QUANTITATIVE METHODS IN ECONOMICS
Volume XX, No. 3, 2019, pp. 230 – 239

Received: 04.06.2019
Accepted: 27.06.2019

RESPONSE DYNAMICS IN BUSINESS TENDENCY SURVEYS: EVIDENCE FROM POLAND

Emilia Tomczyk https://orcid.org/0000-0002-4565-0352
Institute of Econometrics
Warsaw School of Economics, Poland
e-mail: Emilia.Tomczyk@sgh.waw.pl

Abstract: In this paper, trends, business cycle correlates and macroeconomic patterns in response rates are explored. Two groups of respondents taking part in the RIED (Research Institute for Economic Development of the Warsaw School of Economics) economic tendency survey are taken into consideration: industrial enterprises and households. Empirical analysis indicates that household response rates rise slightly with consumer price index, and decline during current expansion phase of the economy. Gender, geographical location and city / country residence are not factors in determining household response rate dynamics. In case of industrial enterprises, willingness to answer seems to rise when business conditions deteriorate, and vice versa, although this effect is small in terms of absolute values of correlation coefficients. Non-response is found to be higher when economy expands but the relationship is weak.

Keywords: economic tendency surveys, industrial enterprises, households, survey data, survey response, business cycle

JEL classification: C83, D10, D22, E32

INTRODUCTION

Studies of causes and consequences of survey non-response have a history just as long as surveys themselves (for an early example of quantitative analysis of non-response, see [Platek 1977]). Non-response is recognized to be the main source of non-sampling errors in surveys, and as generally it is not random, it introduces the element of self-selection and reduces reliability of surveys in terms of representativeness of results; hence importance of this subject within the field of survey data analysis.

https://doi.org/10.22630/MIBE.2019.20.3.22

Causes of non-response are usually grouped in four categories:

- no-contact: failure to establish contact (for example, wrong address; bankruptcy in case of firms; change of residence in case of families),
- refusal: unwillingness of the prospective respondent to cooperate for any reason,
- not-able: circumstances preventing obtaining answers such as prospective respondents' temporary absence or lack of expertise, ill health, language barriers etc.,
- accidental loss of questionnaire and consequently all of the data or part of it.

The "refusals" seem the most interesting category to analyze because of the intentional nature of their behavior and hence opportunity to discover factors that determine it. What makes an individual person or a company representative decide to take part in an economic tendency survey? It turns out that empirical literature does not provide consistent insights into determinants of individual decisions to participate – or not – in economic tendency surveys. Such decisions are probably influenced by numerous factors, many of them unobservable, and therefore are difficult to quantify.

Empirical analysis presented in this paper is based on the RIED (Research Institute for Economic Development of the Warsaw School of Economics) 2006 – 2017 survey data. Prior studies of the RIED non-response focused on consequences of non-response, particularly in terms of non-response bias and representativeness issues (see [Białowolski et al. 2005; Kowalczyk, Tomczyk 2009]) and not its reasons or causes, and the few efforts to determine individual factors influencing response decisions did not prove successful. Empirical results indicate that information collected in RIED questionnaires does not allow to identify factors that influence industrial enterprises' individual decisions to participate in the survey (see [Tomczyk 2018]). The only statistically significant finding is a tendency of petroleum, chemical, pharmaceutical, rubber and plastic producers to be slightly more responsive than other companies.

Since efforts to determine individual factors of survey response have not led to definite results so far, I propose to inspect aggregated response rates. In this paper, the RIED response rates are examined in search for trends, seasonality, business cycle patterns or correlations with macroeconomic time series.

There is little empirical evidence available so far on behavior of response rates within the business cycle or their correlation with economic activity indicators (in case of enterprises) or indices of economic situation (in case of households). As far as I am aware, only one quantitative analysis of this type has been published. For the IFO Business Survey, Seiler [2010] finds that non-response among industrial firms is more frequent in economically good times, and cites similar results for households. This paper attempts to find macroeconomic patterns for the Polish economic tendency survey.

RESPONSE DYNAMICS OF HOUSEHOLDS

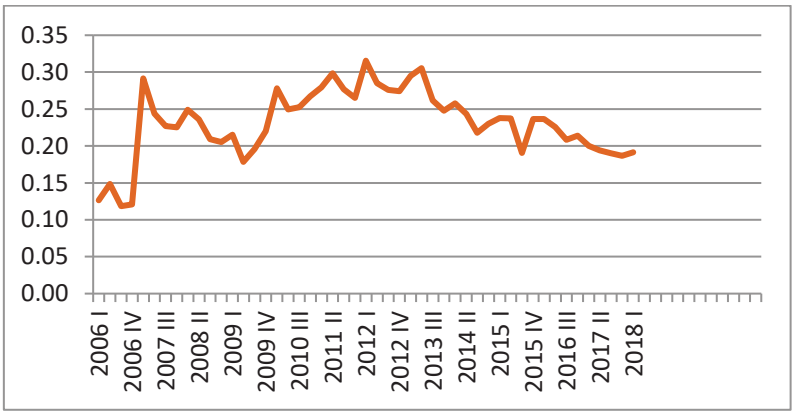
Response rates among households are assessed on the basis of quarterly data collected by the Research Institute for Economic Development (RIED) of the Warsaw School of Economics. Current questionnaire includes 15 basic questions consistent with the European Union guidelines, and additional questions concerning present economic situation. Survey questions are designed to evaluate current economic situation of a household, as compared to its situation 12 months earlier, and to formulate forecasts for the next 12 months. Survey is conducted in the first month of each quarter (that is, January, April, July, and October), and its results are reported in quarterly bulletins (see [Dudek 2017]).

The household survey has been launched in 1990 but data on numbers of questionnaires sent and received has been registered only since 2006. The following characteristics of respondents are available from the household survey database: gender, place of residence (city / village) and geographical region.

Let us define unit response rate (URR) following Thompson and Oliver [2012] as a percentage of total number of responding sample units to the total number of sample units drawn (gross sample).[1] Average response rate equal to 0.2313. It seems rather low but is consistent with other studies of response rates (see [Rasmussen, Thimm 2009; Seiler 2010; Czajka, Beyler 2016]), and in contrast to most of the literature, does not exhibit a long-term downward trend (see Figure 1). Decline in response rate has only begun in 2012 and continues until the end of the sample. There is no evidence of seasonality. Authors of the previous analysis of the RIED household response rates (see [Białowolski et al. 2005]) note variable response rates in 2000-2004 and attribute part of this effect to resampling. They do not find long-time trends or seasonality.

[1] Item non-response rate is not analyzed in this paper. Determinants of omitting individual questions probably differ from factors influencing decision not to answer at all. In postal questionnaires such as RIED economic tendency survey, as opposed to web questionnaires (where skipping questions is usually not allowed by the design of the web page) item non-response constitutes a separate and valid research problem.

Figure 1. Household response rate (2006 – 2017, quarterly data)



Source: RIED database

To verify whether there is any correlation between the willingness of households to take part in a business tendency survey and macroeconomic factors influencing economic environment and decisions of households, correlation coefficients with the following macroeconomic factors are considered:

- Average gross wages (AGW): average nominal gross wages in the economy, corresponding quarter of the previous year = 100 (with the lag of one: data for first quarter of 2006 is assigned to the April 2006 survey to provide respondents with time to take changes in wages into account),
- Consumer price index (CPI), corresponding quarter of the previous year = 100 (also with the lag of one),
- BAEL unemployment rate (UNEMPL).

The highest positive correlation is found in case of CPI: household response rate is correlated with consumer price index with a coefficient of 0.3048 which is statistically significant at the 0.05 significance level. Correlation with average gross wages is much smaller and negative, equal to -0.1672, and correlation with unemployment rate is almost zero (0.0060). It seems that none of the macroeconomic factors exhibits close relationship with household response rates, and the only noticeable pattern is the tendency of the survey addressees to become slightly more responsive as consumer prices rise.

Finally, let us examine household response rate with within the business cycle. Analyses of Polish business cycle (see [Gradzewicz et al. 2010; Drozdowicz-Bieć 2012]) agree that Polish economy enjoyed expansion from 2006 until the first quarter of 2008, then noted worsening of the economic conditions until February 2009 (with Poland pretty much immune to the world recession; see [Drozdowicz-Bieć 2012]. Since March 2009, Polish economy again continues in

a boom phase with a minor slowdown between May 2011 and December 2012[2]. It seems that household response rates were rising during the expansion periods of 2006 – beginning of 2008 and March 2009 – May 2011, and declining during the last expansion phase after December 2012. This final conclusion is consistent with Seiler's [2010] study in which he reports higher non-response in economically good times.

Slight decrease in response rates around business cycle turning points might be expected due to higher uncertainty but it does not show in the household response rate dynamics.

Response rates between men and women do not differ considerably; on average they are equal to 0.2323 and 0.2302 respectively, and follow the dynamics of total response rates. Since BAEL unemployment rates are available for men and women separately, correlation coefficients with unemployment rate can be calculated independently for both sexes. Correlation coefficients are equal to -0.0186 for men and 0.0464 for women, indicating that response rates among women increase with growing female unemployment and among men – decrease with growing male unemployment, but both effects are close to zero. Lack of statistically significant relationships between characteristics of households and their willingness to respond has been already noted in the literature: Wittwer, Hubrich [2015] find no significant differences in response rates with regard to social demographics (gender, age, household size, form of employment, or mobility).

Finally let us note that gender of the main survey addressee is recorded in the database while decision to answer the survey may have been taken (and responses provided, if any) by another member of the household. Consequently we do not know whether decision to take part in the survey was made by the person to whom the survey is addressed.

Data on respondents' place of residence is available for 2006 – 2009 only. For this period, response rates among city residents have been slightly higher than among villagers (0.2468 and 0.2093, respectively). Response rates were increasing, particularly in 2006/2007 and from the first quarter of 2009, which is consistent with the dynamics of total response rates.

In the prior study of the RIED household non-response rate, Białowolski et al. [2005] note the following response rates over the period 2000 – 2004: 28% for city residents, 24% for villagers. They also note that "(…) village respondents were initially more willing to participate in the survey than city respondents but they quickly got discouraged – most probably due to lack of incentive to participate" (p. 35). Higher participation of city respondents seems therefore a constant feature of the RIED household survey, in contrast to other studies. Cobben [2009], on the

[2] Source: Maria Drozdowicz-Bieć, private communication.

basis of extensive literature review, concludes that city residents are less likely to be contacted and to respond to questionnaires.

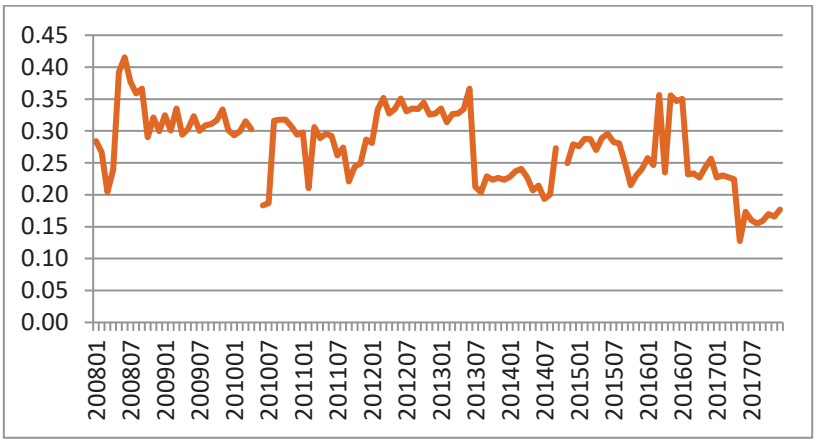
In RIED household survey, Poland is divided into six large geographical regions. In Central, Eastern and Northern regions of Poland response rate closely follows the shape of general response rate. Slightly higher variation is observed in response rates of households located in Southern, South-western and North-western regions. North-western region is characterized by the highest variance of response rates, with an unique peak in the second and third quarter of 2016, a trough right afterwards, and relatively high volatility until the end of the sample. South-western region, on the other hand, is characterized by alternating peaks and troughs across most of the sample. Since these two regions seem similar with respect to economic environment of households – they consist of the western voivodeships generally similar in terms of demographics, infrastructure and standards of living – reasons for minor differences in non-response dynamics noted above remain to be explained. Apart from minor variations between the regions, there seems to be no clear geographical determinants of household response rate dynamics. This finding is consistent with the prior analysis of the RIED household response rate: between 2000 and 2004, Białowolski et al. [2005] do not find evidence of regional variation.

RESPONSE DYNAMICS OF INDUSTRIAL ENTERPRISES

Response rates analyzed in this paper have been collected by the Research Institute for Economic Development (RIED) of the Warsaw School of Economics. Expectations and subjective assessments of changes in eight fields of business activity are collected by RIED through monthly business tendency surveys. The questions are designed to evaluate both current situation (as compared to last month) and expectations for the next 3 – 4 months by assigning them to one of three categories: increase / improvement, no change, or decrease / decline. On the basis of the percentages of responses, balance statistics are calculated, and then published in monthly bulletins (see [Adamowicz, Walczyk 2018]). The industrial survey has been launched in 1997 but data on numbers of questionnaires sent and returned is available only since 2008 with two missing observations: in May 2010 and October 2014.

Average response rate is equal to 0.2440 which does not differ from results noted in literature. In contrast to the RIED household response rate, and in agreement with general literature, it does exhibit a long-term downward trend – albeit slight (see Figure 2).

Figure 2. Industrial enterprises response rate (2008 – 2017, monthly data)



Source: RIED database

Individual characteristics of industrial enterprises surveyed by RIED do not permit disaggregated analysis. They are either too spread out (for example, firms can be classified into 25 categories out of 99 defined by the Code List of Classification of Business Activities in Poland) or too imbalanced (for example, share of public sector enterprises amounts to only 3.3% to 6.2% of the sample). Correlation between the respondents' willingness to provide answers and macroeconomic factors can be assessed, however, in order to verify whether worsening or improving conditions of operation influence response rates.

Monthly measures of general business conditions are described by the following indices:

- general business climate indicator (GBCI) of the Central Statistical Office (CSO) of Poland: a composite index calculated as an arithmetic average of the balances of the answers to questions from the monthly CSO questionnaire concerning current and expected economic situation,
- synthetic indicator (SI) of business climate, also published by the Central Statistical Office, calculated on the basis of seasonally adjusted and standardized answers to survey questions with the following weights: manufacturing industry (50%), services (38%), retail trade (6%), and construction (6%),
- RIED Economic Activity Indicator (EAI), calculated as a weighted average of seven sector indicators, with weights reflecting importance of a given sector in explaining seasonal variation in Gross National Product (see [Dudek, Zając 2012]): manufacturing industry ($^2/_9$), households ($^2/_9$), construction ($^1/_9$), trade ($^1/_9$), banking ($^1/_9$), agriculture ($^1/_9$) and car freight ($^1/_9$).

All three indices rise with improvement of business conditions and decline with their deterioration. Over monthly data 2008 – 2017, correlation coefficients of

response rate with GBCI, SI and EAI are negative and equal to -0.1736, -0.2340 and -0.4745, respectively. The closest relationship binds enterprises' response rate to the RIED Economic Activity Indicator. Generally, respondents' willingness to answer seems to rise when business conditions deteriorate, and vice versa, although the size of the reaction is limited. All three correlation coefficients are significant at the 0.05 significance level. This result, even though small in terms of absolute values of correlation coefficients, is confirmed in another analysis (see [Seiler 2010]). Author hypothesizes that this effect is due to the fact that in boom times the companies have less time to answer the questionnaire, being busy with filling orders. I would like to offer a complementary interpretation: that in worsening economic conditions enterprises are more willing to take part in tendency surveys and report their failing economic health, hoping, eventually, for government intervention or other forms of assistance.

Finally, let us examine enterprises' response rate with within the business cycle. The response rate has fallen sharply at the beginning of the current expansion phase: from 0.3662 in June 2013 to 0.2124 in July 2013 and, apart from the peak in mid-2016, has not climbed back to the levels from the last slowdown phase of May 2011 – December 2012. This again confirms the finding that non-response is higher when economy expands.

SUMMARY AND CONCLUSIONS

The aim of this paper was to verify whether business cycle phase and macroeconomic aggregates are relevant to enterprises' response rates in business tendency surveys, and whether worsening or improving economic standing of families influence response rates of households. Empirical analysis indicates that household response rates rise slightly with consumer price index, and decline during the latest boom phase in the economy – although the opposite effect is noted for the prior expansion period. Gender, geographical location and city / country residence are not factors in determining household response rate dynamics. In case of industrial enterprises, willingness to answer seems to rise when business conditions deteriorate, and vice versa, although this effect is small in terms of absolute values of correlation coefficients. Generally, non-response is found to be higher when economy expands but the relationship is weak. These findings confirm a result noted previously in the literature: that lower response accompanies economically good times, either because enterprises are too busy filling orders to bother with questionnaires, or because in poor economic conditions they are more willing to take part in surveys and report their failing economic health, hoping, eventually, for government intervention or other forms of assistance.

Since sabotaging economic growth for the purpose of increasing tendency survey response rates would be neither feasible nor ethical, what can be done to improve response rates of the RIED economic tendency survey?

Well-known and widely used methods of improving response rates are discussed in Phillips et al. [2016]. Establishing direct rapport with the addressees and gaining their support and understanding of the aims of the survey may induce them to participate in the survey more actively. Re-contacting non-respondents in particular may persuade them to become involved in the survey. Several authors (see [Curtin et al. 2005; Toepoel, Schonlau 2017]) point to the use of incentives. While most authors agree that incentives promote response, high incentives may consume a significant portion of a project's budget, and skew responses when provided only in order to obtain a payoff. They can also lead to higher, rather than lower, non-response bias if effective only for particular groups. Bańkowska et al. [2015] provide the following example: incentives may increase response rate in a household survey but could result in a higher proportion of poorer respondents, and if income correlates with the topic of the survey, this could lead to biased estimates.

Also, post-survey adjustment techniques, including imputation, extrapolation and weighting, have been developed and used to reduce non-response biases (see [Rasmussen, Thimm 2009; Toepoel, Schonlau 2017]). Recently two new approaches have emerged: responsive and adaptive survey designs meant to facilitate tradeoffs between survey quality and survey costs (see [Calinescu, Schouten 2016; Brick, Tourangeau 2018]), and a shift away from standardized surveys towards custom-made or personalized questionnaires in which various respondents are treated differently (see [Lynn 2017]). Efficiency of these approaches has yet to be tested empirically.

REFERENCES

Adamowicz E., Walczyk K. (2018) Koniunktura w przemyśle. Luty 2018. Badanie okresowe nr 353. Instytut Rozwoju Gospodarczego (RIED), SGH Warsaw School of Economics (in Polish).

Bańkowska K., Osiewicz M., Pérez-Duarte S. (2015) Measuring Non-Response Bias in a Cross-Country Enterprise Survey. European Central Bank Statistics Paper Series, 12.

Białowolski P., Dudek S., Kowalczyk B. (2005) Analiza zwrotności w badaniach konsumenckich oraz próby poprawiania reprezentatywności na przykładzie badania kondycji gospodarstw domowych. Prace i Materiały Instytutu Rozwoju Gospodarczego (RIED), 76, SGH Warsaw School of Economics (in Polish).

Brick J. M., Tourangeau R. (2017) Responsive Survey Designs for Reducing Nonresponse Bias. Journal of Official Statistics, 33(3), 735-752 [http://dx.doi.org/10.1515/JOS-2017-0034].

Calinescu M., Schouten B. (2016) Adaptive Survey Designs for Nonresponse and Measurement Error in Multi-Purpose Surveys. Survey Research Methods, 10(1) [https://ojs.ub.uni-konstanz.de/srm/article/view/6157].

Cobben F. (2009) Nonresponse in Sample Surveys: Methods for Analysis and Adjustment. Statistics Netherlands, The Hague [www.cbs.nl].

Curtin R., Presser S., Singer E. (2005) Changes In Telephone Survey Nonresponse Over The Past Quarter Century. The Public Opinion Quarterly, 69, 87-98.

Czajka J. L., Beyler A. (2016) Declining Response Rates in Federal Surveys: Trends and Implications. Mathematica Policy Research, Final Report, 1.

Drozdowicz-Bieć M. (2012) Cykle i wskaźniki koniunktury. Wydawnictwo Poltext, Warszawa (in Polish).

Dudek S. (2017) Kondycja gospodarstw domowych. IV kwartał 2017. Badanie okresowe nr 101. Instytut Rozwoju Gospodarczego (RIED), SGH Warsaw School of Economics (in Polish).

Dudek S., Zając T. (2012) Zastosowanie modeli czynnikowych do konstrukcji barometru koniunktury na podstawie badań ankietowych. Prace i Materiały Instytutu Rozwoju Gospodarczego (RIED), 90, SGH Warsaw School of Economics (in Polish).

Gradzewicz M., Growiec J., Hagemejer J., Popowski P. (2010) Cykl koniunkturalny w Polsce – wnioski z analizy spektralnej. Bank i Kredyt, 41(5), 41-76 (in Polish).

Kowalczyk B., Tomczyk E. (2009) Survey Non-Response and Properties of Expectations of Industrial Enterprises – Analysis Based on Business Tendency Surveys. [in:] Wywiał J. L., Żądło T. (Eds.) Survey Sampling in Economic and Social Research. 4, 42-59.

Lynn P. (2017) From Standardised to Targeted Survey Procedures for Tackling Non-Response and Attrition. Survey Research Methods, 11(1), 93-103 [doi:10.18148 /srm/2017.v11i1.6734].

Phillips A. W., Reddy S., Durning S. J. (2016) Improving Response Rates and Evaluating Nonresponse Bias in Surveys: AMEE Guide No. 102. Medical Teacher, 38(3), 217-228.

Platek R. (1977) Some Factors Affecting Non-Response. Paper Presented at the 41st Session of the International Statistical Institute, New Delhi, 5-15.

Rassmusen K., Thimm H. (2009) Fact-Based Understanding of Business Survey Non-Response. The Electronic Journal of Business Research Methods, 7(1), 83-92.

Seiler C. (2010): Dynamic Modelling of Nonresponse in Business Surveys. IFO Working Paper 93 [www.cesifo-group.de].

Thompson K., Oliver B. (2012) Response Rates in Business Surveys: Going Beyond the Usual Performance Measure. Journal of Official Statistics, 28(2), 221-237.

Toepoel V., Schonlau M. (2017) Dealing with Nonresponse: Strategies to Increase Participation and Methods for Postsurvey Adjustments. Mathematical Population Studies, 24(2), 79-83 [https://doi.org/10.1080/08898480.2017.1299988].

Tomczyk E. (2018) To be (Accounted for) or not to be: Factors Influencing Probability of Non-Response in Economic Tendency Surveys. Prace i Materiały Instytutu Rozwoju Gospodarczego (RIED), 100, SGH Warsaw School of Economics.

Wittwer R., Hubrich S. (2015) Nonresponse in Household Surveys: A Survey of Nonrespondents from the Repeated Cross-Sectional Study ”Mobility in Cities – SrV” in Germany. Transportation Research Procedia, 11, 66-84.