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New Statistics of BTS Panel

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Abstract

The paper offers a system of statistical indicators to describe the panel of enterprises covered by BTS. Such system becomes important while organizing conjuncture surveys on the basis of enterprises' voluntary participation. The first section contains a description of the arrangements for monthly surveys in the Russian industry, performed by the Institute for the Economy in Transition. The second section is devoted to traditional characteristics of BTS: panel size, number of returned questionnaires, rate of response, number of asked questions. When the panel size is changed (purposefully or due to forced circumstances), then the indicators will be required, that measure inclusion and exclusion of the enterprises (panel turnover). The third section contains the offered indicators measuring average actual duration of the enterprises' participation in the panel for each survey: number of past months in the panel, number of returned questionnaires, number of responded questions. Special attention is devoted to the enterprises quitting the panel in each survey. The fourth section contains a statistical description of the panel, using hypothetical surveys and hypothetical answers. This approach reveals the tendencies of the panel development, depending on the duration of the enterprises' participation in the panel and on the period of enterprises' responses, but not on its size and structure. Estimation of all the indicators is made for the panel of Russian industrial enterprises, on which the Institute for the Economy in Transition has conducted surveys since 1992.

Key Words: business surveys, panel surveys, statistics of BTS, Eastern Europe

JEL Classification: C42, C81

1. Organization of surveys at Russian industrial enterprises

Understanding of the reasons for writing this report and of its data sources requires a vision of the principles and the scheme for organizing Russian conjuncture surveys by the Institute for the Economy in Transition (IET).

The Institute for the Economy in Transition launched conjuncture surveys at industrial enterprises in 1992, and since then they have been performed by the standard classical scheme. Envelopes with questionnaires, paid envelopes to return filled questionnaires and results of the previous survey are sent to enterprises by mail. IET respondents are located across the territory of the Russian Federation, from the Baltic Sea to the Pacific Ocean. The only motive for enterprises to participate in IET surveys is their interest to receive the results of previous surveys. Administrative pressures to engage and keep enterprises as participants of IET surveys are not involved at all, because they have never existed.

IET surveys are performed on the panel basis. That is, a surveys' organizer takes effort so as the surveys could cover the same officials from the same enterprises. To this end, an organizer compiles information about respondents' names and positions just at the first response from an enterprise, uses this information when mailing questionnaires next time, and makes monthly up-dating of the available information in the database containing addresses of the enterprises included in the panel.

Because IET surveys are an absolutely voluntary matter for enterprises, some of the enterprises clearly refuse to take part in our surveys, while others merely stop to send back their answers. This leads to monthly changes in the panel: part of the enterprises are excluded from the panel, while another part is involved in it. Main reasons for clear refusals (reasons, about which a respondent cares to inform us) from further participation in the surveys are most often as follows: liquidation of an enterprise, unwillingness of the new administration to take part in the surveys, commercial secrecy of the surveys' information for an enterprise, lack of any benefit from the surveys, death of a respondent.

Enterprises that have stopped to send back their responses are excluded from the panel by the following scheme. If a respondent has not responded for the two months, then a reminder asking him to continue his participation in the surveys is added to his envelope. Such reminder is mailed twice (during two surveys). But if a respondent does not send back the answers even after the two reminders, then his enterprise will be excluded from the panel. So, the period between the last response from an enterprise and its exclusion from the panel makes up four surveys with non-response. But this enterprise is not for ever excluded from the panel. In a year or two, it may receive again an invitation to take part in the survey, with the questionnaire for the next survey in the series. In attempting to return an enterprise to the panel, only the position of the previous respondent is used, but the name is not printed on the envelope.

To retain the panel size, it's added monthly by engaging new enterprises. Inclusion of new enterprises in the panel is also follows strict rules. Enterprises receive an invitation to take part in the surveys, questionnaire and results of the previous survey, during three surveys (three months). If an enterprise fills the questionnaire, it will be included in the panel, and communication with it will follow common principles. The third invitation contains a warning that the questionnaire and results of the previous survey are mailed to the enterprise for the last time. If this enterprise does not respond to the invitation, mailing with it is stopped.

The panel of officials from Russian industrial enterprises is used for not only monthly conjuncture surveys, but also for ad hoc surveys on various themes. Questions asked in such survey can be added in the questionnaire for regular surveys or can be mailed to enterprises in a separated envelope. Such surveys are most often commissioned. Clients commissioning such surveys on the IET panel of industrial enterprises include the World Bank, the OECD, Russian ministries. Of course, such surveys create an addition burden for the panel.

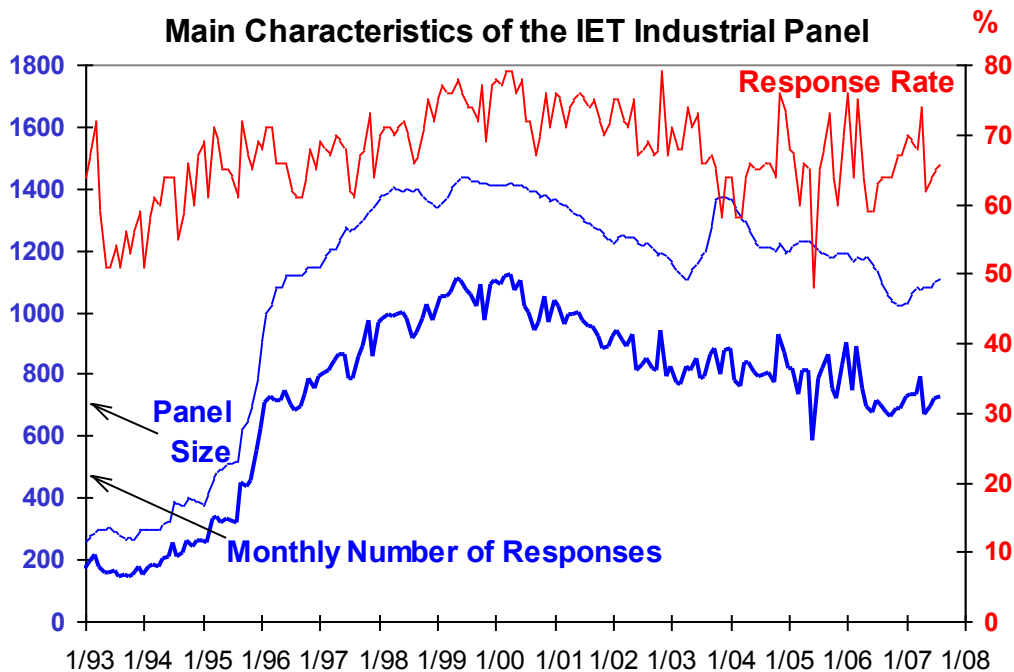
Because there are other organizations in Russia, several at least, performing analogous regular surveys across the Russian territory, due control of the panel becomes even more important. Given these conditions, statistical description of building and developing (expanding, up-dating) the enterprises panel is much more important than the mere description for research purposes. And it

should be born in mind that the competition in Russia in any sphere still takes much more stiff forms than in other countries.

2. Main characteristics of the IET panel of industrial enterprises

Like in most of the analogous surveys, main statistical characteristics of the Russian panel of industrial enterprises include its size, monthly number of responses and the response rate (see Figure 1). Use of the panel for additional surveys makes us to employ an indicator such as the number of questions asked to the enterprises in the panel.

Figure 1



In 1993-1994, the size of the panel was rather small, as the surveys initially covered only the Moscow region, and then – only the European part of Russia. The percentage of response (the response rate) was also small, because of the lack of a due control of the panel. That is, “silent enterprises” were not regularly excluded from the panel, its up-dating being confined to adding new enterprises. This led to filling the enterprises in the panel that have never responded or stopped to respond.

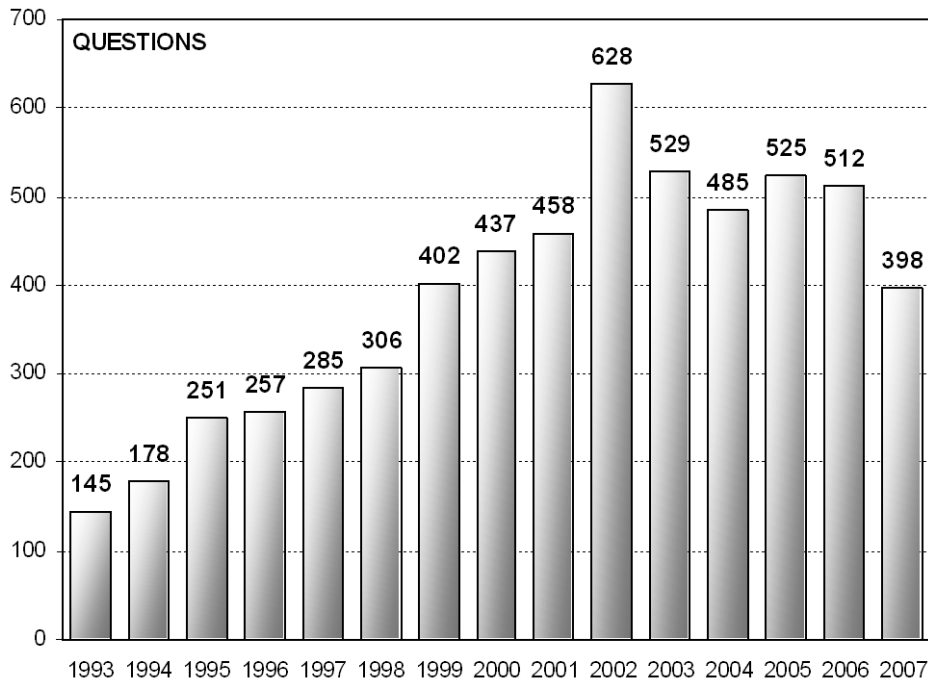
In 1995, after checking the performance of the Russian post, the decision was taken to cover all the Russian territory by the survey and to increase the panel size. This increased significantly the panel size and the number of responses (response rate) (see Figure 1). Also, the panel was “cleansed” from non-responding enterprises, and the above-mentioned rules to exclude enterprises from the panel in case of their non-response were fixed (introduced). So, since 1996 the panel has been built by the same rules.

The panel reached the biggest size in 1999: it included 1440 enterprises, and the number of monthly responses exceeded 1000. There were months in 1999-2000 when more than 1000 filled questionnaires came back. The percentage of response (the response rate) approached 76-78% in 1999. The maximal response rate was reached in 2000, being 78-79%. These two years were the most “favorable” for the surveys in Russia. However, 2001 was marked by gradual decrease in the panel size and in the number of responses given the same number of mailed questionnaires, that is, the same number of invitations and questionnaires mailed to new enterprises. The panel shrank to 1110 enterprises.

One probable reason for this was the increased survey (more precisely, questions) burden on the panel. We mean the number of questions in the questionnaires received by enterprises in a period of time (a quarter, a half of the year, a year). Measurement of the panel burden seems to be a more precise characteristic in relation to the number of surveys. It's true that questionnaires can strongly differ by the number of questions and the complexity of questions' wording. But while the number of questions received by an enterprise can be counted simply enough, it's very difficult to judge about the complexity of questions for enterprises.

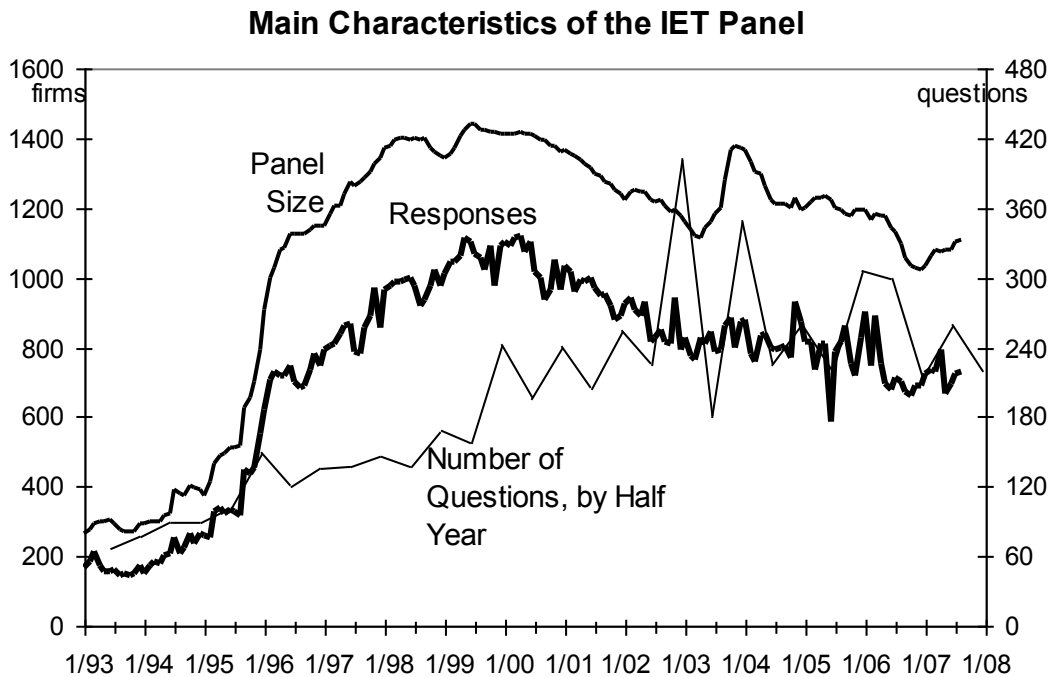
Figure 2

Total Number of Questions Contained in Questionnaires, by Year



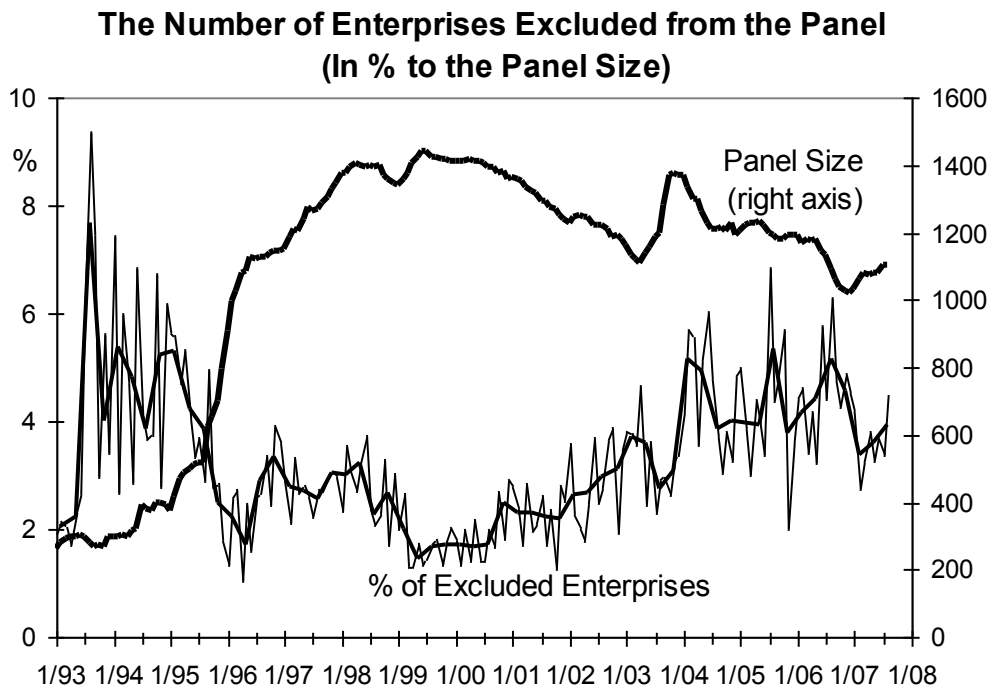
In the first full year of surveys, enterprises of the panel were asked 145 questions, in the second one – 178, in the third one – 251. In 2002 (11th year of the surveys), the figure already reached 628 (see Figure 2). The above number of questions comprises not only questions for regular conjuncture surveys, but also questions for additional surveys. And all the questions were sent to the same enterprises of the IET panel. No doubt, that the four fold increase in the questions burden on the panel became a main reason for rapid shrinking of the panel: its size shrank to the minimum in April 2003 in relation to the beginning of 1996. This thesis is confirmed by confronting the data about the number of questions sent to the panel enterprises with the data about the panel size (see Figure 3). The local minimum of the panel size in 2003 was preceded by the highest questions burden on the panel in the later half of 2002. During those six months, enterprises were asked 403 questions, while earlier they were asked not more than 250 questions over a half year. This led to the exclusion of enterprises from the panel.

Figure 3



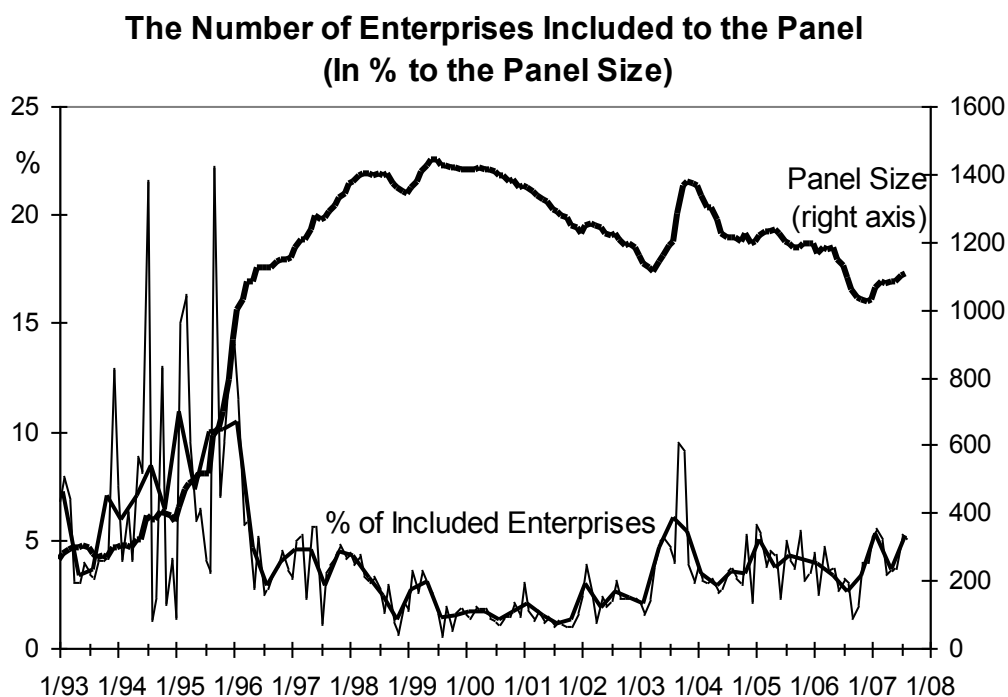
We believe that the number of enterprises excluded from the panel due to the clear refuse to participate in the surveys or the four months long non-response is also a useful statistical characteristic of the panel development. Given stable rules for the exclusion from the panel (four months long non-response), the number of excluded enterprises depends on the panel size. Therefore, it would be correct to analyze the percent ratio of the number of excluded enterprises to the panel size (see Figure 4).

Figure 4



Exclusion from the panel was maximal in 1993-1994, when there were no strict rules for building the panel (inclusion versus exclusion), reminders were not used, and nobody cared about establishing and keeping contacts with respondents. Introduction of clear rules for building the panel could reduce the percentage of excluded enterprises. Also, the exclusion could be reduced in 1995-1996 due to an increase in the panel size, because enterprises are excluded from the panel after a period of being included in it. So, during a rapid increase of the panel in 1995-1996, the percentage of the excluded enterprises was small because of a smaller size of the panel in the earlier period and, consequently, a smaller number of candidates for exclusion. In 1996-1998, the exclusion ratio increases: the reason for its increase is exclusion of the enterprises brought into the panel in the period of mass-scale increase of the panel size. The period of minimal exclusion from the panel fell on 1999-2000, when the exclusion ratio didn't exceed 2%, and the panel size was maximal. It was followed by the period of more intensive exclusion from the panel, along with the reducing panel size. Both processes reach "the worst" points in the survey organizers' eyes in the first half of 2003. To prevent further reduction of the panel size, IET increases the number of mailed questionnaires and invitations for new enterprises to engage them in the survey. These steps could have a positive effect, but short-time (see Figure 5).

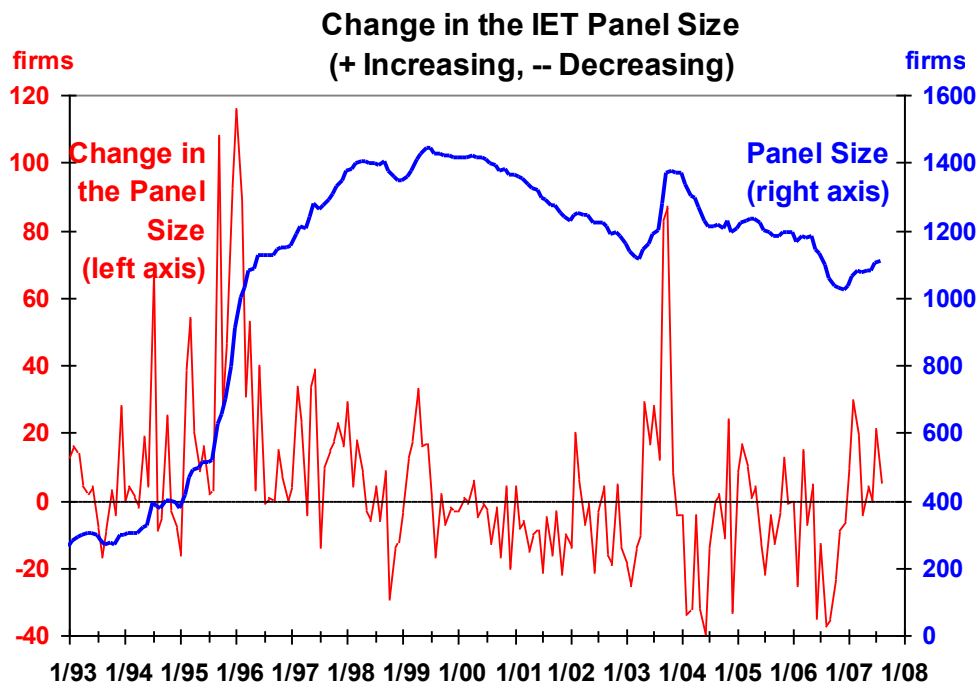
Figure 5



The panel size grew by the end of 2003 up to 1375 enterprises, but after that it began to reduce, falling down to 1200 enterprises by the end of 2004. Retaining the previous panel size (1300-1400 enterprises) required mass-scale mailing of questionnaires to new enterprises. This could not be done for the two reasons. First, high mailing expenses against budgetary limitations complicate such way for retaining the panel size. Second, low ratio of response to initial letters also decreases the efficiency of this method. However, the number of mailed invitations was nevertheless increased. And the number of questions in regular conjuncture questionnaires was reduced. This could give positive effects: the inclusion ratio was up, and the panel size stabilized at the level of 1200 enterprises. However, negative tendencies became stronger again at the beginning of 2006. This was connected with additional surveys by questionnaires that were large and sophisticated for enterprises.

The balance of change in the panel size, derived as the difference between the number of the enterprises included in the panel and the number of the enterprises excluded from it, is the best illustration for our fighting for "enterprises response" (see Figure 6).

Figure 6



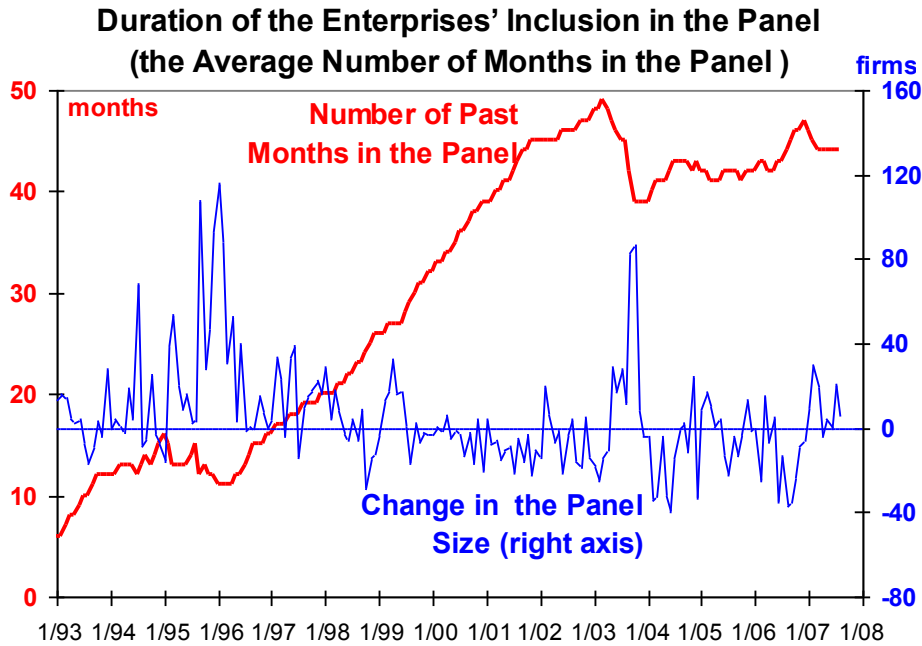
So, when participation of enterprises in Business Tendency Survey is voluntary, statistics of the panel becomes necessary to measure the efficiency of the surveys organization. If even only simple characteristics are calculated (panel size, response rate, number of included and excluded enterprises, number of questions), this can give a very indicative picture about the panel development (the panel performance).

3. “Life cycle” of an enterprise in the panel: months, mailed questionnaires, questions

There're no enterprises capable to give non-stop response on the ever increasing number of questionnaires. Earlier or later, an enterprise clearly refuses to respond or merely stops sending back its answers without explaining the reasons. So, the duration of the enterprises participation in the panel is finite. At least, three periods of the enterprise's life cycle in the panel for conjuncture surveys can be distinguished. The first period starts with the first response on monthly questionnaires, and continues unless a respondent is get used to receive questionnaires and results, and to rapidly fill the next questionnaire. The second period starts from the moment when a respondent is get used to receive questionnaires and results, and to rapidly fill the next questionnaire. This period is supposed to come to the end when a respondent starts to question himself why he fills these questionnaires and what benefit he has from this. Each next questionnaire raises this question it him more and more explicitly and, eventually, leads to the expected finish, the refusal to take part in the surveys. Of course, any survey's organizer would like that such questions come to respondents' minds as rarely as possible, or to postpone this moment as farther as possible. But this will inevitably happen earlier or later: the enterprise's “life cycle” in the panel comes to the end. So, it's necessary to know its duration, at least.

The simplest indicator that can be used to describe the duration of the enterprises life cycle in the panel is the average number of months of the enterprise's participation in the panel or the actual time of the enterprise's participation in the panel by the next survey. This indicator can be calculated for enterprises that are included in the panel during each survey. This will give a time series describing average duration of the enterprises' participation in the panel for each survey (see Figure 7). The Graph shows that the dynamics of average duration of the enterprises participation in the panel featured several periods depending on the dynamics of the panel size.

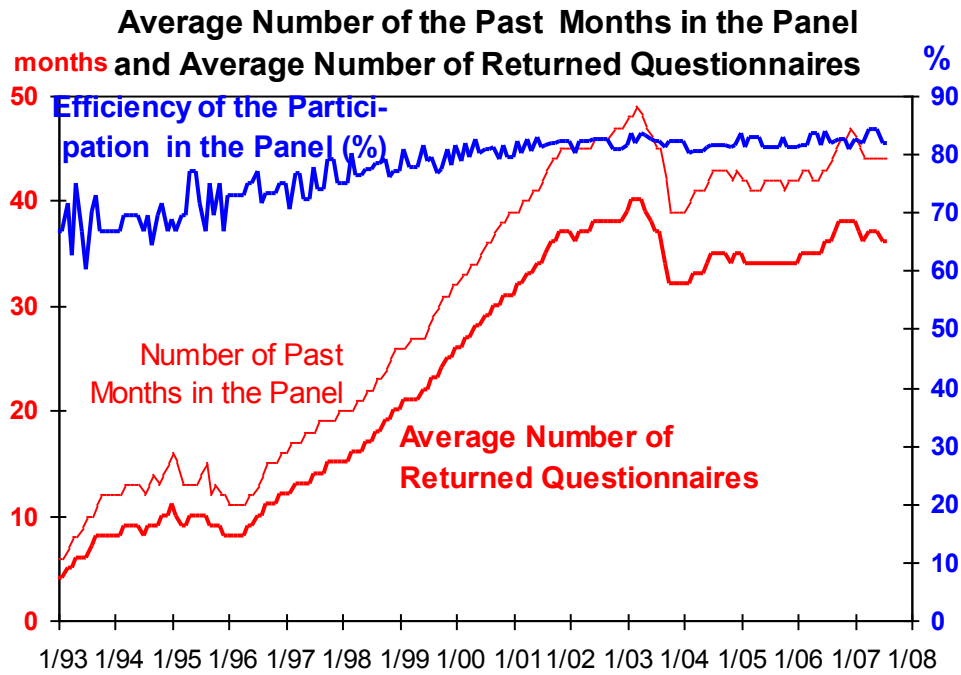
Figure 7



At the first stage (in 1993), the average duration of participation in the panel increased and reached 12 months by the 19th survey. Then the period of relative stabilization in this indicator appears, due to concentrated effort to increase the panel size. This means mass-scale inclusion of enterprises with minimal (1, 2, 3 months) duration of the survey experience, which did not allow to increase the average duration of participation in the panel. When the scopes of newly involved enterprises became especially large (end of 1995 – beginning of 1996), the average duration of participation started to shorten, and could be stabilized during four months at the level of 11 months (of duration). The middle of 1996 marked a stable growth in the duration of participation in the panel. This at first occurred given the positive balance of change in the panel, while since the middle of 1999 it occurred given the reducing panel size. This indicator reached its maximum (49 months) in March 2003, when the panel size fell down to the local minimum of 1110 enterprises. This means that the panel structure shifted in favor of enterprises with long duration of participation in the surveys, while “new” enterprises tended to quit the panel after a short while. An increase in the panel size in 2003 due to mass-scale mailing of questionnaires to new enterprises led to reduction in the average duration of participation. It can be assumed that if the previous scopes of the inclusion of new enterprises were kept, then the average duration of participation would be increasing, but the panel size and the response rate would be reducing.

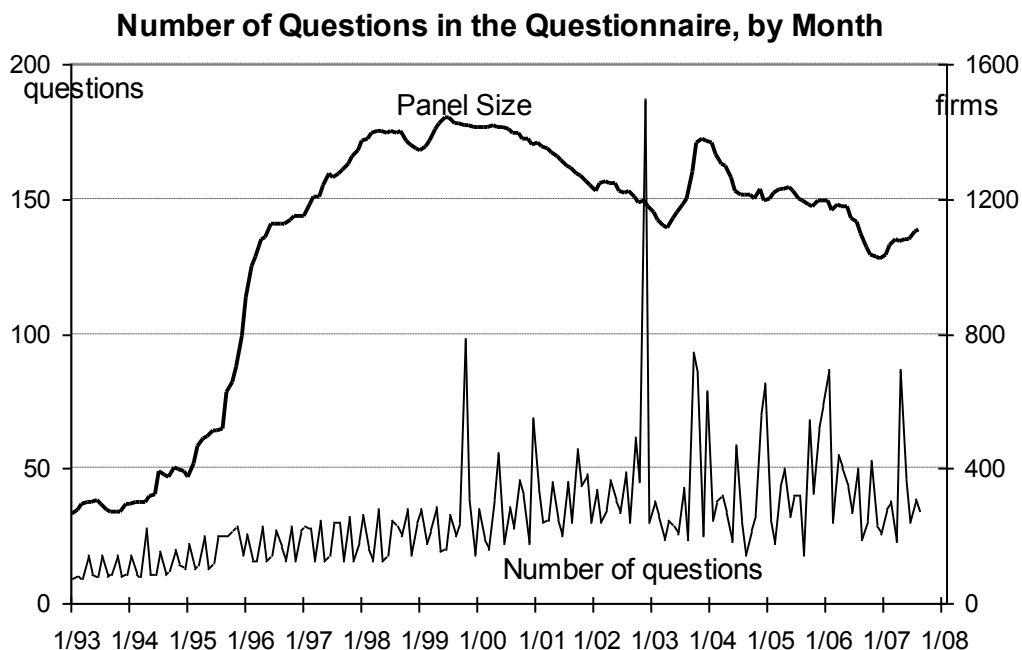
A more precise characteristic of the enterprises' participation in the panel will be the number of returned questionnaires during their participation in the panel, and not only the total number of months (surveys) of the enterprises' participation in the panel since the first response to the survey till the last questionnaire is sent to an enterprise. This indicator doesn't account for the months (surveys) when an enterprise did not respond. Of course, the curve of such indicator is a bit lower than the curve featuring the average duration of participation in the panel (see Figure 8). If the number of returned questionnaires is taken in percents to the number of months of participation in the panel, then we have a characteristic of the efficiency of the participation in the panel. According to our calculation, during the latest years this indicator has stabilized at the level of 80% for the panel of Russian industrial enterprises. This figure means that enterprises, while being in the panel, respond on average 80% of mailed questionnaires. Such good result is ensured by a simple system for the responses control and monthly “cleansing” the panel from “silent” enterprises.

Figure 8



But the surveys in which enterprises take part (send back questionnaires) can vary by the number of questions. Of course, when only conjuncture surveys are born in mind, which questionnaires are unlikely to be subject to by month changes, and the panel is not involved in additional surveys, then statistics of the questions number won't be very interesting. But the situation with the IET panel is reverse. Questions in the regular questionnaire may be changed quickly and easily, which is really done if necessary: ad hoc additional questions are constantly included in the regular questionnaire, and additional ad hoc surveys are performed. So, statistics of the number of asked questions has its sense in case of the IET panel. By month change in the number of questions shows heterogeneity of the questions burden on the panel (see Figure 9).

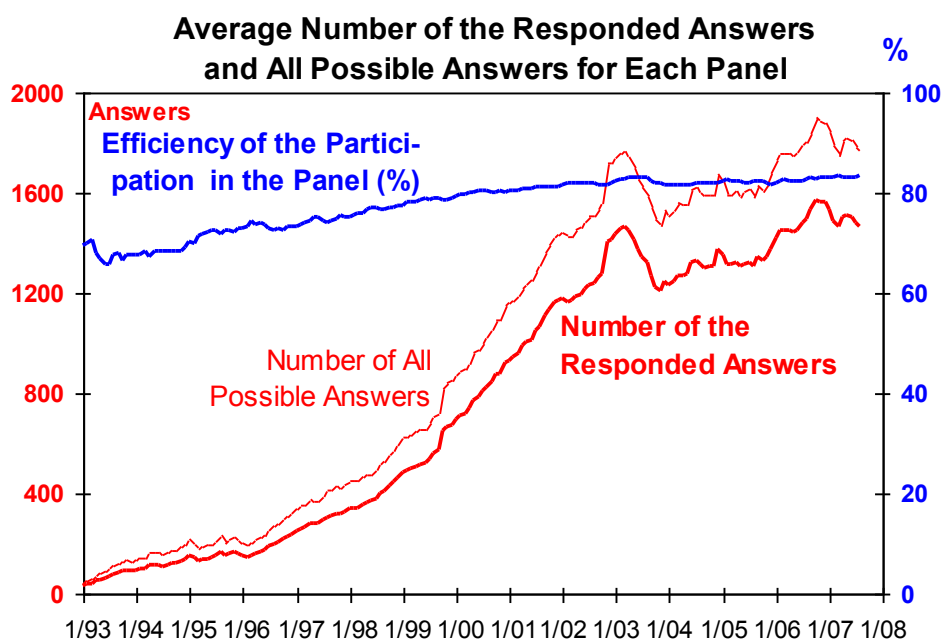
Figure 9



Until the middle of 1999, the panel had been used only for regular conjuncture surveys, additional surveys and questions had been too rare and insignificant and, consequently, had only a minor effect on the questions burden for the panel. A slight upward tendency could be explained by the growing number of questions in regular conjuncture questionnaires. For the first time the panel was subject to a significant ad hoc burden in October 1999. In that time an additional survey was performed, and the regular questionnaire was added by additional questions. As a result, the number of questions made up 98. The overall upward tendency in the questions burden persisted in 2000-2002, and additional surveys were also performed. The absolute record was reached in November 2002, when due to unexpected overlap of circumstances, the number of questions to the panel enterprises equaled 187. In several months it became evident that such extreme burdens ruin the panel. Then the decision was taken to reduce the number of questions in regular conjuncture questionnaires and to evenly distribute additional surveys across the year.

Data about the number of questions in the questionnaires allow us to have more precise estimates about duration of the enterprises' participation in surveys. Now, to estimate the duration, the number of questions can be used, responded by each enterprise by any moment of time. Then the average number of returned questionnaires is replaced by the average number of questions in returned questionnaires (see Figure 10). The later indicator, like the two former, has shown a stable growth since the launch of surveys till March 2003. In that period, the panel included enterprises that responded on average 1465 questions, but the expansion of the panel that followed later led to reduction in the "surveying" duration of the panel. The exclusion scopes were not significant in that period and, therefore, could not strongly affect "surveying" duration of the panel. By the middle of 2006, the surveying duration of the panel reaches its maximum again due to a large number of questions asked at the end of 2005 – beginning 2006. It may lead to the increasing exclusion from the panel in the later half of 2006.

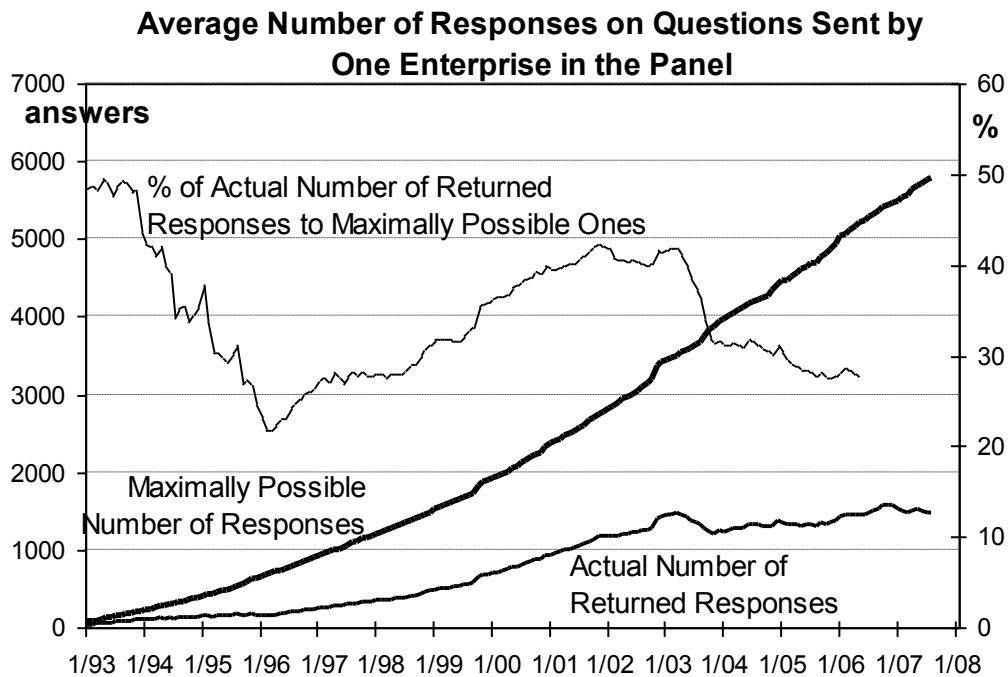
Figure 10



Analysis of the duration of enterprises' participation in surveys can involve data about the maximally possible number of responses. The maximally possible number of responses shows the number of questions that could be responded by one enterprise in the panel if it was in the panel from the first survey and responded on all the questionnaires (see Figure 11). In other words, this is the accumulated sum of questions (the total of questions) from all the questionnaires sent to the panel. At the first glance, both lines diverge, indicating on the decreased efficiency of measures on building up and maintaining the enterprises panel. However, calculation of the ratio of actually returned responses

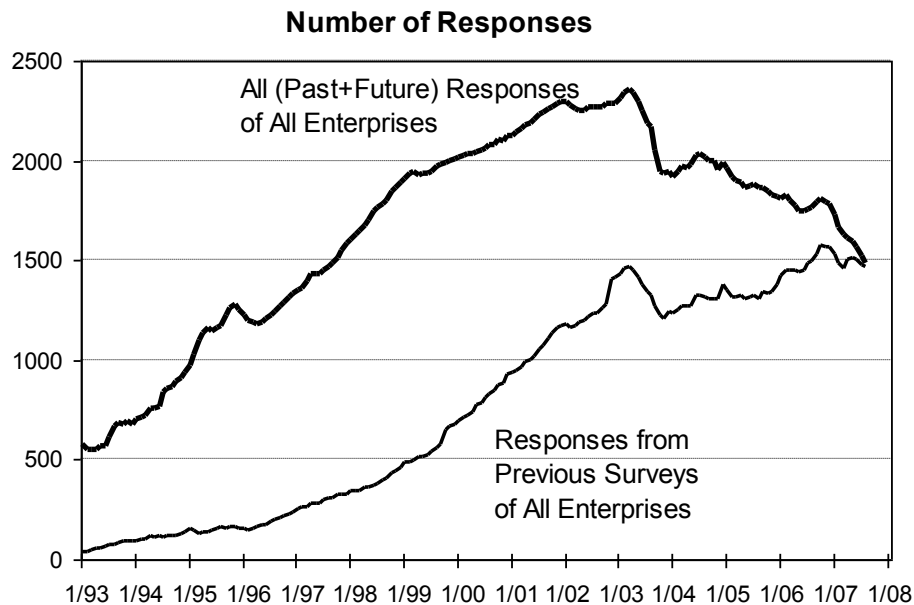
and maximally possible ones has also shown heterogeneity of this dynamics. The efficiency of the panel decreased from 49 to 22% over 1994-1996, due to the lack of measures to cleanse the panel from non-responding enterprises. But the efficiency started to increase and reached 42% in 2001-2002 as soon as strict rules on exclusion of enterprises and increasing the panel size were introduced. However, mass-scale mailing of questionnaires to new enterprises and their inclusion in the panel led to rapid decrease in this indicator. In 2004-2006, the panel efficiency was around 30%.

Figure 11



Data about the number of actually returned responses on the questions can be used to calculate other indicators about enterprises participation in the surveys. For example, for the panel in each survey, not only the number of previously returned responses can be derived, but the total number of responses can be derived for the available panel, including responses that will be received from enterprises in future. But it should be born in mind that the calculations will be most precise for the panels where all the enterprises have ceased to participate in the surveys. If an enterprise continues to respond at the time of calculations, then it's impossible to derive final estimates of its participation in the surveys (that is, before the moment of its exclusion). The dynamics of this full burden on an enterprise shows the volatility of this indicator in time (see Figure 12).

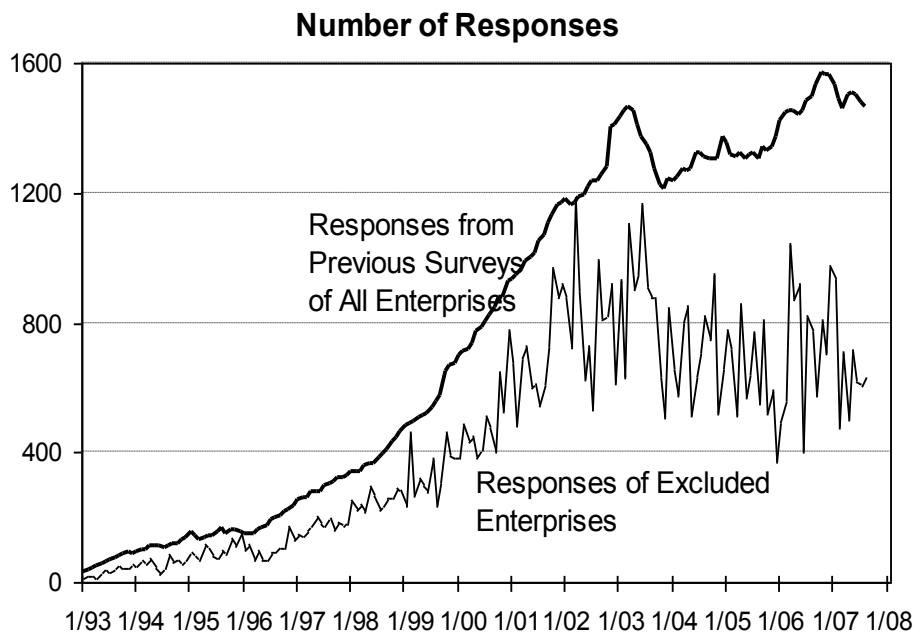
Figure 12



The number of all the responses from enterprises (received and expected) featured the overall upward tendency over 1993-2001. A downward tendency in this indicator at the end of 1995 – beginning of 1996 can be explained by the rapid increase in the panel size due to the inclusion of new enterprises, which means the appearance in the panel of a larger number of enterprises with the minimal duration of the previous participation. Analogous processes (but in smaller scales) also occurred in the panel at the beginning of 1999. The total number of responses reached its peak in March 2003, after launching several large-scale additional surveys. This was followed by not only expected fatigue of the enterprises from surveys and questions with their subsequent quitting the panel, but also by the next mass-scale inclusion of new enterprises into the panel with the expected decrease in the overall duration of the participation in the panel. Approach to the latest performed survey will certainly decrease the rate of the analyzed indicator, as calculations can not account for the responses of the enterprises included in the panel for future surveys. In the latest performed survey, the total number of questions equals the number of questions from previous surveys, due to the absence of information about future surveys.

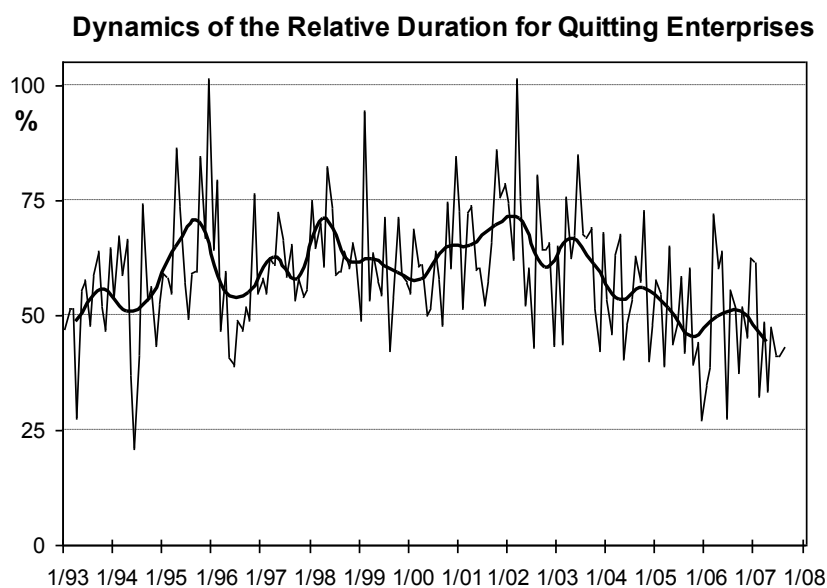
Due to the defect in the indicator summing up all the questions (in the indicator of the total number of questions) for all the enterprises (because not performed surveys are not fully accounted), another indicator can be offered, which measures the duration of participation in the surveys for the enterprises that have quitted the panel. This measure will be more precise (as an enterprise has already quitted and will no longer receive questionnaires), but also more interesting, as it shows which questions burden will push an enterprise from the panel. The problem of keeping enterprises in the panel appears to be the most important one for non-government organizations performing surveys on voluntary basis. This new indicator shows on which number of questions an enterprise could (wanted or was capable) to respond before it quitted the panel. The lower line (see Figure 13) shows the dynamics of the number of actually returned responses from enterprises at the moment of their exclusion from the panel. This line has always been lower than the line that shows the total number of responses received from the panel enterprises. That is, the panel has always been quitted by the enterprises whose duration of participation in the surveys is shorter than the average for the panel.

Figure 13



If the duration of participation of the excluded enterprises is re-calculated as percentage ratio to the average number of questions responded by the whole panel, we will have the deviation of the duration of participation for the quitting enterprises from the average duration of participation in the panel, comparable over time. And estimates exceeding 100% will mean that the panel is quitted by older enterprises, while estimates less than 100% will show that the panel is quitted by younger participants. The shorter is the relative duration (duration ratio) before quit, the younger are the enterprises which have to be excluded from the panel. The dynamics of the relative duration (duration ratio) before quit is shown in Figure 14.

Figure 14

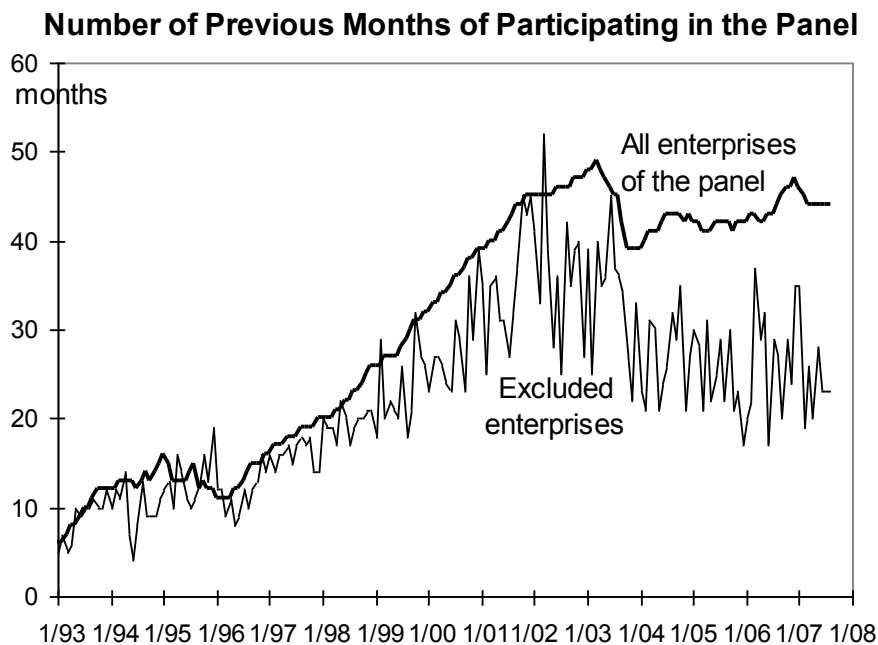


As seen from the Graph, the duration of quitting enterprises, with exception of two surveys, has always been shorter than the average for the panel. In other words, the panel has always been quitted

by younger firms. Much more often the duration before quitting varied from 50 to 75% of the average duration for the panel, that is, enterprises did remain in the panel after 2 or 3 surveys and “worked” in it for a time. The largest average number of questions that could be responded by excluded enterprises makes up 1185 and occurred in May 2002. 2003-2005 were marked by the negative tendency towards reduction in the number of questions responded by quitting enterprises during their participation in the panel. The relative duration (ratio duration) reduced from 70 to 45% (in the second half of 2005, those enterprises were excluded from the panel, which average response was only 500 questions). The earliest months of 2005 showed an increase in the quitting duration (duration of participation before quitting), probably connected with additional efforts to explain the benefit of surveys for new enterprises.

Also, analogous indicators can be calculated for the duration of enterprises’ participation, measured as the number of months of their inclusion in the panel or as the number of returned filled questionnaires. For reference purposes, we are going to show the dynamics of the duration of participation in the panel, measured as the number of months of the inclusion in the panel (see Figure 15).

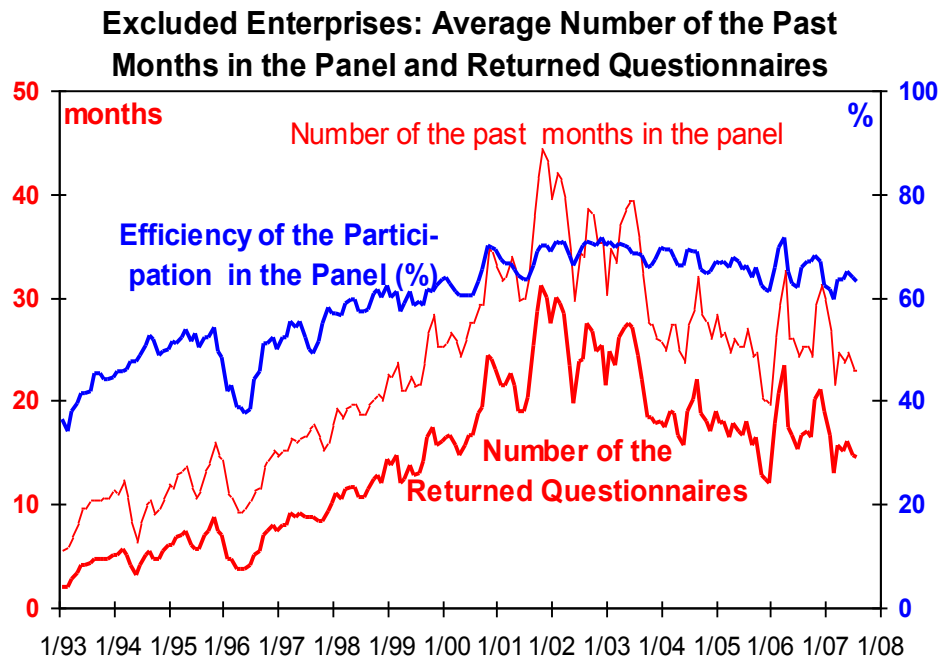
Figure 15



By this indicator, the duration of quitting enterprises differs from the average duration for the panel not so strongly as in case of measuring the duration as the number of questions in questionnaires. In 1996-2002, the average duration for quitting enterprises varied from 80 to 100%, and began to decrease only since 2003, falling down to 60% by the end of 2005. In 2005, the panel was quitted by the enterprises that participated in it 25 months in average. This is an echo of the mass-scale expansion of the panel in 2003.

For enterprises quitting the panel in each survey, indicator of the efficiency of their participation in the panel can be estimated (see Figure 16). As in case of the whole panel, it is calculated as the ratio of the number of returned questionnaires to the number of months of participation in the panel. Initially, the efficiency of the enterprises’ participation in the panel didn’t exceed 40%, and grew up thereafter to 50%. Mass-scale expansion of the panel and introduction of regular rules for cleansing the panel from “silent” enterprises reduced the efficiency of the enterprises’ participation in the panel in II quarter 1996. Since 1997, the efficiency of the enterprises’ participation in the panel started to gradually increase, and after 1999 it has varied within the 60-70% interval.

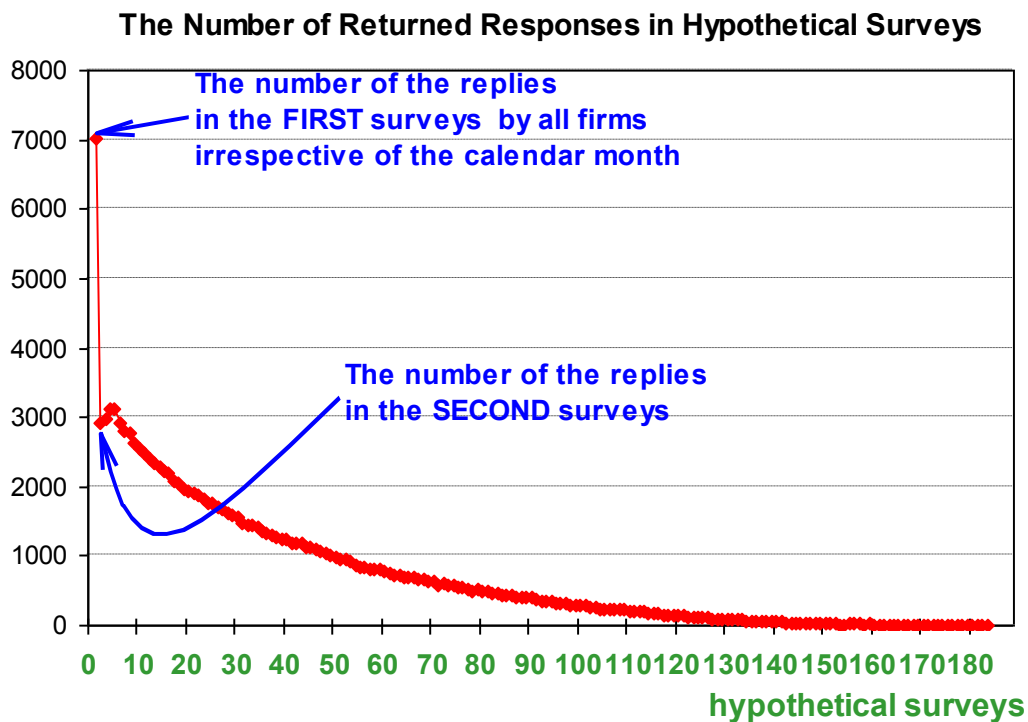
Figure 16



4. “Life cycle” of an enterprise in the panel: hypothetical surveys and hypothetical responses

In the previous section we have dealt with real surveys performed in Russia since 1992 and on. The number of such surveys exceeds 170. The surveys covered more than 4700 Russian industrial enterprises over 14 years. Each enterprise has its own duration of surveys participation and own rate of response. But each enterprise did have its first survey (a month of participation in the panel), and most of them had their last survey. The same applies to the returned questionnaires: each enterprise did have its first filled questionnaire, and most of them had their last one. Then the method of hypothetical surveys and hypothetical responses can be applied to statistical analysis of the enterprises response. In this case, the first survey is considered to be the first survey for all the enterprises, irrespective on what calendar month it really fell for each of the enterprises; the second one is considered to be the second survey for all the enterprises and so on. And the first response will be considered to be the first returned questionnaire, irrespective of the calendar month when it was received. Such approach allows us to derive several useful statistical characteristics of the panel development.

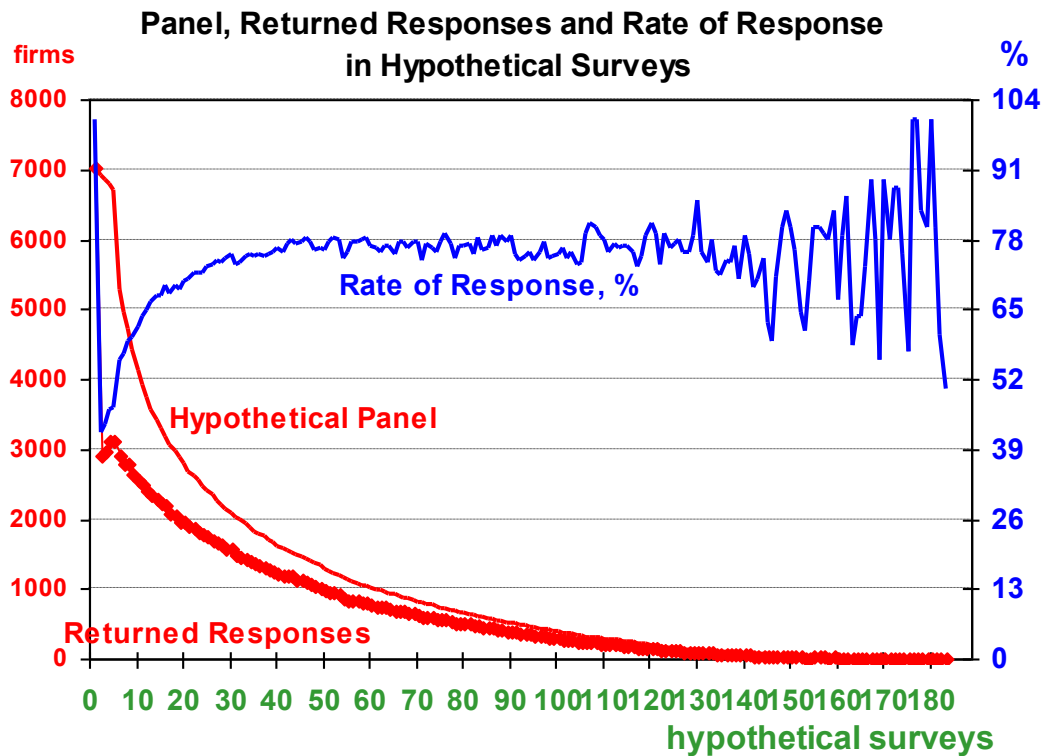
Figure 17



The simplest indicator is the number of returned responses in each hypothetical survey (see Figure 17). In the first hypothetical survey, participation of 6362 enterprises is registered over the period of the surveys. And it must be born in mind that the same enterprise could be included in the panel several times in various periods. Therefore, the number of the first responses (6362) is larger than the number of enterprises (4700). In the second survey the enterprises' participation is much more limited: the questionnaire that was the second one for each enterprise, was responded by only 2695 enterprises, which is 42% of the number of respondents in the first time. In the third and the fourth surveys, the absolute number of participants is a bit larger, but the fifth survey marked a smooth downward trend in the number of responses in hypothetical surveys. At this period of time, each next survey brought 2-9% smaller number of responses than the previous one. Such situation looks quite logical, as the enterprises' fatigue from the surveys and their quitting the panel increases along with the increasing duration of their participation in the surveys. But sometimes the number of responses may be larger than their number in previous surveys. And this is quite logical. Varying samples of enterprises from the same panel can participate in several sequential surveys, as there are enterprises that do not respond on all the questionnaires during their participation in the panel. But the first conclusion (for a surveys' organizer) is clear: the largest losses in the panel occur in the second survey. Therefore, the second survey required a specific approach for all the enterprises, to maintain respondents' interest to the surveys. It's not only important to receive the first response from an enterprise, but also to do one's utmost to receive the second response, and only after that one can feel relaxed.

Also, for each hypothetical survey the panel size can be defined, that is, the number of the enterprises that sent at least one response by the time of the next survey and were not excluded from the panel due to their clear refuse to participate or non-response during the four sequential months. In the first hypothetical survey, the panel size was precisely the same as the number of first responses, and after that the panel size started to decrease (see Figure 18).

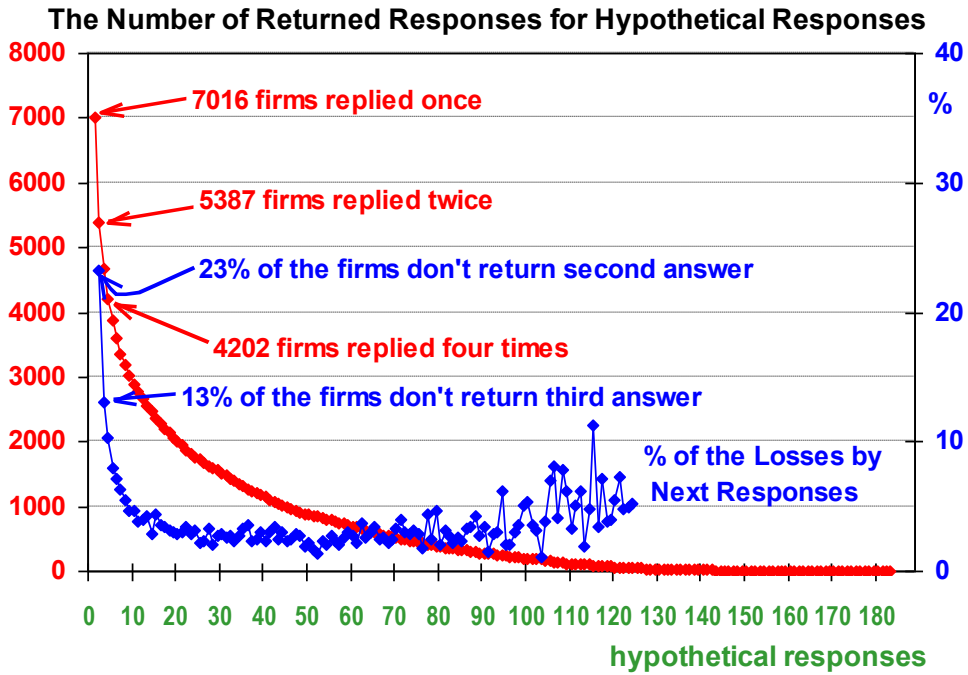
Figure 18



At first (from the second to the fifth survey) the decrease was small, and was only due to clear refusal of enterprises to participate in the surveys. After the fifth survey, the rule for exclusion of “silent” enterprises started working, and the panel size started to reduce more intensively. To judge about the relation between the panel size and the number of responses in hypothetical surveys, the ratio of questionnaires return in hypothetical surveys can be calculated. For the first survey it, of course, is 100%, in the second survey it falls down (to 43%), in the fifth survey it increases by 10 percentage points due to cleansing of the panel from “silent” enterprises. By the 20th survey, the ratio of return reaches 70% and varies between 70-80% till 125th survey. Then the number of responses and the panel size go down, which leads to strong variations in this indicator and decreases its reliability. Hence, the enterprises’ participation in the panel till 20th survey allows us to have a high and stable share of questionnaires’ return in the future.

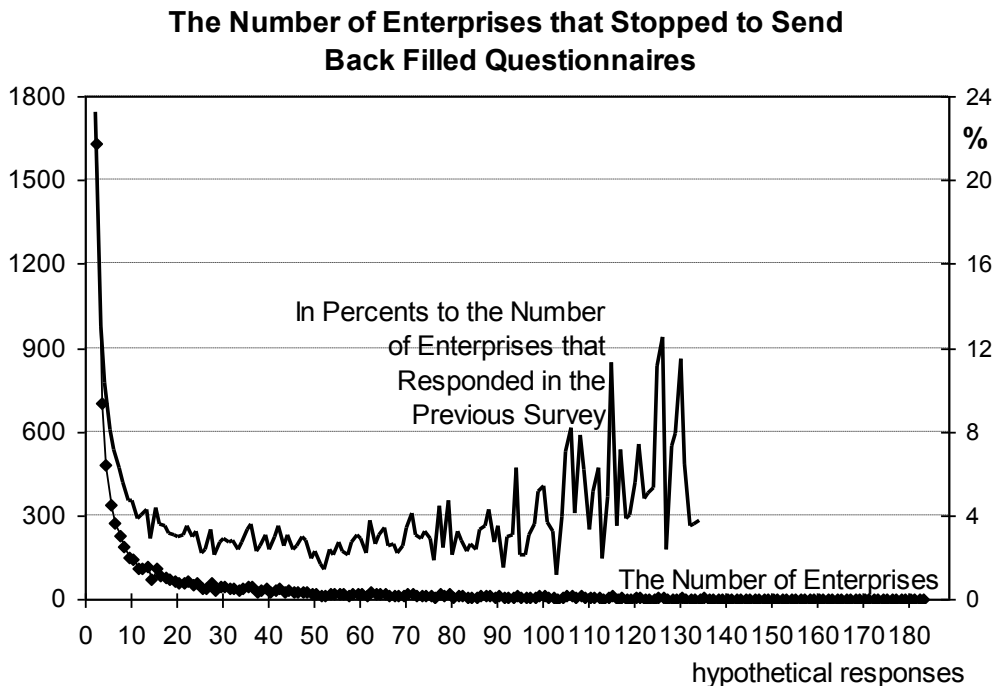
If the method for hypothetical responses is applied, then the dynamics of responses from the panel enterprises can be derived not on the basis of the number of the surveys in which an enterprise participates, but on the basis of the number of the responses sent back by an enterprise. In this case, the surveys missed by an enterprise will not be counted (see Figure 19). This Graph shows that one response have been received from 7016 enterprises, two – from 5328, three – from 4686 etc. The largest number of responses (172) has been received from one enterprise.

Figure 19



The number of responses in hypothetical surveys allows us to have the number of enterprises that stopped to send back filled questionnaires after the next response and thereafter were excluded from the panel. In other words, the number of enterprises that sent back only one response, only two responses etc. 1629 (7016-5387) enterprises could give only one response, and then stopped to return questionnaires and were excluded from the panel. 701 enterprises (5387-4686) could give only two responses and then were excluded from the panel. The new series of figures shows the dynamics of enterprises' quit from the next response (see Figure 20).

Figure 20



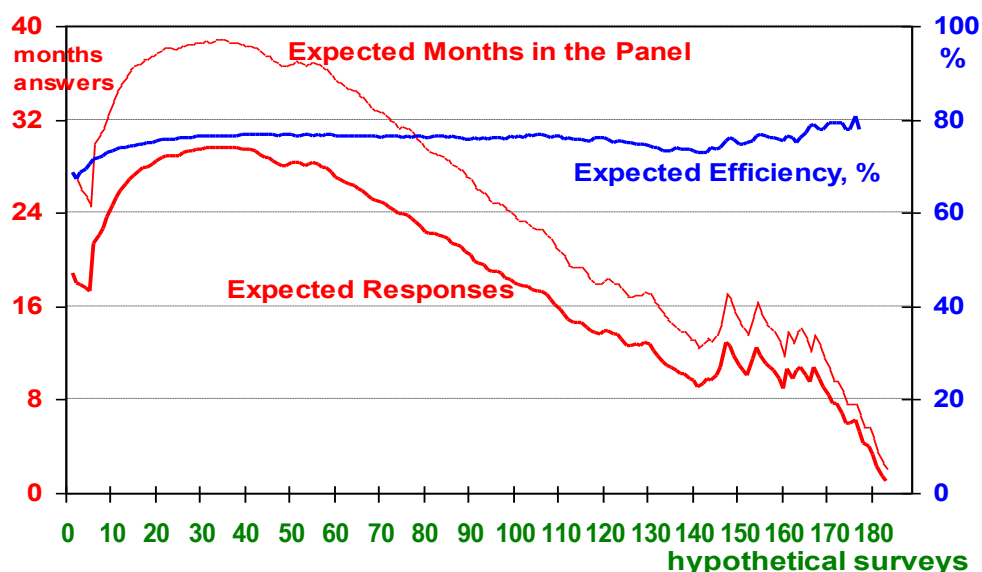
Because the number of those who didn't send the next response depends on the number of those who sent the previous response, the data on the number of quits must be re-calculated in percents to the number of those who sent the last response. This allows us to have the percentage of enterprises' quits (the ratio of enterprises' quits) after the next response. The largest percentage of quit (ratio of enterprises' quit) is derived for the enterprises that sent back only one response. The second response was not sent by 23% of those who sent the first response. After the second response, 13% stopped to participate in the surveys, and 10% stopped after the third response. The share of quitting enterprises reduces to 2-3% by 40-50th response. The minimal quit was registered after 52nd response. After 60th response, the percentage of quit (ratio of quit) increases, and after 90th response it also starts to feature a strong variation due to the absolute decrease in the number of responding and quitting enterprises. Therefore, the largest absolute and relative losses in the panel occur after the first, second and third response. Therefore, after the first response it's necessary to take additional measures to keep enterprises in the panel (to use a simplified questionnaire, to explain the essence of the surveys anew and more carefully, to mail most interesting and most important results from previous surveys).

For each hypothetical survey and hypothetical response, not only the number of surveys and responses in the past can be derived, but also the number of expected surveys (months in the panel) and the number of expected responses. These indicators measure the potential of the forthcoming life cycle of the panel and its response rate depending on its past duration.

The Graph showing the average number of expected months of participation in the panel depending on the number of previous months of participation in the panel allows us to derive the most optimal (from the future perspective) duration of the enterprise's participation in the panel (see Figure 21). Calculations of this indicator for the Russian panel of industrial enterprises have shown that the enterprises participating in the panel over 20 to 40 surveys have the longest duration of the participation in the forthcoming period. This cohort of respondents will be in the panel for about 37 months. The same cohort features the highest efficiency, that is, the average number of forthcoming responses. The latter indicator will, of course, be lower, as no enterprise responds on all the questionnaires it receives during its participation in the panel. The largest number of forthcoming responses is 28-29. After 45th survey, the number of forthcoming responses starts to decrease and reaches the minimum (9-10) responses by 120-125th surveys. The ratio of the number of forthcoming responses to the number of forthcoming months of participation in the panel shows the efficiency of the forthcoming participation in the panel. Since the 5th survey (that is, since cleansing the panel from silent enterprises) this efficiency has not been lower than 70%.

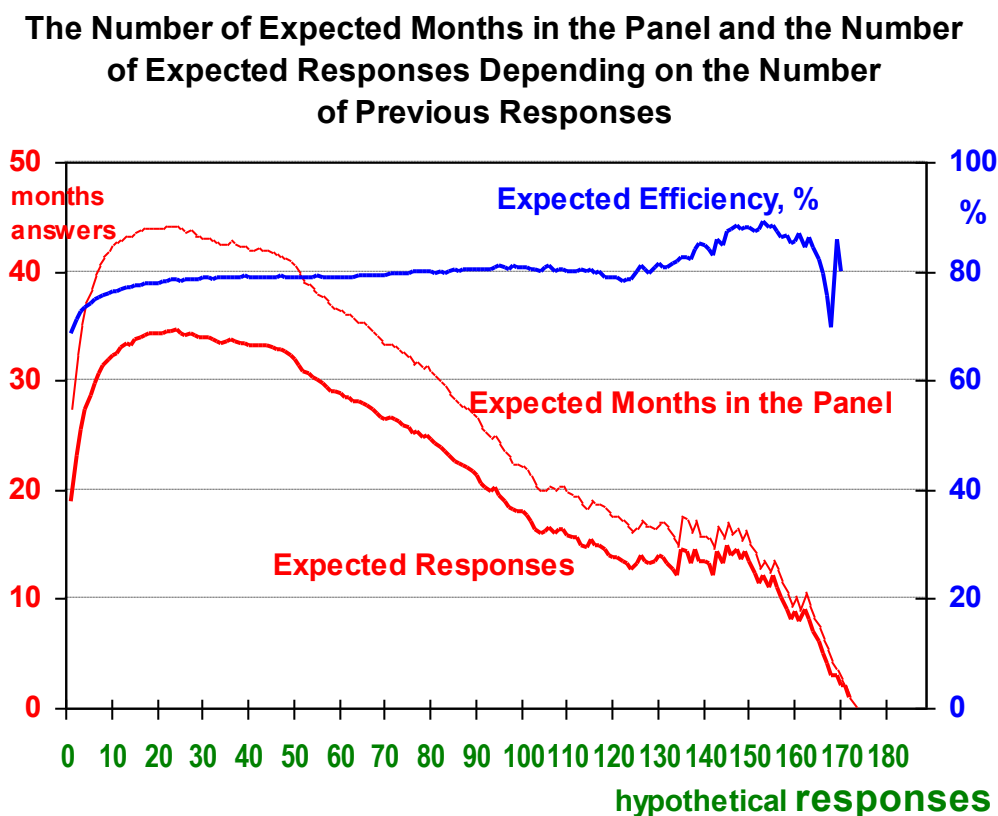
Figure 21

The Number of Expected Months in the Panel and the Number of Expected Responses Depending on the Number of Previous Months in the Panel



Also, analogous indicators can be calculated for hypothetical responses. In this case, we will have the number of forthcoming months of participation in the panel and the number of forthcoming responses depending on the number responses received earlier (see figure 22). Average estimates of these indicators for the first response received from an enterprise are 27 months and 19 responses. That is, an enterprise that sent back only the first questionnaire will stay in the panel for 27 months and will send 19 questionnaires over this period. As early as by the third survey, these estimates grow up to 35 months and 25 questionnaires. From the enterprises that sent back from 10 to 41 responses, we can expect at best 31-33 filled questionnaires in future. And their future period of participation in the panel will last 40-41 months.

Figure 22



Conclusion

Organization of conjuncture surveys on voluntary basis makes an organizer to put emphasis on building up and maintaining the panel of enterprises' managers. Therefore, statistical description of the panel and control over its development can prove to be useful for understanding the processes that occur within the panel. The panel should become subject for even closer care if it's used for not only regular conjuncture surveys, but also for additional ones.

Even monitoring of elementary characteristics of the panel (panel size, number of included and excluded enterprises, number of returned questionnaires, response rate, number of asked questions) is capable to show basic tendencies in its development.

The next step in the analysis allows to estimate several specific "demographical" characteristics describing the enterprises' participation in the panel. The panel for each survey can be described by the average duration of the participation in the panel, measured as the number of months, or as the number of returned questionnaires, or as the number of "responded" questions. The ratio of the number of returned questionnaires to the number of months of participation in the panel will show the efficiency of the enterprises' participation in the panel and the efficiency of the panel control by the surveys'

organizers. Russian industrial enterprises respond on 80% of the mailed questionnaires during their participation in the IET panel. Use of the information about the number of questions on which enterprises respond when they are really participate in the panel and on which they could have responded if they had been in the panel since the first survey allows to calculate another, a more global, measure of the efficiency of the enterprises' participation in the panel.

Because quitting the panel by enterprises seems to be the most unpleasant problem for a surveys' organizer, statistical characteristics of quitting enterprises require special attention from surveys' organizers. The enterprises excluded from the panel can also be described by the average number of months of their participation in the panel, the average number of questionnaires returned by them and the average number of questions responded by them. The above indicators should be compared with analogous characteristics of the whole panel at the same moment of time.

Use of the method for hypothetical surveys and hypothetical responses allows to describe "life cycle" of enterprises in the panel on a large stock of statistical data. In this case, emphasis is put on the tendencies determined by the duration of the enterprises' participation and the number of responses given by an enterprise during its participation in the panel rather than by the panel size and structure. These indicators have shown that for a surveys' organizer it's important to receive an enterprise's response not only in the first survey, but in the second one as well. The least care is required for the enterprises that stay in the panel till 20th survey. The minimal share of quitting in the Russian panel is accounted for by the enterprises returning from 40 to 50 responses.

Estimation of the forthcoming months of the participation in the panel and the number of forthcoming responses for hypothetical surveys and hypothetical responses show the duration of the forthcoming "life" in the panel and the forthcoming efficiency of the respondents depending on their past duration of participation. The longest duration of the forthcoming "life" in the panel is with the enterprises that stay (participate) in the panel during 20 to 40 surveys. They are expected to stay in the panel for another 37 months and return 28 questionnaires. The efficiency of the forthcoming participation of Russian industrial enterprises in IET panel doesn't fall below 70%.