1,24                                 |
| <b>Feb.12</b> | 93,25                     | 79,65                            | 79,65                                | 1,11            | 0,78                             | 0,78                                 | -0,33           | -0,65                            | -0,86                                |
| <b>Mar.12</b> | 93,86                     | 79,34                            | 79,34                                | 0,65            | -0,39                            | -0,39                                | 0,46            | -0,90                            | -1,05                                |
| <b>Apr.12</b> | 91,13                     | 75,75                            | 75,75                                | -2,91           | -4,52                            | -4,52                                | -2,49           | -5,41                            | -5,59                                |
| <b>May.12</b> | 92,12                     | 78,11                            | 78,11                                | 1,09            | 3,12                             | 3,12                                 | -0,79           | -1,82                            | -1,91                                |
| <b>Jun.12</b> | 91,75                     | 76,76                            | 76,76                                | -0,40           | -1,73                            | -1,73                                | -4,84           | -7,09                            | -7,74                                |
| <b>Jul.12</b> | 92,78                     | 77,01                            | 77,01                                | 1,12            | 0,33                             | 0,33                                 | -2,16           | -5,22                            | -5,63                                |
| <b>Aug.12</b> | 91,10                     | 74,33                            | 74,33                                | -1,81           | -3,48                            | -3,48                                | -0,70           | -5,44                            | -5,33                                |
| <b>Sep.12</b> | 88,81                     | 72,12                            | 72,12                                | -2,51           | -2,98                            | -2,98                                | -5,22           | -10,18                           | -10,38                               |
| <b>Oct.12</b> | 85,73                     | 69,34                            | 69,34                                | -3,47           | -3,85                            | -3,85                                | -4,46           | -9,82                            | -9,37                                |
| <b>Nov.12</b> | 89,18                     | 72,60                            | 72,60                                | 4,02            | 4,71                             | 4,71                                 | -2,04           | -6,93                            | -6,70                                |
| <b>Dec.12</b> | 89,00                     | 73,59                            | 73,59                                | -0,20           | 1,35                             | 1,35                                 | -3,30           | -6,69                            | -6,64                                |

## BACKCASTING OF CONSUMER CONFIDENCE INDICES BASED ON INDIVIDUAL QUESTIONS

Consumer Confidence Index is computed using 4 indices based on individual questions. In the previous section Consumer Confidence Index has been backcasted using Reg-ARIMA model for January 2004 – December 2011 period. In this section, the backcasting process of 4 indices based on individual questions for January 2004 – December 2011 period shall be covered.

In contrast with Consumer Confidence Index, indices based on individual questions do not have any substitutes for the period January 2004 – December 2011. As the question structure has been changed with the alterations carried out in 2012 and the concepts measured with the questions before and after 2012 completely differ from each other, comparability has vanished.

In this case for January 2004 – December 2011 and January 2012 – October 2016 periods Consumer Confidence Index and for January 2012 – October 2016 period 4 indices based on individual questions are available. The aim is to obtain 4 indices based on individual questions for January 2004 – December 2011.

A VAR (Vector Auto Regression) model has been estimated for January 2012 – October 2016 period treating 4 indices based on individual questions as endogenous and Consumer Confidence Index as exogenous. As a result of the estimation of the VAR model a 4x6 sized learning matrix consisting of 4 endogenous and 1 exogenous variables has been obtained. After then in order to minimize the errors in January 2012 – October 2016, this learning matrix has been optimized by a Second Degree Forward Newton Algorithm. Following that, using the optimized learning matrix, January 2004 – December 2011 estimations (backcast) of 4 indices based on individual questions have been acquired. Finally, in order to provide compatibility of the acquired indices based on individual questions with Consumer Confidence Index a benchmarking procedure has been carried out.

When the figures of 4 indices based on individual questions for January 2004 – December 2011 is examined it can be stated that they are affected both by their own movement in January 2012 – October 2016 and by the movement of Consumer Confidence Index in January 2004 – December 2011. On the other side, the compatibility of the acquired indices based on individual questions with the subcomponents of Real Sector Confidence Index indicates a high performance of the VAR model used in the backcasting procedure.



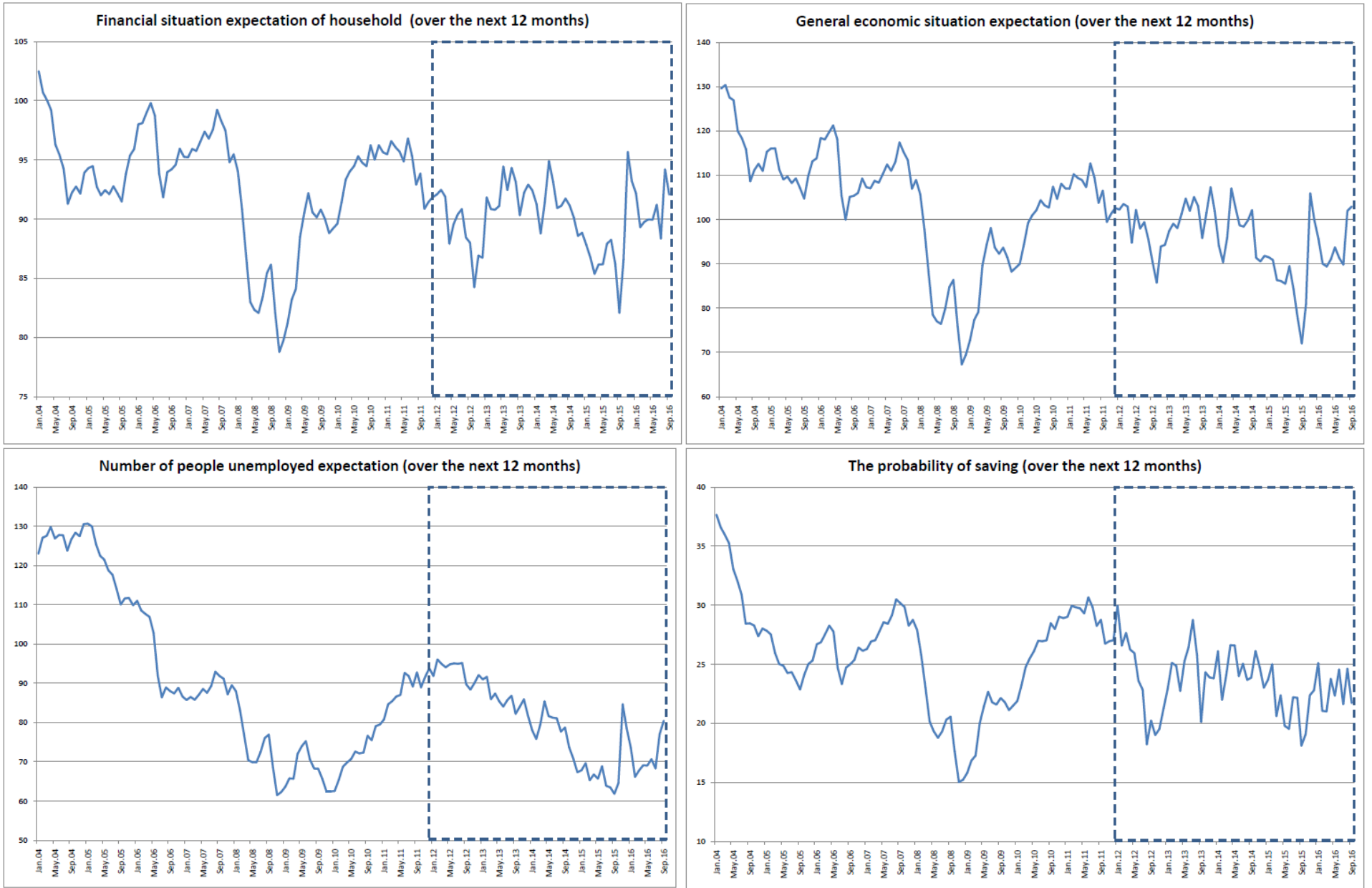


Figure 4. Backcasted Indices Based on Individual Questions

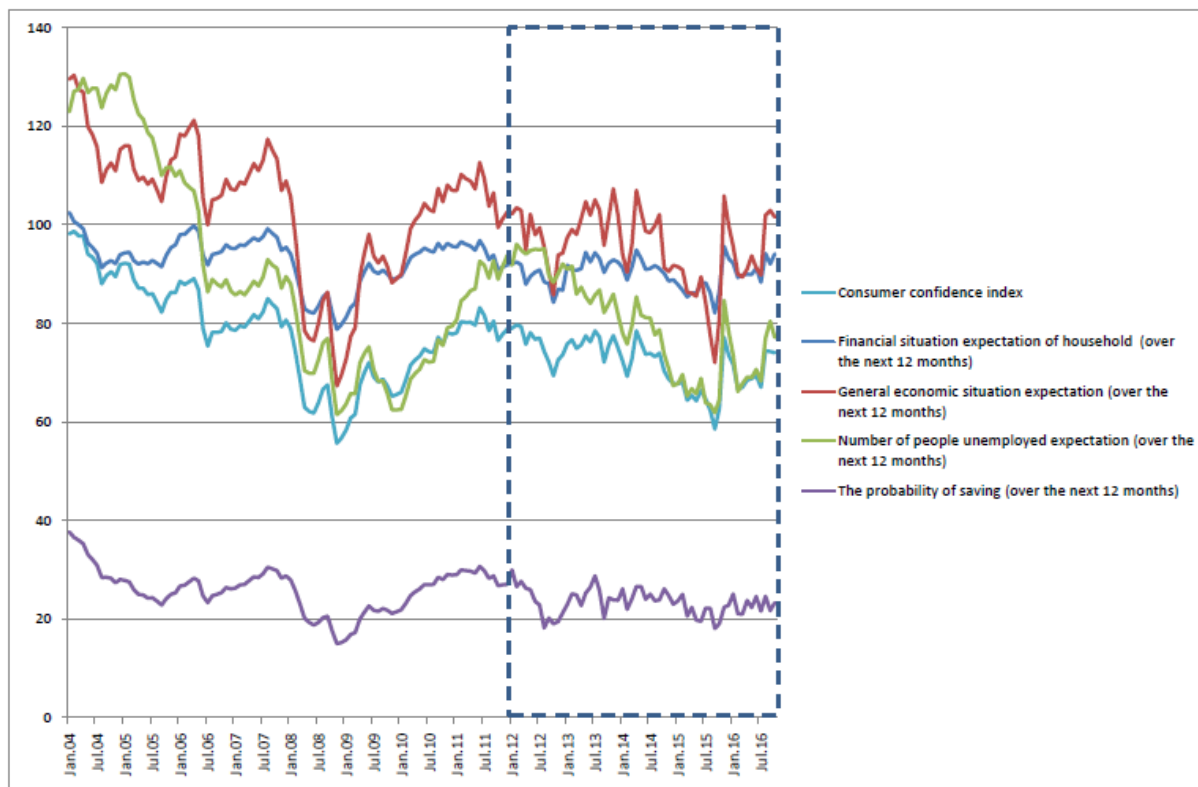


Figure 5. Backcasted Indices Based on Individual Questions and Consumer Confidence Index (January 2004 and After)

Table 2. Backcasted Indices based on individual questions and Consumer Confidence Index (January 2004-December 2011)

|        | Financial situation expectation of household (over the next 12 months) | General economic situation expectation (over the next 12 months) | Number of people unemployed expectation (over the next 12 months) | The probability of saving (over the next 12 months) | Consumer confidence index (over the next 12 months) |
|--------|------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| Jan.04 | 102.49                                                                 | 129.58                                                           | 122.99                                                            | 37.65                                               | 98.18                                               |
| Feb.04 | 100.70                                                                 | 130.37                                                           | 127.06                                                            | 36.58                                               | 98.68                                               |
| Mar.04 | 100.03                                                                 | 127.55                                                           | 127.55                                                            | 35.97                                               | 97.78                                               |
| Apr.04 | 99.20                                                                  | 126.92                                                           | 129.75                                                            | 35.24                                               | 97.78                                               |
| May.04 | 96.29                                                                  | 119.91                                                           | 126.86                                                            | 33.06                                               | 94.03                                               |
| Jun.04 | 95.42                                                                  | 118.32                                                           | 127.77                                                            | 32.08                                               | 93.40                                               |
| Jul.04 | 94.26                                                                  | 115.82                                                           | 127.68                                                            | 30.89                                               | 92.17                                               |
| Aug.04 | 91.29                                                                  | 108.62                                                           | 123.74                                                            | 28.43                                               | 88.02                                               |
| Sep.04 | 92.23                                                                  | 111.16                                                           | 126.66                                                            | 28.46                                               | 89.63                                               |
| Oct.04 | 92.75                                                                  | 112.56                                                           | 128.36                                                            | 28.28                                               | 90.48                                               |
| Nov.04 | 92.15                                                                  | 110.96                                                           | 127.42                                                            | 27.37                                               | 89.48                                               |
| Dec.04 | 93.93                                                                  | 115.29                                                           | 130.54                                                            | 28.02                                               | 91.94                                               |
| Jan.05 | 94.31                                                                  | 116.02                                                           | 130.65                                                            | 27.84                                               | 92.20                                               |
| Feb.05 | 94.47                                                                  | 116.05                                                           | 129.93                                                            | 27.52                                               | 91.99                                               |
| Mar.05 | 92.72                                                                  | 111.27                                                           | 125.38                                                            | 25.95                                               | 88.83                                               |
| Apr.05 | 92.01                                                                  | 109.04                                                           | 122.47                                                            | 25.02                                               | 87.13                                               |
| May.05 | 92.45                                                                  | 109.67                                                           | 121.48                                                            | 24.87                                               | 87.12                                               |

Table 2.Backcasted Indices based on individual questions and Consumer Confidence Index (January 2004-December 2011) (continued)

|        | Financial situation expectation of household (over the next 12 months) | General economic situation expectation (over the next 12 months) | Number of people unemployed expectation (over the next 12 months) | The probability of saving (over the next 12 months) | Consumer confidence index (over the next 12 months) |
|--------|------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| Jun.05 | 92.10                                                                  | 108.23                                                           | 118.73                                                            | 24.26                                               | 85.83                                               |
| Jul.05 | 92.77                                                                  | 109.28                                                           | 117.63                                                            | 24.33                                               | 86.00                                               |
| Aug.05 | 92.17                                                                  | 107.15                                                           | 114.02                                                            | 23.63                                               | 84.24                                               |
| Sep.05 | 91.49                                                                  | 104.73                                                           | 110.05                                                            | 22.86                                               | 82.28                                               |
| Oct.05 | 93.79                                                                  | 109.85                                                           | 111.60                                                            | 24.11                                               | 84.83                                               |
| Nov.05 | 95.37                                                                  | 113.14                                                           | 111.73                                                            | 25.02                                               | 86.31                                               |
| Dec.05 | 95.92                                                                  | 113.80                                                           | 109.87                                                            | 25.32                                               | 86.23                                               |
| Jan.06 | 98.00                                                                  | 118.39                                                           | 110.98                                                            | 26.69                                               | 88.52                                               |
| Feb.06 | 98.11                                                                  | 118.04                                                           | 108.52                                                            | 26.86                                               | 87.88                                               |
| Mar.06 | 99.00                                                                  | 119.69                                                           | 107.65                                                            | 27.55                                               | 88.47                                               |
| Apr.06 | 99.80                                                                  | 121.23                                                           | 106.88                                                            | 28.26                                               | 89.04                                               |
| May.06 | 98.74                                                                  | 118.09                                                           | 102.80                                                            | 27.76                                               | 86.85                                               |
| Jun.06 | 93.86                                                                  | 105.42                                                           | 91.82                                                             | 24.69                                               | 78.95                                               |
| Jul.06 | 91.83                                                                  | 99.97                                                            | 86.38                                                             | 23.32                                               | 75.38                                               |
| Aug.06 | 93.97                                                                  | 105.10                                                           | 88.94                                                             | 24.72                                               | 78.18                                               |
| Sep.06 | 94.20                                                                  | 105.37                                                           | 88.00                                                             | 24.99                                               | 78.14                                               |
| Oct.06 | 94.58                                                                  | 106.02                                                           | 87.41                                                             | 25.36                                               | 78.34                                               |
| Nov.06 | 95.95                                                                  | 109.26                                                           | 88.87                                                             | 26.41                                               | 80.12                                               |
| Dec.06 | 95.25                                                                  | 107.29                                                           | 86.60                                                             | 26.14                                               | 78.82                                               |
| Jan.07 | 95.22                                                                  | 107.06                                                           | 85.75                                                             | 26.29                                               | 78.58                                               |
| Feb.07 | 95.92                                                                  | 108.74                                                           | 86.49                                                             | 26.93                                               | 79.52                                               |
| Mar.07 | 95.76                                                                  | 108.29                                                           | 85.79                                                             | 27.04                                               | 79.22                                               |
| Apr.07 | 96.58                                                                  | 110.33                                                           | 87.08                                                             | 27.78                                               | 80.44                                               |
| May.07 | 97.39                                                                  | 112.42                                                           | 88.56                                                             | 28.56                                               | 81.73                                               |
| Jun.07 | 96.80                                                                  | 110.99                                                           | 87.58                                                             | 28.42                                               | 80.95                                               |
| Jul.07 | 97.57                                                                  | 113.04                                                           | 89.33                                                             | 29.14                                               | 82.27                                               |
| Aug.07 | 99.23                                                                  | 117.40                                                           | 92.96                                                             | 30.50                                               | 85.02                                               |
| Sep.07 | 98.29                                                                  | 115.22                                                           | 91.86                                                             | 30.17                                               | 83.89                                               |
| Oct.07 | 97.48                                                                  | 113.40                                                           | 91.17                                                             | 29.85                                               | 82.98                                               |
| Nov.07 | 94.81                                                                  | 106.96                                                           | 87.17                                                             | 28.26                                               | 79.30                                               |
| Dec.07 | 95.47                                                                  | 108.93                                                           | 89.50                                                             | 28.76                                               | 80.67                                               |
| Jan.08 | 94.04                                                                  | 105.63                                                           | 87.99                                                             | 27.91                                               | 78.89                                               |
| Feb.08 | 90.83                                                                  | 97.80                                                            | 83.08                                                             | 25.79                                               | 74.38                                               |
| Mar.08 | 86.91                                                                  | 88.19                                                            | 76.81                                                             | 23.05                                               | 68.74                                               |
| Apr.08 | 82.98                                                                  | 78.52                                                            | 70.40                                                             | 20.16                                               | 63.01                                               |
| May.08 | 82.32                                                                  | 77.01                                                            | 69.90                                                             | 19.32                                               | 62.14                                               |
| Jun.08 | 82.07                                                                  | 76.45                                                            | 69.87                                                             | 18.77                                               | 61.79                                               |
| Jul.08 | 83.45                                                                  | 79.86                                                            | 72.53                                                             | 19.31                                               | 63.79                                               |
| Aug.08 | 85.43                                                                  | 84.73                                                            | 76.04                                                             | 20.31                                               | 66.63                                               |
| Sep.08 | 86.15                                                                  | 86.36                                                            | 76.92                                                             | 20.56                                               | 67.50                                               |
| Oct.08 | 82.06                                                                  | 75.83                                                            | 68.56                                                             | 17.62                                               | 61.02                                               |
| Nov.08 | 78.78                                                                  | 67.30                                                            | 61.51                                                             | 15.03                                               | 55.66                                               |
| Dec.08 | 79.75                                                                  | 69.48                                                            | 62.27                                                             | 15.21                                               | 56.68                                               |
| Jan.09 | 81.19                                                                  | 72.73                                                            | 63.62                                                             | 15.80                                               | 58.33                                               |
| Feb.09 | 83.20                                                                  | 77.33                                                            | 65.76                                                             | 16.85                                               | 60.78                                               |

Table 2. Backcasted Indices based on individual questions and Consumer Confidence Index (January 2004-December 2011) (continued)

|        | Financial situation expectation of household (over the next 12 months) | General economic situation expectation (over the next 12 months) | Number of people unemployed expectation (over the next 12 months) | The probability of saving (over the next 12 months) | Consumer confidence index (over the next 12 months) |
|--------|------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| Mar.09 | 84.11                                                                  | 79.14                                                            | 65.69                                                             | 17.26                                               | 61.55                                               |
| Apr.09 | 88.48                                                                  | 89.64                                                            | 71.99                                                             | 20.02                                               | 67.53                                               |
| May.09 | 90.51                                                                  | 94.32                                                            | 73.95                                                             | 21.43                                               | 70.05                                               |
| Jun.09 | 92.19                                                                  | 98.08                                                            | 75.25                                                             | 22.66                                               | 72.05                                               |
| Jul.09 | 90.57                                                                  | 93.65                                                            | 70.59                                                             | 21.77                                               | 69.15                                               |
| Aug.09 | 90.15                                                                  | 92.26                                                            | 68.31                                                             | 21.59                                               | 68.08                                               |
| Sep.09 | 90.79                                                                  | 93.63                                                            | 68.25                                                             | 22.14                                               | 68.70                                               |
| Oct.09 | 90.02                                                                  | 91.45                                                            | 65.69                                                             | 21.79                                               | 67.24                                               |
| Nov.09 | 88.81                                                                  | 88.22                                                            | 62.47                                                             | 21.12                                               | 65.16                                               |
| Dec.09 | 89.22                                                                  | 89.11                                                            | 62.46                                                             | 21.49                                               | 65.57                                               |
| Jan.10 | 89.61                                                                  | 89.99                                                            | 62.56                                                             | 21.89                                               | 66.01                                               |
| Feb.10 | 91.41                                                                  | 94.43                                                            | 65.42                                                             | 23.24                                               | 68.63                                               |
| Mar.10 | 93.34                                                                  | 99.26                                                            | 68.71                                                             | 24.77                                               | 71.52                                               |
| Apr.10 | 94.02                                                                  | 100.94                                                           | 69.81                                                             | 25.51                                               | 72.57                                               |
| May.10 | 94.47                                                                  | 102.13                                                           | 70.72                                                             | 26.11                                               | 73.36                                               |
| Jun.10 | 95.31                                                                  | 104.37                                                           | 72.60                                                             | 26.98                                               | 74.82                                               |
| Jul.10 | 94.76                                                                  | 103.18                                                           | 72.13                                                             | 26.94                                               | 74.25                                               |
| Aug.10 | 94.47                                                                  | 102.68                                                           | 72.34                                                             | 27.03                                               | 74.13                                               |
| Sep.10 | 96.24                                                                  | 107.41                                                           | 76.63                                                             | 28.47                                               | 77.18                                               |
| Oct.10 | 95.02                                                                  | 104.67                                                           | 75.51                                                             | 27.98                                               | 75.79                                               |
| Nov.10 | 96.24                                                                  | 108.09                                                           | 79.10                                                             | 29.03                                               | 78.12                                               |
| Dec.10 | 95.64                                                                  | 107.01                                                           | 79.50                                                             | 28.91                                               | 77.77                                               |
| Jan.11 | 95.48                                                                  | 106.98                                                           | 80.78                                                             | 29.01                                               | 78.06                                               |
| Feb.11 | 96.58                                                                  | 110.23                                                           | 84.61                                                             | 29.94                                               | 80.34                                               |
| Mar.11 | 96.07                                                                  | 109.37                                                           | 85.45                                                             | 29.82                                               | 80.18                                               |
| Apr.11 | 95.69                                                                  | 108.89                                                           | 86.63                                                             | 29.73                                               | 80.24                                               |
| May.11 | 94.87                                                                  | 107.30                                                           | 87.03                                                             | 29.30                                               | 79.63                                               |
| Jun.11 | 96.81                                                                  | 112.67                                                           | 92.63                                                             | 30.67                                               | 83.19                                               |
| Jul.11 | 95.34                                                                  | 109.44                                                           | 91.83                                                             | 29.83                                               | 81.61                                               |
| Aug.11 | 92.92                                                                  | 103.76                                                           | 89.17                                                             | 28.24                                               | 78.52                                               |
| Sep.11 | 93.84                                                                  | 106.53                                                           | 92.76                                                             | 28.76                                               | 80.47                                               |
| Oct.11 | 90.87                                                                  | 99.46                                                            | 88.95                                                             | 26.74                                               | 76.51                                               |
| Nov.11 | 91.46                                                                  | 101.26                                                           | 91.61                                                             | 26.94                                               | 77.82                                               |
| Dec.11 | 91.85                                                                  | 102.59                                                           | 93.80                                                             | 27.04                                               | 78.82                                               |