



**Design of the Oregon Business Confidence Survey
OBCI Proposal**

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**Under the Supervision of
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Abstract

Information about current conditions in the state's economy is vital to businesses trying to make optimal decisions about investments, hiring, and pricing. Currently, Oregon businesses have had to depend on information about state output and employment that is several months old, or on business indices that reflect national sentiment, rather than specific local trends. This paper proposes the design and creation of an Oregon Business Confidence Index. This index would give Oregon businesses a business confidence index that represents the state, generating information about current business confidence, and providing a forecast of economic growth and employment in the state. This proposal explains the design of the method for creation of an OBCI.

Approved: _____

Professor Bill Harbaugh

Date

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Introduction

Business confidence surveys typically examine the sentiment of business leaders, asking variations on questions like “Do you expect your cost of goods sold or services to rise in the next 6 months?” or “Are knowledgeable employees easier to come by now than they were 3 months ago?” These surveys attempt to draw information from businesses about output, efficiency, employment and current conditions. The sample pool for the survey includes Oregon business owners or individuals associated with the firm that are intimately familiar with the company’s plans and current conditions. Such a survey would complement the current economic indicator, The Oregon Leading Economic Indicator (OLEI), run by professor Tim Duy and the Oregon Economic Forum. This kind of survey would assist Professor Duy and the Forum in their forecasts of future Oregon economic activity. The OLEI examines economic indicators from the Bureau of Labor Statistics, Bureau of Economic Analysis and other economic data for the state, while the business confidence survey would examine the sentiment of business owners and managers across the state.

Confidence surveys such as the one we propose can be used to help provide important information to economic policy makers and analysts. While conventional econometric models of levels of sales, output, investment or employment have proved to be reasonably reliable in times of stable economic growth, they have not performed well in signaling directional changes in the economy. The ability to measure change is what makes these business confidence surveys useful in analyzing the state business cycle. The confidence surveys are created to obtain and provide qualitative information to monitor the current regional business situation and help forecast short-term business

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Comment: Awkward transition

developments. When combined with quantitative statistical surveys, results from business confidence surveys have proved to be valuable in revealing current business sentiment and forecasting turning points in the business cycle.

The creation of a business confidence survey in Oregon is especially important for several reasons: Firstly, both the Gross Domestic Product (GDP) and the Gross State Product (GSP) give hard numbers about the state's economic situation, but they are derived from "outdated" data. The numbers used to compute these indicators give no hint to the future direction of the country or state's economy. They are considered outdated from the moment they are printed, and in many cases, collected, in fact usually 3 months or less. In the case of GDP and GSP, data that is collected in December is not released to the public until March. This is not helpful for two reasons. Both the GDP and GSP are trailing indicators, which mean they state what has been done already and not what's going to be done. Second, because the data is released so late, it's not even helpful in gauging present economic situations. These indices merely state what has happened in the past.

Looking at other business confidence surveys, such as the Institute of Supply Management's nationwide indicator or Northwest indicator, we find they do not apply to Oregon specifically. While they show what is occurring on a nationwide level or general Northwest region respectively, they do little to isolate the causes and effects of changes in Oregon's complex business structure. The make-up of Oregon's economy is unique, and economic factors from Washington or Idaho skew information that Oregonians need in order to make decisions that affect their state, and their state alone. For instance, Oregon is more heavily vested in agriculture than Washington. Its logging

industry contributes more to the state's total revenue than that of Idaho's. Factors such as these, which separate Oregon's economy from that of its neighbors are things we want to be able to see in the Oregon Business Confidence Indicator. People making planning decisions that will primarily involve Oregon, such as local businesspeople and state officials, should have a measure of business confidence that is specific to the state of Oregon.

Until our survey is functional business leaders and public policy planners have to pay for access to the kind of report we will eventually create. Currently a one year subscription the Conference Boards' Business Confidence Survey Report is \$130. Access to all of the Conference Boards' reports for one year is near three thousand dollars. Even if a company purchases these reports they only report national results. Our report will have state and even county information available publicly. A [description of our report](#) will be given in our presenting results section.

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Our intentions are to sample Oregon businesses, using an intermingled set of questions to create an overall picture of Oregon's business confidence level and future outlook and we also intend to collect information about issues that businesses feel are particularly important to investment decisions. The first type of question will be used in the direct computation of the business confidence indicator, and the second type of question will be used to gain feedback from local Oregon businesses in regards to law and policy changes and their effects on Oregon businesses.

In the following literature review we will discuss the history of these kind of surveys. We will also describe how some of the challenges we face constructing this kind of survey have been overcome by others. We will describe the process of creating an

internet survey and why we used the questions we did for the survey in the survey design section. Finally we will show how we create the index values and the report format we recommend the Oregon Economic Forum uses.

Literature Review

There is a sizeable library of methods and questions to use when designing the Oregon Business Confidence Index (OBCI). But definitive research on the value of such indices is mixed at best. While it is still valuable to us, this research provides no clear conclusions to our problems with how our Index relates to GSP. Instead, we must rely on previous research to infer the value of our index. In this section we discuss some of the previous research we will be depending on in designing and interpreting the OBCI.

Knowledge of the future and the ability to accurately forecast the magnitude of economic changes in GDP, employment and productivity have been active pursuits in economic and business research. The use of expectations to forecast future changes in the economy goes back to the 1930's and the end of World War 2.

The Institute for Strategic Management (ISM), a research group based in San Antonio, Texas has been conducting production surveys on manufacturers since 1931. In 1930, trying to accommodate for the stock crash of 1929, the Hoover administration attempted to find more information about manufacturers and began a manufacturers survey. Although the administrations' survey was halted, the ISM picked up the survey in 1931.¹

National consumer sentiment surveys began in 1946. Consumer sentiment surveys use consumers as the data pool to gather observations from. Forecasts for the 1946

¹ ISM history of the report on Business, <http://www.ism.ws/ISMReport/OriginOfBoth.cfm>

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Comment: define, explain

employment rate had been noticeably inaccurate. The Federal Reserve commissioned the University of Michigan to conduct a survey of consumers about their expected spending habits and outlook for the future. The University used the data to create a Consumer Sentiment Index.¹ Fred Katona then used these consumer sentiment results in his subsequent work to create a new exogenous variable for his macroeconomic model and found robust improvements in his forecasts.² The university maintains the sentiment Index to this day. The CEO Roundtable, the Bank of Canada, the Conference Board and other organizations around the world use confidence surveys, in general, to predict future inflation, GDP growth and future employment levels. Some Groups like the Bureau of Economic Research Marist University use regional results to compare national changes to those observed locally.

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Comment: Make the distinction between consumer and business confidence surveys.

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Comment: Give a transition to the business confidence versus consumer confidence.

The Conference Board began surveying consumer confidence in 1960 and its Consumer Confidence Index is currently one of the most popular indices used to forecast future economic changes. The Board maintains other regularly updated indices as well, including the CEO Confidence Index. The ISM maintains its monthly index of manufacturing sentiment that solely examines manufacturer responses. Consumer confidence Surveys are one way to forecast consumer demand and their consumers expectations in the change of prices of finished goods. Business confidence surveys examine changes in employment, business conditions and input prices. The use of indices based off expectations is well founded and the OBCI will have several indices we can

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Comment: Again, say something about the general use of confidence info, versus specific info on business confidence.

¹ House, Juster, Kahn ..., "A Telescope on Society: Survey Research at the University of Michigan and Beyond", The University of Michigan Press, 2002.

² House. p. 141 Katona included the sentiment index as a variable in his economic model under the assumption that the theory of rational expectations was valid.

compare it to when trying to predict changes in state economic activity. More recently research has focused around some of the challenges that face confidence surveys.

There has been a considerable amount of work on business confidence, and in this section we examine some of the different issues we've encountered and the research papers we've looked at to help (1) understand exactly what problems are at hand and how to fix them and (2) examine what concerns have plagued researchers before us and how they solved their dilemmas. After all, not all research has led to the same conclusions. We want to look at as much as we can and draw our own conclusions based on the value of the research at hand in connection to our paper. We have to address our survey methods, sampling universe, index calculation methodology, implications of the results and finally the format we should present the results.

Issues regarding survey methodology are addressed by Nesbary, Fraley and the Organization for Economic Cooperation and Development (OECD). We are conducting an internet survey and Nesbary and Fraley give defenses for using internet based surveys. Fraley gives a guide for html script writing and his personal experiences with using internet surveys. For calculating the index, the work done by Mitchell, Richard and Jones on turning qualitative responses into quantitative data as well as the OECD will help us create a proper index calculation methodology. Adelman and the OECD give examples of various methods while Robert Inklaar gives an historical overview of methods used to weight the index. to weight our results in order to get a more representative result.

The goal of offering a web based survey is to reduce costs related to telephone or mail in surveys. Although several technical aspects regarding the creation of a server and choosing software to run the survey are important, the key problem remains that we have

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Comment: Good, extend this a little to explain how the readings below will achieve these goals. In general, it's much better to organize a lit review around the subjects – e.g. bias in sample, response, question design, and then point out what different sources have to say about these topics.

to feel confident that using the internet will give us just as valid and robust results as any mail in or telephone surveys. The problem is that not all businesses have access to the internet which may bias the sample we gather because it will limit the survey to business owners and managers that have access to the internet and are proficient in the use of the internet. But research in the use of internet surveys has found that they are as effective as mail in surveys when it comes to non-response. In particular, Sivadas (1995) and Comely (1998) have found that response rates for the internet were comparable to response rates for mail in surveys.¹

The other concern for our survey method is that the Internet may bias our sample.² Fraley addresses the problem that an internet survey may create a biased pool. Most internet surveys draw a respondent pool from the internet, which may lead to only a particular firm responding. In our survey we are recruiting firms through non electronic means and only confirming their interest through email service. Bias from a particular set of firms responding may still exist but it will not be caused by using an internet survey.

Once the businesses have given us their responses we have to turn qualitative responses like good, unchanged into numerical values we can analyze. Smith and Martin (2002) have given specific formulas and transformations for changing survey answers received into hard numbers, which can then be used to create the final business confidence index. A key was determining what these transformed numbers actually mean to economic policy makers. They propose that the creation of an indicator

¹ Nesbary, p42; Nesbary sites the fact that prior to 1995 most research regarding internet surveys were left to the private sector. Only after 1995 did internet surveys really become a focus of study.

² Freley, p283; "To summarize, recruiting subjects over the WWW should not be viewed a substitute for the need of good sampling techniques. Nor should it be viewed as appropriate for all research investigations. . . However, given limited resources, it doesn't seem that samples recruited via the WWW would be worse than student subject pools."

based on a theoretically consistent procedure for quantifying business survey responses that are both ordered and categorical. The Confederation of British Industry's application to business survey data has shown that the indicator of manufacturing output growth outperforms traditional indicators that assume time-invariant thresholds. Which is to say that using an indicator that allows for manufacturing growth rates to change have better descriptive qualities than those models that hold manufacturing growth constant over all periods of time. Firstly, they deal with the topic of calculating the quantification of qualification, an utterly necessary topic to understand when conducting a business confidence survey. After all, an instrumental part of what we're doing is transforming qualitative answers, such as above normal/normal/below normal into number figures that will be used to calculate the total business confidence index. The paper systematically approaches qualitative data and gives detailed information in regards to quantifying it. And secondly, and perhaps most importantly, the paper discusses asking survey questions that reveal prospects for the near-future. The ability to do this will enhance our survey's importance and perhaps be of use in terms of policy-making decisions. For instance, an Oregonian firm that has been recently experiencing higher than average revenues and is therefore looking to expand can look at the business confidence indicator and see what business sentiment in the current community looks like, as well as what it will look like 3-6 months from now. This will help him/her determine whether the current economic situation is just a spike, or a general upward trend in the market that he/she should capitalize on.

Once we have our numerical values we should account for the importance of big firms and how they have more influence on the states' economy. The question really is,

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Comment: This needs some explanation

given our non random sample, should we weight the results using firm revenues, growth rates, emoplment numbers, or should we weight the results at all. Adelman, Inklaar, the OECD And the ISM give different Adelman describes various methods we could use to weigh our results when calculating our index values. One example is the draw method. The draw tries to create a representative sample pool by weighting the likelihood of being picked by the firms' number of employees. Inklaar discusses two different methods of constructing a business cycle indicator. He describes a method constructed by the NBER, the National Board of Economic Research back in the 1930's as well the general dymanic model which uses current econometric methods to produce the proper wieghts for the indicator.¹ The NBER method allows the researcher more control in deciding the weights of the index, however if your reasoning is wrong your index will be too. The Generalized Dynamic Factor Model applies statistical regression analysis to determine the weights you use. Although the latter may produce more accurate results we have to use the NBER method until more data is available.

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Comment: Again, more useful to combine and summarize the literature on this issue rather than just say what this author deals with.

The OECD methodology is the corner stone to the construction of the OBCI. This manual shows specifically how to collect a sample of data, calculate index values and control for the sizes of different firms. The sampling problem that we face is that we have a non-random sample. While the problem of a non-random sample is a concern the fact that we are interested in changes in the response as opposed to levels, non-random sampling should not be a problem. Making accommodations for a non-random sample can be found in the OECD handbook.² The OECD also most thoroughly identifies the many practical uses of a business confidence survey. For instance it describes how to

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¹ Inklaar, page 2: Inklaar gives an overview of the difference between the NBER method and the General Dynamic factor Model method.

² OECD Handbook page 21

turn the data into a time series which can then be compared to state product, CPI, GDP Deflator or employment rates how to produce various indicators depending on the sector and it gives many examples of how the results are publicly presented. They step by step instructions of what to do, why to do it, and how to go about doing it. it is most instrumental in helping our team put together a survey and calculating results. Not only do they address sampling data, example questions and design of the model to be used, but also calculating data received and turning it into a viable economic indicator of current and future business activity. We will use their methodology as somewhat of a guideline for creating our own Business Confidence Survey, and also transforming the Survey's answers into a Business Confidence Index.

There are many different results we can infer from the OBCI. Business Confidence Surveys have the unique ability to gives us a window into current conditions and future conditions. The alternative sources of information, such as the Bureau of Economic Analysis (BEA), only publishes state product information that is several months old. Confidence indices have been shown by the ISM and economic research to describe current conditions.¹ ISM research on their own survey has found that the index is correlated with current conditions. But they also found that certain questions, in particular, those about inventories and current orders, have a predictive characteristic. Such findings are backed up by the Bank of Canada and their quarterly Business tendency survey as well as the Conference Board. The Garret article gives one view of the implications we can generate from the results, but competing findings can be found in literature from The Conference Board and the Bank of Canada.

¹ www.napm.org. Or see OECD Handbook page 9 or 10

Garrett and Hall were concerned with methods to predict future levels of economic activity. We already know about existing economic indicators such as GNP and GSP give lagging figures. However, this is not what we were looking for in order to create the business confidence survey. They explain how the coincidence indicator holds a major influence on the timing and conduct of macroeconomic policy. The coincidence indicator, which is the most influential of all leading and lagging indicators, measures current economic activity. This indicator is thought to contain information on the future level of economic activity. By examining the coincidence index, with its future forecasting ability, we will be able to receive a clear background on the types of questions we want to ask as well as how each question will impact our aggregate index.

The intuition behind such an indicator is that while there are many macroeconomic series that measure the levels of economic activity, there is no measure that summarizes the entire economy by itself. Thus, there is the coincident indicator, which combines a range of economic series together to give a holistic measure of overall economic activity.

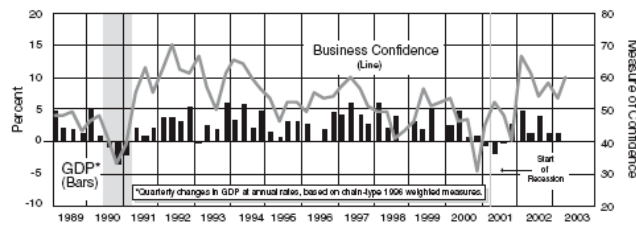
Smith and Hall have helped us create our business confidence indicator as they brings up the factor of forecasting future economic development. The OECD and ISM models which we are looking at also do this, to an extent. We too, want to create a holistic indicator which reveals not only the current business situation, but a glimpse into the future as well.

The Conference Board is an organization that has been conducting confidence surveys since 1960. The example they provide for their CEO Confidence Survey is another illustration in how the survey results can be changed into a time series and

compared to such economic statistics as change in GDP. we can compare the surveys they provide with our Business survey to how national trends are different or similar to state specific trends. The chart depicted below is an example of how we can compare our index with change in GDP. You can see that in some periods the index leads a rise or fall in GDP, or sometimes coincides with that kind of change. If there was a definitive answer whether confidence indices are correlated with the future economy or current conditions we feel confident in using such an index to forecast a change in the economy.

Unfortunately both the Conference Board and the Institute for Strategic Management (ISM) have difficulty making a definitive conclusion. The Conference Board and the Report on Business will be two of the national reports we can compare our index to after we generate data.

Business Confidence and Changes in GDP



(above: This table comes from the Conference Board sample report (page 1) and shows the comparison between National Business Confidence and quarterly changes in GDP.)

Every quarter The Bank of Canada, much like the Conference Board, and what we are proposing to do, examines business sentiment throughout Canada regarding input costs, production, employment and business conditions. The work done by the bank is a good standard we can refer to when designing how our results are presented as well as any future work when examining how production, employment and business conditions correlate to GSP. Understanding how certain questions correlate with other future activity

is key and the Bank has research going back to 1998 that describes how the index value of certain questions relate to GDP, Inflation, employment and the Consumer Price Index. A table of the correlations that the bank has found between the question it asks in its survey and the Canadian Domestic Product, employment rates and productivity can be found in Appendix 4. For instance question regarding business hiring conditions usually correlate to employment conditions six months from now. The table also gives a measure of the strength of the correlations they found when examining the data. Such research may be conducted for the OBCI as more data is collected.

Another characteristic of the OBCI is that we want to compare regional index values with other regions and national sentiment. Thankfully other universities and research groups have established a way to compare regional values to national or international values. A report by Sunil Sinha shows how responses can be broken down by sector or by region.¹ Anne Davis (2002) showed the time series comparison between the nation confidence index produced by the Conference Board and the Confidence index for Hudson valley.² With such work we can see how others have presented regional results and how they can compare to national index results.

Through the past literature we could find solutions or some degree of accountability for the issues we face constructing such the OBCI. What we had not found literature on mainly involved how the questions are asked. Little research has been conducted addressing the different outcomes from the way in which questions are asked or the possible ways the answers are given. It is recommended that as the OBCI matures further research is spent on addressing this concern either by examining psychological

¹ Page 5, Sunhil, [Business Tendency Survey](#)

² Anne Davis, [Hudson Valley Review](http://www.marist.edu/management/bureau/qtr3_02.htm), www.marist.edu/management/bureau/qtr3_02.htm, December 2002

journals or the work by Professor Trudy Cameron involving the economic implications of how questions are asked. Further, the literature accounts for our non-random sample but does not remove the problem. Every effort has to be taken to gather a data set that is representative of the state. Only the work of the Oregon Economic Forum and time can correct this problem.

Survey Design

The OBCI is going to be a web based quarterly survey. The software the project is using is provided by WebSurveyor.com. Bill Harbaugh coordinated with WebSurveyor to provide the software package for the OBCI. At the point that this paper was submitted, the project was using a server provided by Tony Saxman and the Business Technology Center (BTC). The first period of data gathered for the project will be stored on the BTC server.

In order to create the Oregon Business Confidence Survey (OBCS), we will compile a private database of Oregon businesses that are possible participants in the survey, complete with contact information and a description of the industry the business operates in. The Oregon Economic Forum is working with the Eugene City Chamber of Commerce and its Contact program to gather a registry of firms that will be willing to regularly participate. Once this is complete, each firm will be sent an online link to a survey to fill out within a specific window of time. The firms will be sent to an initial registry page where they will confirm their email address, company information, number of employees, estimated revenue and a description of what services or products the firm offers. Once this is complete, each firm will be sent an online link to the survey to fill

out. Each firm's answers to the survey will be uploaded automatically into another private database set up for this purpose. The surveys will be sent out to individual firms, based on the initial registration information they inputted into the database. Samples of the registration questions can be found in Appendix 1.

The firms responses regarding business outlook will be used to compute the actual business confidence indicator. The questions that will be used to compute the business confidence indicator and other indices are derived from the Organization for Economic Cooperation and Development (OECD) Business Tendency Survey Handbook. Specifically, there are a total of seven questions, each addressing various qualitative areas of the business cycle. They address volume of stock, volume of production, expected prices, current business situation, employment, future business sentiment, and order book volume.

The actual business confidence survey however, will be 9 questions altogether. This is done for several reasons. First, we want to "hide" our actual purpose of intent by asking a multitude of questions that do not directly affect the business confidence indicator. Much like psychological tests, research has shown that respondents' answers are often skewed when they are aware of what exactly researches want. Secondly, we want to gain a holistic picture of what is going on in regards to business confidence. Although only a handful of questions will be used to compute the actual index, every question asked will play a part in creating the picture of business sentiment in Oregon.

Once a firm has completed the survey, their answers will be uploaded automatically into a private database set up for the collection of survey data. When the window of time for survey results collection closes, the final results from this database

will be sent to the businesses survey conductors, who will compile this information to create a business confidence indicator. Appendix 2 shows a number of sample questions as well as sector indexes that can be constructed from the responses to the questions. Once the indices are calculated, a final quarterly report will make the results public. We hope to make the OBCI a part of the reports that Tim Duy ...

An example of what this report will look like can be seen in Appendix 5.

We should note that there are criticisms of the OECD methodology from competing organization such as the ISM or Conference Board. Most of these organizations (including the OECD) try mostly to defend the validity of their methods because more people will join as members or use their methods to harmonize their own methodology.¹

Organizations like the ISM, the Conference Board and the OECD all believe that the methodology behind creating their index is the most Efficient. For instance, the ISM does not weight their survey results because they believe their survey sample perfectly represents the national economy. The Conference Board Surveys several thousand businesses nation wide while the OECD will survey far fewer and using combination of probability and firms size to weight their index values. The incentives for designing the most accurate index is more memberships.

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Comment: It would be good to elaborate on these disputes, in the lit review section/

Constructing the Oregon Business Confidence Index

¹ Go to www.napm.ism.org to see the defense of ISM methodology. You can also see OECD defend its methodology starting on page 25 of the OECD Business Tendency Handbook.

Turning the Qualitative into the Quantitative

In order to survey Oregon businesses we have to ask qualitative questions about the firms' business activity. As described above, respondents have three answer choices for each question. Although differently worded, they had a choice between a positive, unchanged and negative response. In order to draw meaningful economic results from the survey we must turn these responses into quantitative values.

Values for Survey Responses

Positive Response = 1

Unchanged/Neutral = 0

Negative Response = -1

Allowing the respondent three choices per question is standard in confidence surveys.¹ Appendix 3 gives a legend for comparison between the firms' qualitative responses and the quantitative values we will use to calculate the index. We could offer more options but it may make the results less robust. If we offer more options, say four, we will flatten out the index making changes over time smaller. This may make correlations between the index and GSP smaller. The index is a diffusion index, which will be described later in more detail. By adding more choices, the index may stay closer to the mean value of 50 and have more difficulty describing any of the larger economic shocks found in GDP.

¹ The OECD and Institute for Strategic Management (ISM) use a three option questionnaire. Other research papers also infer to this three option format including one by Robert Inklaar.

Robert Inklaar, [Business cycle indicators: Does a Heap of Data Help?](#)
University of Grongen, May 2003

We also have to address any problems with the sample. Some of these problems can be fixed, but others we must simply acknowledge and accept the data as is. We are drawing respondents from a convenient, non-random sample. We are taking any respondents we can in order to increase the number of observations. This use of a non-random “convenience sample” can potentially lead to bias. When gathering the data there may be certain types of firms that will respond more often than others. Also, our survey will focus first on Lane County, making us infer the states conditions from that one particular county. We want an index that represents the Oregon economy and to have many similar firms respond may misrepresent economic activity. In order to draw a representative sample of economic activity we will apply a weighting system to the sample responses.

In ideal conditions we would actually draw a random sample from the business population. Even with the ideal of drawing a random sample we would still want to have a representative sample of economic activity. In order to do this we could use a draw method suggested by Adelman (1958). We could create a representative draw by weighting the likelihood of being selected by a firm’s size. The OECD has a similar system they apply to their weighting system when drawing from a random sample from a population.¹ But for this pilot survey we will not have a random sample and it is questionable to predict when the Oregon Economic Forum will ever have access to a business pool large enough to draw a random sample.

¹ OECD Handbook page 38

Weighting

The first method to produce weights, the method we will use, was constructed by the NBER in the 1930's.¹ It allows the researcher to determine the variables that will go into the index. The alternative method is more statistically based, called the Generalized Dynamic Factor Model.² Using this method we would use linear regressions to determine weights for the specific industries. Using this methodology we could use the time series of GSP and use specific industries employment and revenue numbers to calculate which industries are most calculated with state product. An example of such a calculation would look like,

$$GSP = c + \beta x_{\text{wood products}} + \beta x_{\text{paper products}} + \beta x_{\text{semiconductors}} + \beta x_{\text{metal parts}} + \beta x_{\text{house repair}}$$

where $x = Sales_t \square Employees_t$

The linear equation shown above is an abridged version of the actual equation which would include all primary industries in the NAICS listings, those listings with two digits.

Because we are just starting to gather the appropriate data it would not be reasonable to calculate the OBCI with the latter method. However, as the index matures and more data is gathered it could be recommended that we use a more formal econometric method to determine the index and its components.

The size of the firm is important. Some firms and sectors of the economy have greater influence on Oregon than others. We need to account for this. We also need to account for sample bias in the form of multiple firms from a single industry responding.

¹Robert Inklaar page 2

² Inklaar page 6

Using OECD recommendations, we will use a weighting system that will be multiplied by the responses.¹

$$Weight_i = \frac{1}{N_i} \times w_i \qquad \text{or} \qquad Weight_i = w_i$$

Where W_i is the Number of workers in an industry and N is the number of firms represented by i industry in the survey. Applying this rate we can account for the influence a sector has on the state economy, measured by employment, while lowering the weight as we collect more responses from that particular industry. We could have used industry revenues as the indicator for industry influence, but when looking over census data it becomes clear that just looking at revenues may not really describe an industry's influence.

A perfect example of this is comparing the impact of forestry and paper products have on the Oregon Economy compared to Semi-conductor manufacturers. Forestry companies employ around 38,000 Oregonians while semiconductor manufacturers employ 15,000. Semi-conductor firms account for almost 20% of manufacturer's contribution to state GSP.² So it would be inappropriate to use industry revenues to weight our survey responses. Some business surveys do not weight their survey responses.³ The ISM would be the most noted example. The ISM creates the "Report on Business" based on a business survey of firms across the country, both large and small. They do not weight because they believe that the responses from the firms represent a normalized representation of the country's businesses. This strengthens our need to

¹ OECD Handbook page 73

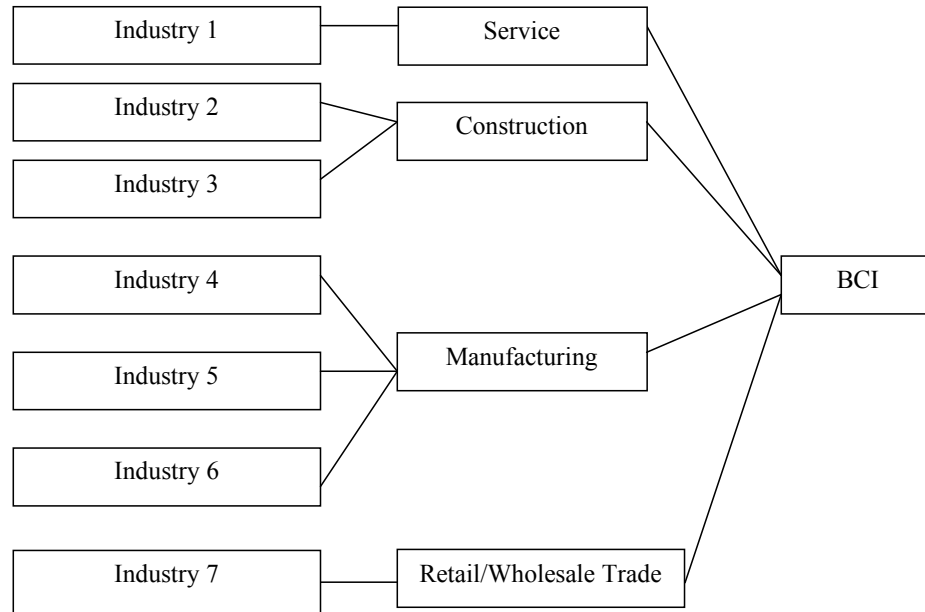
² Data is available at the US Census website, www.census.gov

³ We contacted the ISM and asked how they weight there surveys and found out that since they have an accurate representation of the national economy in there sample universe they do not weight their responses. For more ISM information go to www.NAPM.org

weight the firms' responses because we know that our sample will not represent the state economy at first.

Once we have calculated the proper weights to apply to our respondents we can calculate the Index.

Movement from Firm to Aggregate Expectations



The index calculation begins with the index values of the specific industries classified by the NAICS 97 codes. Then we place industries into 4 large categories; manufacturing, construction, retail and wholesale trade and services. We then aggregate up these four categories to produce the Business Confidence Index.

Presenting the Results

Diffusion Index

$$DI = (P + E / 2) \times 100$$

The OBCI will be presented as what is called a “diffusion index.” This is just a value that compares the difference between positive and neutral responses we get from respondents. The Index can range from 0 to 100. If the index is above fifty, there is positive change in the economy. If the index is below 50 the economy is contracting.

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P is the proportion of respondents that answer in the positive way. *E* is the percentage of respondents whose answer is the neutral or unchanged response. Once we get our responses, we will apply the weights and find the weight adjusted sum of positive and unchanged responses. Businesses that do not respond this period but have in the past fall into a non-response category. We cannot get rid of non-response but we must try to limit any form of dropout from the survey. We have two options dealing with non-response as described by the OECD. First we can remove those responses from the index for the period that the business does not respond. Second, we can create another sample from the firms that did not respond and attempt another survey to draw responses from them.¹

The index represents an acceleration, positive or negative, of economic activity. As the diffusion index gets further away from fifty, the mean level, the economy will decline or grow faster and faster.² Since we are using the NBER method we will try to examine the index with several sets of questions that will hopefully either give us sector

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¹ OECD Handbook pages 27, 28.

²www.NAPM.org

indexes or more accurate OBCI. Table 1 gives a numerical example of seven imaginary businesses giving their responses to their current business conditions and number of employees. You can see the process that is involved in moving from the individual firm to the aggregate.

Conclusion

Information about current and future conditions is vital to businesses trying to compete in open, competitive markets. Currently, Oregon businesses that want information about the state's economy have had to depend on either dated quarterly information about state product or infer information about the state economy from national indices. We intend to design a state index that will give Oregon businesses information about current economic conditions that are representative of the state's economy and ask questions that are pertinent to current state events like legislation or changes in the minimum wage. The statistical criticism of such indices is that research has shown that in some situations the index has the ability to predict, or describe current conditions. Even the ISM has research that contradicts previous research done on their own index. In the end we intend to design and start the OBCI because such indices have been conducted nationally since the 1940's and economists around the world still use them to forecast economic conditions. We believe it can serve a valuable complementary role with the Oregon Leading Economic Indicators index.. Over the first two years the index can act as a complementary index that can collaborate the findings of the OLEI. Finally as the data set grows and the number of Index responses increase Professor Duy can eventually include the index in the OLEI and increase the Oregon Economic Forum's ability to forecast the state's economy.

Appendix 1: Registration

The registry page verifies the companies information, gives us an estimate of the number of employees they currently have as well as a description that will allow us to Classify each business by sector, industry and region.



**Oregon Business
Confidence Survey
Registration**

Thank you for your interest in participating in the Oregon Business Confidence Index. By filling in the information below you register to participate in the quarterly survey and will be first to have access to the index reports on the Oregon economy.

1) Company Information

Company Name

Mailing Address

Phone Number

Email Address

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2) Approximately how many employees do you currently employ?

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3) Your companies annual revenues are: (in millions)

- ▲ less than 1
- ▲ 1-10
- ▲ 10-50
- ▲ more than 50

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4) Approximately what percent of business activity involves Oregon

▲ 0-25

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▲ 25-50

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▲ 50-75

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▲ 75-100

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5) What description best fits your business activities?

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6) Please give a brief description of the products and services your company offers.

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Appendix 2: Sample Confidence Survey



Oregon Business Confidence Survey

Please fill out the following questions to the best of your ability.

1) What type of company are you (Choose the one that best fits)

- ▲ Construction 6/18/05 5:36 PM
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- ▲ Manufacturing 6/18/05 5:36 PM
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- ▲ Wholesale/Resail trade 6/18/05 5:36 PM
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- ▲ Services or other 6/18/05 5:36 PM
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2) Excluding normal seasonal changes, what changes do you expect during the next three to four months with regard to the volume of production?

- ▲ Up 6/18/05 5:36 PM
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- ▲ Unchanged 6/18/05 5:36 PM
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- ▲ Down 6/18/05 5:36 PM
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3) Excluding normal seasonal changes, do you consider that the present level of your total book order volume is (firms with no order books are requested to estimate demand):

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- ▲ Normal 6/18/05 5:36 PM
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- ▲ Below normal 6/18/05 5:36 PM
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4) Excluding normal seasonal changes, do you consider that the present level of your stock of finished goods in **volume** terms is:

- ▲ Above normal 6/18/05 5:36 PM
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- ▲ Normal 6/18/05 5:36 PM
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- ▲ Below normal 6/18/05 5:36 PM
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5) Excluding for seasonal changes, what changes do you expect to see in the next three to four months with regards to your **average selling prices**?

▲ Increase

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▲ Unchanged

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▲ Decrease

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6) Excluding normal seasonal changes, what changes do you expect during the next three to four months with regard to the number of people employed in your company?

▲ Up

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▲ Unchanged

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▲ Down

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7) Do you consider the present business situation of your company is:

▲ Good

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▲ Satisfactory

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▲ Bad

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8) Do you expect that the business situation of your company during the next six months will be:

▲ Better

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▲ Same

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▲ Worse

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9) What factors are limiting ability to increase **business activity**? Please check the most important factor(s):

| | |
|--|---|
| <input type="checkbox"/> None | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> Demand | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> Weather Conditions | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> Cost of materials | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> Cost of labor | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> cost of finance (e.g. interest rates) | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> access to bank credit | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> shortage of skilled labor | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> Lack of equipment | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> Shortage of materials | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> Supply | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> Competition in own sector | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <input type="checkbox"/> Other (please specify) | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| If you selected other, please specify: | |
| <input type="text"/> | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |
| <hr/> | |
| Thank you for your time. We will notify you when our report has been posted. | |
| <input type="button" value="Submit Survey"/> | 6/18/05 5:36 PM Formatted: Font:Verdana, 10 pt |

Appendix 3: Quantitative Equivalents to Survey Responses

| Question | Firms Response | Numerical Value |
|---------------------------------|----------------|-----------------|
| 2) Volume of Production | Up | 1 |
| | Unchanged | 0 |
| | Down | -1 |
| 3) Book Order Volume | Above Normal | 1 |
| | Normal | 0 |
| | Below Normal | -1 |
| 4) Volume of Finished Goods | Above Normal | 1 |
| | Normal | 0 |
| | Below Normal | -1 |
| 5) Average Selling Prices | Increase | 1 |
| | Unchanged | 0 |
| | Decrease | -1 |
| 6) Number of Employees | Up | 1 |
| | Unchanged | 0 |
| | Down | -1 |
| 7) Present Situation | Good | 1 |
| | Satisfactory | 0 |
| | Bad | -1 |
| 8) Expected Business Conditions | Better | 1 |
| | Same | 0 |
| | Worse | -1 |

Numerical values pertain to the files exported from Websurveyor.com results from the survey. The program replaces the qualitative responses in numerical values and saves the results into a .CSV formatted file that may be opened using EXCEL.

Appendix 4

Bank of Canada Data on the Correlations between leading and lagging variables.

Box 1: Assessment of the Correlation Results

| Survey variable | Economic variable | Correlation |
|---|--|---|
| Past business conditions | | |
| Past sales | Momentum* of real business GDP | moderately strong: $t - 1$ |
| Past sales | Growth of real business GDP | strong: $t - 1, t$ |
| Past sales | Growth of nominal GDP | moderately strong: $t - 1, t, t + 1$ |
| Outlook for business activity | | |
| Future sales | Momentum of real business GDP | moderate: $t + 1, t + 2$ |
| Future sales | Growth of real business GDP | weak: $t + 1, t + 2$ |
| Future sales | Growth of nominal GDP | moderate: $t + 1, t + 2$ |
| Investment intentions, machinery and equipment | Growth of business investment, machinery and equipment | moderate: $t + 2$ |
| Investment intentions, buildings | Growth of business investment, buildings | weak: $t + 4$ |
| Outlook for employment | Growth of private sector employment | moderate: $t + 2$ |
| Pressures on production capacity | | |
| Ability to meet demand | Industrial capacity utilization rate | strong: $t, t + 1$ |
| Ability to meet demand | Output gap | moderately strong: $t, t + 1$ |
| Labour shortages | Wage growth | moderately strong: $t - 1, t, t + 1$ |
| Labour shortages | Output gap | moderate: $t - 1, t$ |
| Inventory imbalances | Quarterly growth of real business GDP | weak: $t - 1, t$ |
| Inventory imbalances | Output gap | weak: $t - 1$ |
| Outlook for wages, prices, and inflation | | |
| Outlook for wages | Momentum of LFS earnings | moderate: $t, t + 1, t + 2$ |
| Outlook for wages | Momentum of business sector compensation | moderate: t ; weak: $t + 1$ |
| Outlook for input prices | Momentum of the GDP deflator | moderately strong: $t + 1$ |
| Outlook for output prices | Momentum of the GDP deflator | moderately strong: $t + 1$; moderate $t + 2$ |
| Outlook for output prices | Momentum of total CPI | moderately strong: $t + 2$ |
| Inflation-expectations index | Two-year total CPI inflation | moderately strong: t ; weak beyond $t + 3$ |
| Inflation-expectations index | Two-year core CPI inflation | strong: $t + 7$; moderately strong: $t + 8$ |

*See Appendix A for a definition of momentum.

Interpretation of correlation coefficients—scale of assessment:

- Strong: > 0.80
- Moderately strong: 0.80 to 0.60
- Moderate: 0.60 to 0.40
- Weak: 0.40 to 0.20
- Insignificant: < 0.20

APPENDIX 5 Final Report and Other Index's

The final report should include interpretation of question 9 and discuss the implications of some of the most common problems sited. At the point this paper was submitted the material included in the quarterly report is still being decided given recent suggestions from the Eugene City Chamber of Commerce that regional indexes would be included as well. It is recommended that the first reports focus on the Confidence Index, employment and regional indices and as the survey grows it should include some of the sector indices.

The report given in this report is the most recent version of the quarterly report. As an incentive for businesses participation in the survey, the Oregon Economic Forum will provide the report and its results to the participants before they are made public.

Preliminary Results for the second quarter: July, 2005

Index values vary from 0 to 100. Index values greater than 50 indicate a positive outlook. Values less than 50 indicate a contraction or negative outlook. The further away from 50 the greater magnitude regarding the outlook. The BCI indicates whether there is expected growth in the next three to six months. An Index value above fifty indicates the economy will grow over the next three to six months.

| | |
|-------------------------------------|-----|
| Business Confidence Index (1 Month) | 73 |
| Change from last month | +42 |

| | |
|-------------------------------------|----|
| Business Confidence Index (6 Month) | 63 |
| Change | +5 |

| | |
|--|----|
| Employment Outlook | 54 |
| Capital and machinery usage | 63 |
| Production | 48 |
| Outlook for Future Business Conditions | 32 |

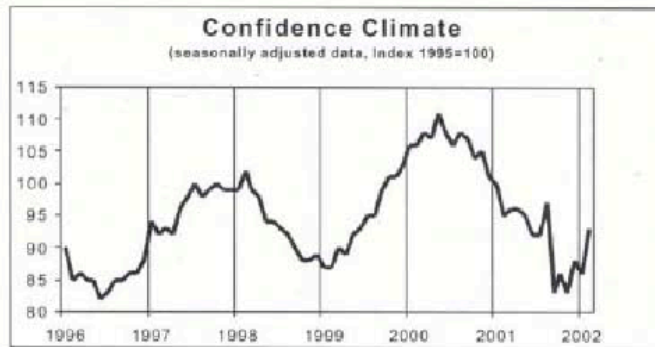
A positive value for the employment outlook indicates a growth in the numbers employed. A positive value in the capital index indicates that usage and utilization of machinery is improving. A negative value in the outlook index indicates that the economy should contract over time.

Sector Specific Results

The businesses surveyed fall into four major categories: manufacturing, construction, wholesale / retail trade, service and other sector. The sector specific index

| | |
|---------------------------|----|
| Manufacturing | 68 |
| Retail/Wholesale Trade | 84 |
| Construction | 15 |
| Service and Other Sectors | 46 |

The graph below shows the changes in the month to month index since the beginning of the project.



Biggest Concern for Business Growth

The businesses are asked each quarter what they believe to be the biggest problems hindering the growth of their businesses. Listed below are the top three responses from the last quarter.

- | |
|--|
| 1) Demand 2) Regulation 3) Access to Skilled Labor |
|--|

Regional Index

Every quarter Businesses from Eugene, Portland, Bend, Coos Bay and Salem are asked about Business conditions. Values above 50 indicate economic expansion for that region while values below fifty indicate contraction.

| | |
|----------|----|
| Eugene | 49 |
| Portland | 74 |
| Bend | 89 |
| Coos Bay | 46 |
| Salem | 75 |

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