



הלשכה המרכזית לסטטיסטיקה
Central Bureau of Statistics
دائرة الإحصاء المركزية

Israel Central Bureau of Statistics

It's All in the Numbers

Sentiment indicators based on business tendency survey

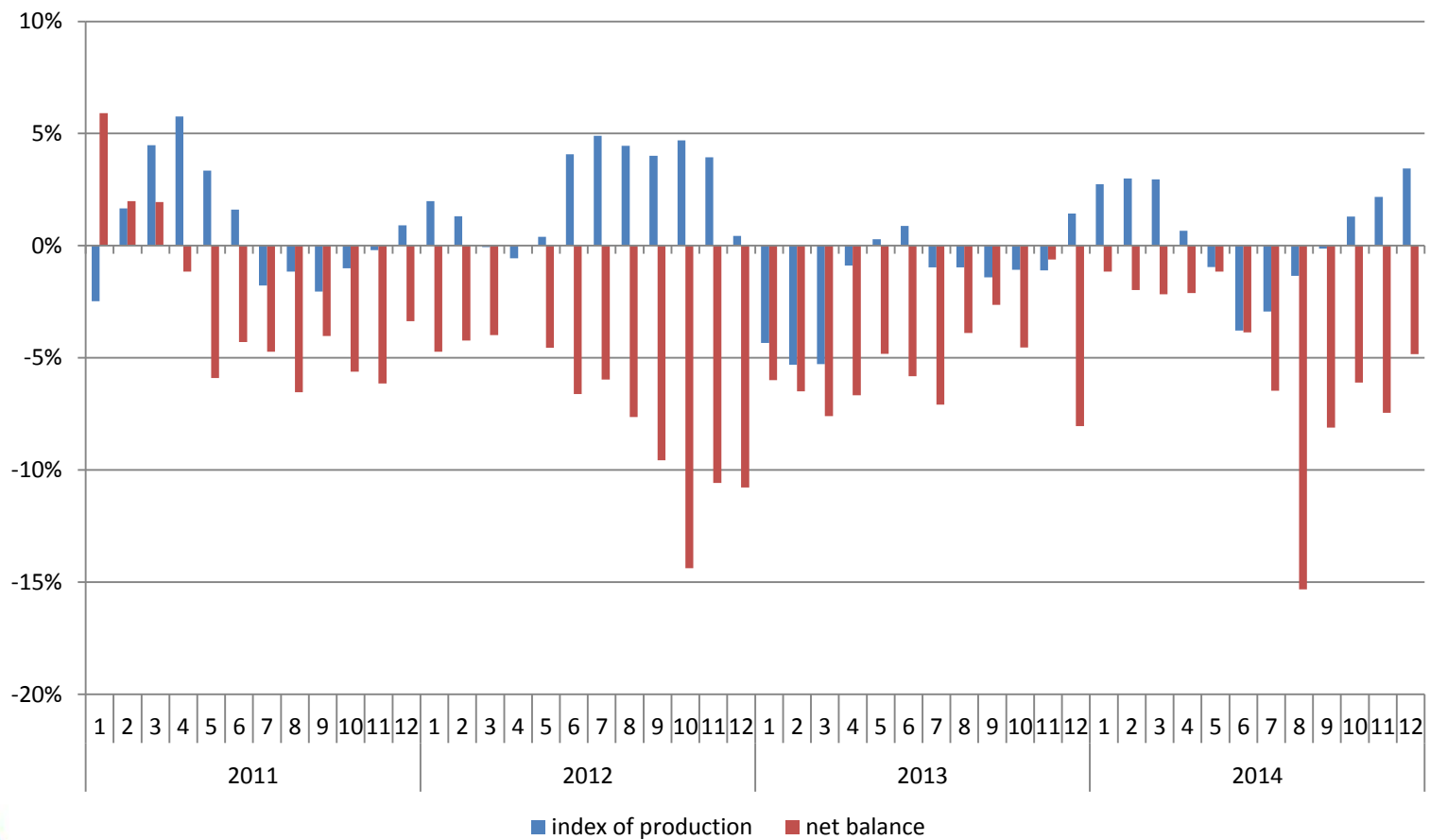
Background

- Business Tendency Survey (BTS) collects qualitative answers from business-sector companies concerning past, present and expected activities by ordered scale (of 5 categories)
- Representative samples for 5 major sectors
- The balances of opinions are released about the 5-th day of the month, but time-series have been disconnected due to methodological changes in questionnaires (2015).

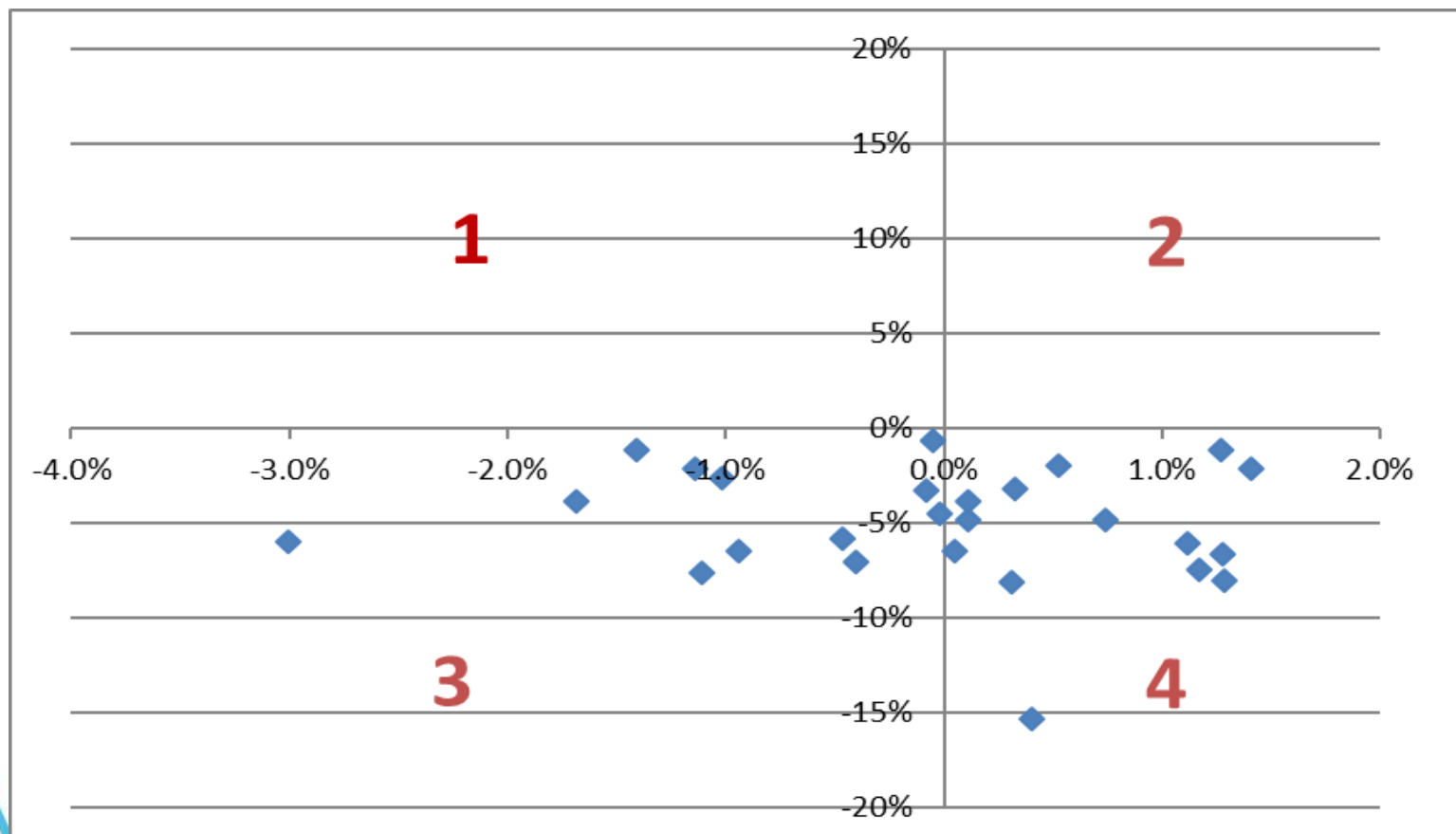
Background

- In the middle of 2014 we noticed two distressing phenomena:
 1. The net balances from the BTS are not correlated to the corresponding quantitative series.
 2. The net balances are mostly negative while the economic situation is positive and stable.

Comparison between production net balance and index of production



Comparison between production net balance and index of production



Committee of Inquiry

- Due to these lack off correlations and the different trends of the qualitative data and the quantitative data we organized a Committee of Inquiry which examined the BTS results.
- We made a comparison between the BTS and the Company's Survey which is qualitative quarterly survey that is conducted by the central bank.

Committee of Inquiry

- The comparison revealed three differences between the results for the same period:
 1. A high percentage of respondents replied “no change” in the BTS.
 2. Negative results in the BTS.
 3. In many businesses we noticed that that their qualitative answer (past sales) was uncorrelated to their quantitative data from the business register

Committee of Inquiry

- The main conclusion from the test was that the wording of the retrospective questions were very confusing and the committee suggested changing the questions.
- The retrospective questions were “**what is your company’s experience over the last three months compared with the previous three months for the season?**”

Committee of Inquiry

- One of our conclusions were that since this was a very ambiguous question, many managers chose to answer “no change”.

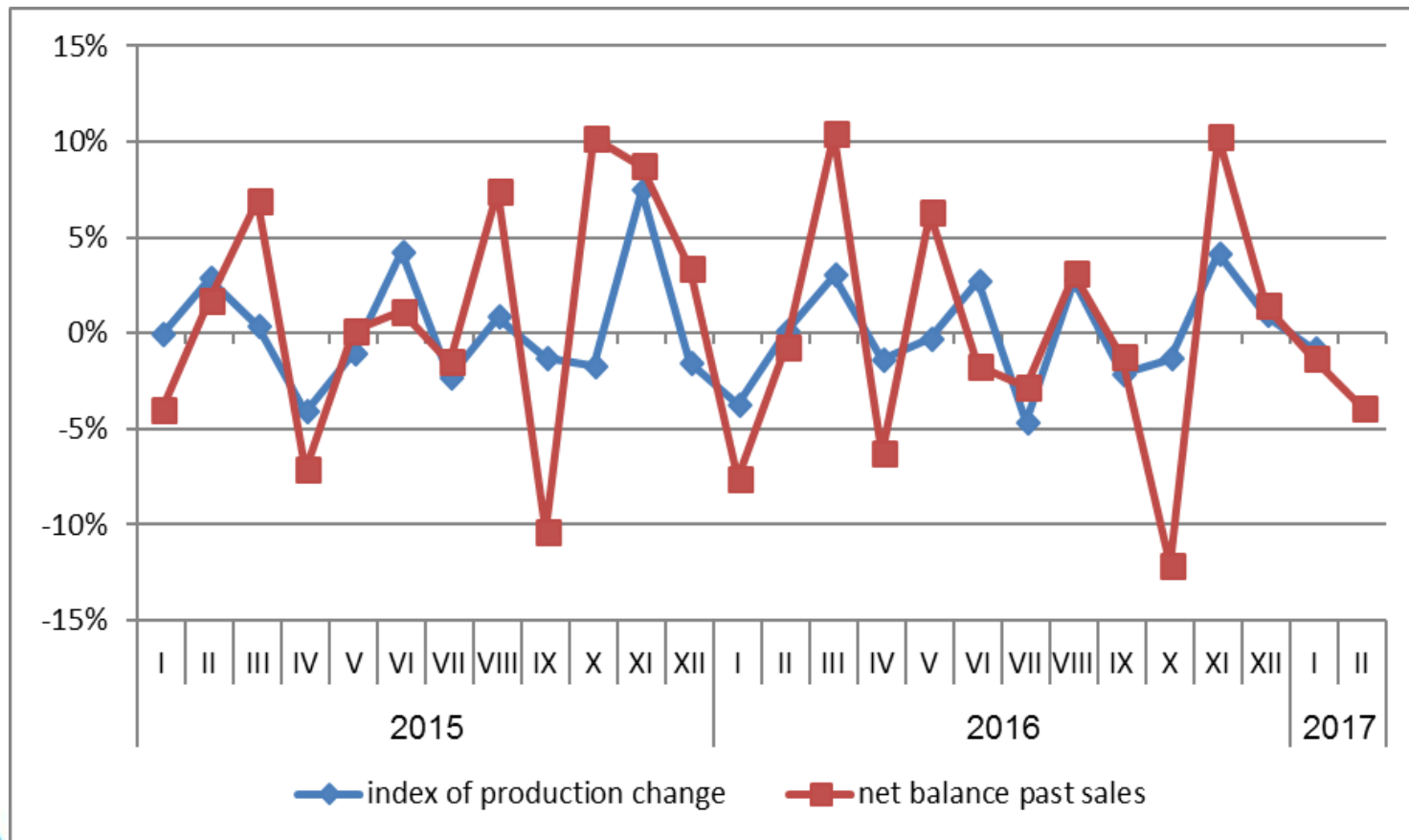
Committee of Inquiry

- With the guidelines of Methodology Department , from Israel CBS, we decided to divide the BTS sample to 2 random samples.
- One sample will answer the problematic questionnaire and the other sample will get a new questionnaire.

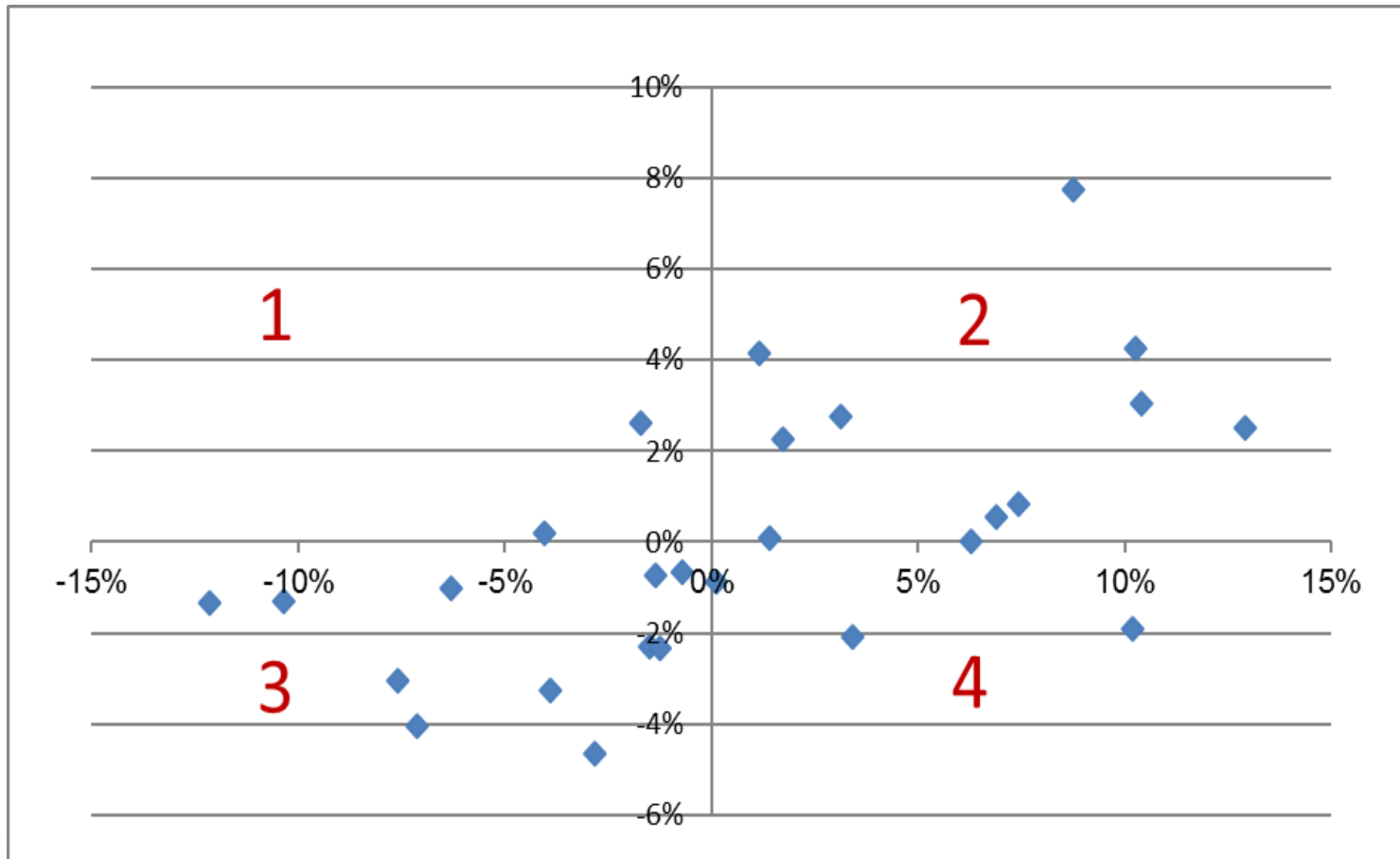
Committee of Inquiry

- The retrospective questions in the new questionnaire are “**what is your company’s experience over the month xxx compared with the previous month xxxx ?**” .
- The results showed significant improvement and we decided to change all the questionnaires to the new version.

Comparison between production net balance and index of production-new questionnaire



Comparison between production net balance and index of production-new questionnaire



PLS model-background

- Due to the fact that we have short time series (2015-2016) without business cycle using the net balances as a single indicators will lead (in most cases) to a low correlation.
- In order to strengthen the correlation and to maximize the useful information in the BTS results we use disaggregated balances (by size groups and sub-industry)

PLS model-background

- When we have many explanatory variables (in our case net-balances of past present and expectations) we have problem of multicollinearity .
- Most of the researchers use PCR method in order to produce a sentiment indicator and avoid unstable regression results.
- PCR capture most of the covariance of X but does not guarantee that latent factors that explain X will also provide a good fit for y

PLS model-background

- In contrast to PCR , Partial Least Squares construct the factors by maximizing the covariance between X and Y.
- We use a cross validation in order to determine the number of latent factors and the pool selection

Table 6. CV-parameters for selection of the appropriate PLS-specification, by industries, group aggregation and weighting (new questionnaire)

Time perspective	Weighted (W)/ Unweighted (UW) net balanced	Reference series	Group aggregation	Number of extracted factors	Improvement (+) in PRESS relatively to:		Chosen model (V)	Explained in-sample variance of:	
					Baseline	One-factor model		Dependant variable	Model effects
Panel A: Manufacturing									
All ¹	W	tpr	size	1	14.6%		V	71.1%	16.4%
Past, lag.past, expected	W	tpr	size	1	11.6%			68.9%	16.8%
All ¹	UW	tpr	size	2	17.4%	16.8%		85.9%	31.8%
Past, lag.past, expected	UW	tpr	size	1	19.1%			67.1%	18.0%
All ¹	W	tpr	sub-ind.	4	34.6%	22.8%		98.3%	49.2%
Past, lag.past, expected	W	tpr	sub-ind.	4	36.6%	25.1%		98.1%	51.7%
Past, lag.past, expected	UW	tpr	sub-ind.	2	23.3%			83.9%	35.9%
All ¹	W	gdp	size	4	24.5%	-5.1%		42.9%	100.0%

PLS model-selection of net balances

- From the results of the cross validation we chose the model specification. [\..\مחקر](#)
[Table6.pdf](#) מגמות\מצגת\
- We conducted out of sample simulation for the monthly reference series of manufacturing and trade and for the quarterly GDP growth.

Results

- For the nowcasting of the GDP growth the PLS model outperforms the current model and also allows to produce the nowcast a month before the current model.
- The current model is based on bridge equations that estimate the different component of the GDP (e.g consumption government...)

Conclusion

- NSO's should test the BTS results correlation to quantitative reference series from time to time.
- Before conducting methodological change it is advised to design an experiment with a control group in order to examine the change.
- PLS method should be tested as an alternative method to PCR in compiling sentiment indicators.

Thank U