

SkillTRAN PROCESS FOR ESTIMATING DOT EMPLOYMENT NUMBERS

There is an overwhelming and urgent need for sound foundations to build reliable vocational opinions. This document explains the new SkillTRAN methodology for estimating DOT employment numbers using existing government labor information sources. This new technology is deployed in SkillTRAN's Job Browser *Pro* software – Version 1.6.

The new SkillTRAN methodology is the result of 20+ years of discontent with the "generally accepted practice" among many vocational experts - often built on the faulty assumption that all DOT occupations occur with equal frequency within a given Census or OES Statistical Group. This assumption can lead to gross overestimates of the number of jobs for some DOT occupations, and underestimates of the number of jobs for other DOT occupations.

PROBLEMATIC POPULAR METHOD

The problem can best be explored by considering a commonly cited occupation: 211.462-010 Cashier II. Using self-reported Census data or employer-reported Occupational Employment Statistics (OES), the assumption is made that all DOT occupations within a Census or OES occupational group occur equally frequently. Since there are 19 DOT occupations in this Census group (18 DOTs in the OES group), the assumption works out to 5.26% / 5.56% of all employment per Census / OES group. A study of the list of the 18 DOTs within the OES 41-2011 Cashier group reveals that 6 of the 18 (i.e. 1/3) are found employed ONLY in racetracks (pari-mutuel ticket sales). The faulty conclusion then is that 33.3 % of employment of cashiers is found in racetracks (a subdivision of the industry "Spectator Sports").

The reality of employment reported by employers in the OES long-term employment projections shows that in the year 2006, only 4,922 of 3,500,169 cashiers were found in "Spectator Sports". Even adding the 3,743 cashiers reported employed in the Gambling industry, these 8,665 cashiers represent less than 1% of employment of cashiers (.25%) – not 33% as poorly estimated by the popular method. And the 8,655 should be divided by the 6 DOT cashier occupations in this industry!

Using long-term employment projections, it can be empirically established that about 23.5% of the OES Group: Cashiers work in grocery stores; that 14.9% work in Gasoline Stations; and so on. Use of this empirical industry frequency data from the occupational employment projections enables more precise analysis of the likely occurrence of DOT occupations, which are often described as existing in only a few, very specific industry settings.

SkillTRAN encourages the use of OES data for this process for the following reasons: employer-reported; more occupations than the Census code system; employment numbers are updated annually; industry projections are updated biannually at the national level; and employment numbers are available for national, statewide, and for regional (sub-state) areas. Census data from the Current Population Survey (CPS) is only available nationally, is only reported at the industry level once every 10 years, and is based on household survey responses, not employer responses. There is sometimes a large discrepancy between the national total employment numbers estimated for essentially the same occupational group when comparing OES to Census. SkillTRAN believes that employers are more likely to accurately report employment of a specific occupational group than when self-reported during the Census survey.

It is only within the last few years that it has become clearer how to converge/triangulate various generally accepted government data sources (www.socialsecurity.gov/OP_Home/cfr20/404/404-1566.htm) in a new way to squeeze more information from available public data resources.

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CORE SkillTRAN ASSUMPTIONS

SkillTRAN makes the following core economic assumptions in its new methodology:

1. Jobs exist to fulfill an economic purpose/business activity.
2. The operation of a specific business requires specific occupations.
3. As a business grows or contracts, it requires a different number of some occupations than others. This is also known as the staffing pattern for the organization.
4. Business activity (and hence occupations) can be influenced by a variety of factors such as: opportunity, automation, outsourcing, competition, external economic factors, restructuring, etc.
5. In any given business, there may be only one or a very few job positions for a specific occupation.
6. A business may need to be of a certain size (in terms of number of employees) before certain occupations are likely to exist.

CORE DATA SOURCES

- Occupational Employment Survey (OES) – www.bls.gov/oes
- Employment Projections – www.bls.gov/emp
- Occupational Projections and Training Data (OPTD) – www.bls.gov/emp/optd
- Current Population Survey (CPS) - www.bls.gov/CPS
- North American Industry Classification System (NAICS)
www.census.gov/eos/www/naics
- SkillTRAN NAICS Industry Suggestions for each DOT occupation
- County Business Patterns (CBP) - <http://www.census.gov/epcd/cbp/index.html>

The new SkillTRAN method relies heavily on the bi-annual Occupational Employment Survey (OES) Long-Term Occupational Employment Projections (occupational projections by NAICS industry) and the annual OES Employment Numbers Nationally, Statewide, and Regionally.

The OES program periodically reports national employment numbers industry by industry for an OES occupation. Long-term (10 year) projections are developed from employer projections to estimate the unique rate of change for an OES occupation in each industry. Employment growth for an OES occupation is shown in some industries; decline in others. These long-term national industry projections are adjusted every two years. Projections at a state level are also prepared for some OES occupations, but rarely released on an industry-by-industry basis, since sometimes the numbers are quite small and individual employers might potentially be identified. The OES survey program promises confidentiality to the employers who respond. The OES program requires a high response rate (75-80%) and at least 50-100 jobs before it will report industry employment data for an occupation.

The OES program annually prepares cross-industry estimates of occupational employment nationally, statewide, and at the regional level (MSA – Metropolitan Statistical Area and now non-MSA areas). MSAs are defined by one or more counties, some of which cross state boundaries.

SkillTRAN METHODOLOGY

Using a constant rate of change specific to the OES occupational group for each related industry (straight-line interpolation method), SkillTRAN estimates the current year (or some other target year) national employment level within each reported industry. The percentage of estimated national employment of an OES occupation in each NAICS industry is calculated for the target year and shown as the Occupational Density factor. There are often hundreds of NAICS industries in which an OES occupation is reported by employers.

SkillTRAN uses the annual OES occupation employment numbers reported nationally, statewide, and regionally when available. SkillTRAN suggests relevant industries for each DOT occupation, carrying forward the target year Occupational Density factor for each industry relevant to a DOT occupation to a new screen to estimate DOT employment numbers on both an unweighted and a weighted basis.

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The industry suggestions for a specific DOT are initially built on SkillTRAN's review of the DOT from an industry perspective. Over the years, SkillTRAN staff and consultants have read the DOT cover to cover from a job placement perspective. SkillTRAN has assigned various NAICS industries (North American Industry Classification System) to each DOT occupation. SkillTRAN used the DOT description or industry clues implying where the occupation is likely to be observed. Some DOT occupations have only one NAICS assignment because the occupation is quite narrowly defined. Other occupations have 25 or more likely NAICS industries. Sometimes, an obsolete occupation such as 371.667-010 – Crossing Tender (railroad) has an industry tied to it, but no OES statistics to support its existence.

The Estimated DOT Employment Numbers screen shows only the SkillTRAN-assigned NAICS industries in which employment seems most likely for a specific DOT. The suggested industries can be modified by the customers to remove an irrelevant industry and to add more industries. SkillTRAN multiplies the un-weighted industry estimate (occupational density factor) times the reported national/statewide/regional employment number for the OES occupation. This yields an unweighted estimate of OES employment in each industry.

Because most OES occupational groups contain many DOT occupations, SkillTRAN checks its industry suggestions for other DOT occupations in this same OES group and reports the number of DOT occupations also likely to be found in this industry in the Weight (WT.) column. When more than one occupation is likely, the list of likely DOT occupations is available for review by clicking the WT hyperlink. Only at this much smaller subset level does SkillTRAN initially assume equal distribution of employment. A skilled vocational expert or other subject matter expert in this industry will eventually be able to re-set the assumed equal distribution to more accurately apportion employment of the DOTs in a specific NAICS industry across the set of likely DOT occupations.

In the Industry Distribution screen, the weighted column initially reflects the assumption of equal frequency of employment by the member DOT occupations within that OES job family in that specific NAICS industry. For example, if the WT column for an industry shows 4 DOT occupations, then $1/4^{\text{th}}$ of that industry's employment is attributed to a specific DOT occupation (unless user adjusted). The software will remember user adjustments for later backup to its internet servers. This apportionment/weighting to a different portion is repeated for as many NAICS industries as are listed on the screen that are relevant to the specific DOT occupation. If there is only one DOT occupation in a specific NAICS industry for an OES group, all OES employment for that NAICS is attributed to the weighted DOT column (i.e. unweighted and weighted are the same values).

The user can remove industry suggestions found to be irrelevant for the selected DOT occupation. The user can also add additional NAICS industries for which OES statistics are available and its associated national Occupational Density factor value to the mix. The software instantly recalculates and remembers these changes, which are also archived for backup and subsequent SkillTRAN study for potential revisions to its industry suggestions.

SkillTRAN sums the unweighted and weighted occupational density values for each relevant industry and multiplies this summed percentage by the OES national, state and regional employment numbers to estimate DOT employment numbers.

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ADVANTAGES OF THIS NEW METHODOLOGY

1. Rather than self-reported survey data, the methodology is rooted in OES employer responses, a more reliable resource than CPS. Consider that the CPS reports 2007 employment of 1,459,000 Cashiers nationally (self-report) vs. employer-reported May 2007 count of 3,545,333 \pm 10,636. This is just one example of the substantial variance in self-reported vs. employer-reported data.
2. OES data is collected on a systematic sampling of various industries and adjusted across a 3-year cycle. This smoothes out wild data sampling fluctuations.
3. Long-term projections are national and by industry. Dynamic adjustments every two years detect changes in the economy, including the precipitous decline of various manufacturing industries. Industry change values may apply to one OES occupation within an industry, but not to another. For example, automation in an industry may reduce the number of production workers but increase the number of maintenance mechanics needed to support more automated equipment and processes.
4. OES employment numbers are reported annually at the National, State, and Regional levels.
5. SkillTRAN's method does not use a fixed ratio staffing pattern captured once every 10 years in the decennial census, then proportionately adjusted each year, simply based on the size of a labor force.

CORROBORATING EVIDENCE

Initial exploratory research shows substantial declines in employment numbers for many occupations that common sense tells us probably exist in very low frequency. For example, the "boot & shoe" industry (NAICS 3162 - Footwear Manufacturing) had a total work force of 82,500 workers in 1990. In 1995, total employment in this industry had dropped to 57,100. In 2000, the number dropped to 30,700. By 2005, total employment in this industry (across all occupations) had dropped to 18,200 – a 78% plummet in employment over a 15-year period. Decline in the overall work force of an industry absolutely impacts the number of DOT occupations within that industry as well.

Source: <http://data.bls.gov/PDQ/outside.jsp?survey=ce>

Many DOT occupations show small estimated numbers of employment, in the expected direction. This is exactly what is needed to show low frequency of occupations particularly in industries that are known to have huge declines over the last 18 years due to off-shoring, outsourcing, automation, and obsolescence. Some occupations show no frequency in the expected industry, exactly what is expected due to automation - e.g. 371.667-010 Crossing Tender (railroad).

SkillTRAN expects to continue to study various sources of published government data to build additional support for this new methodology.

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SkillTRAN REVIEW PROCESS – Present and Future

SkillTRAN has engineered and is continuing to refine this technology to eventually stand up to a Daubert challenge. This includes:

- a. Independent review of all 3,100+ unskilled occupations for suitable industry suggestions
- b. SkillTRAN NAICS industry suggestions for semi-skilled and skilled DOT occupations
- c. Widespread distribution of the methodology
- d. Adoption, review, and revision of industry suggestions by the SkillTRAN customer base
- e. Informal anecdotal investigations - nothing scientifically rigorous yet (though SkillTRAN will gladly cooperate with others who desire to do so)
- f. Continuous peer review of our industry suggestions
- g. Harvesting of customer-initiated changes to the industry suggestions for archiving/backup
- h. SkillTRAN study of the customer-suggested industry changes (i.e. continuous peer review)
- i. Sharing of SkillTRAN modifications of industry suggestions with the customer community
- j. Establishing a conservative "minimum size" (in terms of total number of employees that a company would likely require) for a specific DOT occupation to even exist.
- k. Use of County Business Patterns (CBP) to determine the number of employers in a specific geographic area to establish the frequency of actual appropriately-sized employers in the context of each DOT occupation
- l. Further adjust the State/Regional estimates of DOT employment numbers using this CBP distribution data to reflect the unique and actual industry distribution of each state/region.
- m. Identify actual appropriately-sized potential employers in a specific geographic area so that contact can be established for Labor Market Survey. SkillTRAN Internet Services have 13+ million employers on file - updated quarterly – to facilitate the identification and contact process.
- n. Correlate actual results of Labor Market Surveys to the estimated numbers

These steps show the total planned process envisioned at this time. Steps a-b are complete. Steps c-f are happening now as customers use the software and report very good results using this methodology. Steps g-n are planned and in development. SkillTRAN plans more uses for this new process, including eventual calculation of Lost Earnings Capacity. This first requires a generally accepted method of determining the frequency with which occupations exist so that weighting can be appropriately done in the wage loss calculations.

CAVEATS

- a.) This is an ESTIMATION process, not any kind of assurance that "these ARE the actual numbers". Because the estimated numbers are based on National staffing patterns, SkillTRAN believes that this estimation process is more reliable at the national level than the state/regional level, unless the industry distribution in a specific state closely parallels the national economy. We have a plan to further adjust the numbers going forward so that non-National estimation is more refined (Step "L").
- b.) Long-term employment projections are not sensitive to short-term or cyclic economic changes, such as a high oil prices, economic recession, or natural disaster (e.g. Katrina). Partial adjustment for these events occurs retrospectively as the OES data are updated.
- c.) The OES program is reducing its sample size in a cost-reducing measure. Hopefully the reliability of its collected data will not significantly decline.
- d.) This method does not consider the effect of several discrete DOT occupations being combined into a single occupational definition. To handle this situation, combine the DOT employment number estimates for each discrete occupation.
- e.) This method does not address obsolete job descriptions/occupations nor does it update the DOT. It is sensitive to declining employment of many occupations, particularly in the manufacturing sector due to off-shoring, outsourcing, and overall industrial decline.

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This is a "disruptive" new methodology - meaning that it shakes up the disability market and causes folks to reconsider traditional methods. It will take a while for it to become more widespread and particularly to be ready for careful scientific dissection and research studies. In the meanwhile, SkillTRAN has been encouraged by enough people to continue with its development work in this area. It was at a point late in June, 2008 that SkillTRAN decided that it was "ready enough" for release and to take it to the market. It is not perfect. Nothing ever can be. It still takes skilled interpretation by a vocational professional, but it will get even better over time. The process of continuous peer review of SkillTRAN industry suggestions is an industry first, and an important part of the design to deal with Daubert defensibility. Additional description of the methodology is contained in the Help file topic linked to the screen showing these DOT estimates.

SkillTRAN's mission is to provide a better methodology for estimating DOT employment numbers than has previously existed. At this point, SkillTRAN has anecdotal information supporting this new method from different sources, most of whom are vocational experts. In many cases, the numbers estimated are quite small. Vocational experts often share that the SkillTRAN estimates are surprisingly accurate based on a prior Labor Market Survey conducted by the VE.

A peer-reviewed article about Job Browser *Pro* was recently published in the Rehabilitation Pro, the journal of the International Association of Rehabilitation Professionals (IARP). Click the hyperlink to the PDF document on SkillTRAN's home page – http://www.skilltran.com/RehabPro_Vol_16_No_4.pdf

Additional documents are available reflecting ongoing SkillTRAN research to establish support for its estimates using multiple government resources. These include handouts shared with attendees at a May, 2008 presentation at the IARP Conference in Los Angeles by SkillTRAN:

- Initial identification of low/no frequency unskilled occupations by industry
- Estimated national employment numbers for all 137 Sedentary, Unskilled occupations
- Historical industry employment numbers for industries showing greatest decline for unskilled occupations
- Frequency counts of employer size (by number of employees) from multiple sources in selected industries
- Slides presented 5/17/2008 at the IARP Conference:

EMPLOYMENT NUMBERS: An Industry Evolution - Building a Better Mousetrap

SkillTRAN embraces all constructive suggestions about how to further refine its processes. We welcome customer feedback and will do our best to respond to customer needs. This document will be periodically revised to reflect changes and systematic improvements. SkillTRAN is grateful to a significant number of industry leaders who have already reviewed this methodology and made some great suggestions.

Please direct further questions about this exciting new methodology to:

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