

Labor Supply/Demand Analysis: Approaches and Concerns

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To many people new to labor market analysis the obvious approach to determining “demand” occupations (with education or workforce development implications) involves establishing a numerical, short-run supply/demand equilibrium status for each occupation in a local economy. It would follow, in theory, that if one counted all available jobs in a given occupation and compared that number against all the people that had the necessary skills to do that job, one could establish whether skills shortages existed. This topic continues to arise in the face of questions regarding expenditures, the public education pipeline, and whether or not the public education system is adequately preparing students to meet the challenges of the labor market of the 21st century. And while the questions are generally laudable and reasonable, the confidence placed in supply/demand calculations to determine numerical targets for public education or workforce graduates may be misplaced.

Intuitively, if one can estimate the demand for workers and also the available supply of skilled labor, the connection of these two measurements should provide an indication as to whether there is an occupational shortage or surplus. There are numerous reasons, however, why such calculations are challenging at best. This article will discuss issues relating to numerical supply and demand analysis with the purpose of helping those tasked with such an endeavor to either proceed with informed caution or guide their colleagues in other, more appropriate directions.

The reader should be forewarned that despite attempts to maintain neutrality in the tone of discussion of supply/demand analysis, the author encourages those eager to embark on a supply to demand employment matching exercise to readily acknowledge the inherent limitations of such and to be guarded in any public policy applications of such data analysis.

Establishing the Context of Supply/Demand Equilibrium

Current total occupational employment provides an excellent starting place for understanding the context for applications of supply/demand matching. In a labor market with an unemployment rate of four (4) percent, it is important to note that ninety-six (96) percent of the labor force is already employed. The presumption behind every employed person is that a worker’s skills have been sufficiently valued or demanded by an employer, at a given wage rate, such that a match has occurred. That person now is employed, with employment representing the ultimate supply/demand match.

If total employment represents 96 percent of the total supply/demand equation, then all remaining calculations are an effort to quantify the prospective match between the remaining four percent of known or projected jobs (available demand) and those persons skilled, available, and actively seeking paid work (available supply). Thus, at best, most of the value of supply/demand matching is focused only on the margin of the labor market.

In general, the invisible hand of the free market does an excellent job of regulating occupational employment levels and the demand for education and skills training. This interplay, generally speaking, results in labor market equilibrium within the context of prevailing wages, e.g. the monetary value attached to a particular skill set through market forces. But even if supply/demand matching were quantifiable and available, would it be used only to facilitate changes on the margin, i.e. address the needs of the four percent? Or instead, could it be used through public policy to more generally and effectively guide education and training program investments? In this latter case, the presumption would be that the free market is hindered in some way; perhaps due to imperfect information or a lack of information. If public policy interferes with free market forces, e.g. the rights of individuals to study what they wish and for business to hire whomever they wish, would such practices override the natural functions of the marketplace. And would this result in greater market inefficiencies, i.e. how effective is a centralized planned economy versus an open market?

Generally speaking, supply/demand matching is ultimately useful only if supply is centrally controllable. There are many anecdotes where central controls on supply have influenced the overall equilibrium position leading to less than optimal outcomes. One might cite the government control over the supply of shoes in communist Poland -- where all shoes were made size 42 (10.5 U.S.) DD black oxford lace-ups. Or, more on point, the influence of the American Medical Association on the control of the supply of medical doctors in an attempt to artificially support higher wages. In either case, constructing a detailed supply/demand equation for purposes of central control and regulation in place of market forces generally falls under the category of bad policy.

Lastly, not all workers or employers have perfect knowledge of labor market information or an interest in some kinds of work. Thus some imbalances are likely to occur naturally, at least in the short run. Labor market theory acknowledges the concept of frictional unemployment -- that component of the unemployed pool that will always be "between jobs" due to imperfect information. More importantly, it also recognizes structural unemployment or that part of the unemployment rate due to a mismatch between worker skills and employer skill demands. The degree to which these structural imbalances are recognized and communicated -- is at the heart of supply/demand analysis.

Ironically, while automation has improved our ability to integrate large amounts of labor market data, it has also contributed to the morphing of occupational titles and

the tasks and duties therein. So much so that at the dawn of the 21st century occupational titles have less precision and less significance than at any time since the industrial revolution. Similarly, higher education program data still reported under the same system of college majors that has existed for generations no longer constitutes the same subject matter, learning objectives or skill mastery that it did a decade ago. Thus, if the task at hand is to perform a supply/demand analysis at the occupational level, that analysis is likely to suffer from not only the historic limitations of data collection but also a new set of problems caused by the increasing vagueness of occupation and education program titles.

Even where job titles are still useful within a demand-side information system, the churning in the labor market has resulted in many occasions where the same title is used for a very different set of skill requirements by different employers. Take the occupation of Drafter, for example. One firm which still designs on paper with mechanical pencils might employ a person titled Drafter. Another firm might employ a Drafter and yet that person is required to master computer-aided drafting and design (CAD/CAM). One occupational title, two very diverse skill sets. It is possible, given this scenario, that even though a person is employed as a Drafter in one job, he or she would not be part of the labor supply (not qualified) for another job also titled Drafter. Such underlying churning in the labor market at the skill level poses a whole new challenge to those intrigued by the occupational supply/demand matching process.

A common approach to mitigate the effects of this underlying churning and definitional confusions in supply/demand analysis is to perform the calculations at a higher level of occupational detail. For this approach to be effective both the occupational detail (relative to labor demand) and the educational program detail (labor supply) must be aggregated to a similar strata of understanding, e.g. it is inappropriate to compare demand for registered nurses against the supply of all healthcare workers.

The aggregation of occupations can come in many different packages including the former National Occupational Information Coordinating Committee's (NOICC) Units of Analysis and other schemes to cluster occupations. Most federal occupational classification systems are hierarchical and accommodate aggregate analysis -- on both the occupation and educational program sides. Through clustering the issues of a direct relationship between any given training program and a particular occupation are in part remedied. For example, if one received training as a diesel mechanic and got a job as a tractor-trailer truck driver, at the detailed level there is no direct relationship between the training and the job. However, at an aggregated level there are skill overlaps that allow persons trained as mechanics to be part of the labor supply pool for truck drivers.

While clustering can be an effective approach to ease the problems of occupation to program relationships, it also reduces the value of performing the supply/demand analysis in the first place. If, through aggregation, someone with an engineering degree

could be part of the labor supply for an electronics assembly job, how would that relationship uncover any prospective shortage of high level engineering skills? While aggregation shields the analyst from many classification issues, the real value of a supply/demand ratio is at the detailed level.

Among the major difficulties of estimating supply/demand ratios is understanding and measuring the various market dynamics, or “flows”, which constantly affect the short-run “stock” of available supply and demand for workers. Calculating these ratios is further complicated by lack of data for assessing certain key components of both available supply and available demand, as well as by occupational coding structure mismatches (for an extended discussion of labor market stocks and flows see W. McKee and R. Froeschle *Where the Jobs Are*, chapter 4).

There are two temporal considerations in calculating an occupational supply/demand ratio: (1) a current measure of the existing equilibrium situation (the “stock”), and (2) a projection of both occupational supply and demand conditions (“flows”).

A current measure represents the existing stock of both labor supply and demand. On the supply side, the stock of existing supply includes those persons who are employed in a specific occupation plus those who are unemployed with specific skills and are actively seeking work, at a given point in time at prevailing wages. The stock of occupational demand is represented by current occupational employment plus current unfilled job openings (again, given prevailing wages). Although it is possible to measure current employment using existing data sources, historically it has proven very difficult to measure the number of current unfilled job openings by either occupational or industrial categories. For several reasons, including the fact that many job openings are never listed through any formal medium, and, other than openings for jobs funded under government contract, there is no mandate for employers to list available openings with any public entity, there has never been an accurate count of the stock of current available job openings. Fortunately, current spidering techniques, such as those used by The Conference Board in their Help Wanted Online (HWOL) data program, now allow for the harvesting of online job postings that have greatly improved the ability to quantify current occupational demand.

It is one thing to identify, purely for enlightenment purposes, the supply/demand equilibrium status of any given occupation. However, because occupational supply/demand ratios are generally used for workforce or education program planning purposes, they are only useful if the two components (supply and demand) are projected for some future time period; one in which those without jobs can be guided to or educated sufficiently to get the available jobs. In theory, projecting the supply/demand equilibrium allows sufficient time for an individual to acquire necessary employability skills. This option, producing a projected supply/demand ratio, historically has been the most widely attempted approach.

There are other complications that arise however in attempting to project forward the supply/demand equation. A projected ratio involves an analysis and measure of labor market flows -- those dynamics within a given labor market which affect the level of occupational demand and the available labor supply pool. The concept of labor market flows implies that there are movements of workers and jobs into and out of any existing labor market. Because there are continual movements into and out of the supply of labor for any specific occupation or geographic area, the flow components are termed positive flows for additions to the supply pool and negative flows for separations. In general, positive flows are components such as formal education and workforce program completers, persons acquiring informal or employer-provided skills training, new labor force entrants or reentrants to the labor market, occupational transfers (whose skill sets allow them to change occupations and thus move into the available supply for job openings in a different occupation), and geographic transfers or in-migrants. Negative flows would be labor force separations (death, retirement, family stop-out, etc), occupational transfers (whose skill sets allow them to change occupations and thus move out of the supply for their previous occupation), and geographic out-migrants. The projected supply/demand equilibrium is comprised of the net flows or the net effect of both positive and negative flows.

Estimating Labor Supply

Current data on education program completers and enrollees are available through most public education agencies. In Texas, this role is filled by the Texas Higher Education Coordinating Board. This source represents a count of persons who have successfully completed a specific course of study and earned a credential. They are presumed to enter the labor pool with skills acquired through a formal education process as they receive a degree, diploma or certificate (in practice, some of these undergraduates continue into graduate studies and thus are not actually available for work in their degree field). And while data on education program graduates from public secondary and postsecondary schools is relatively easy to get, proprietary school graduates and non-credentialed exiters with marketable skills are largely unrecorded. This is especially problematic as private schools capture an increasing percentage of the education dollar and represent a bigger proportion of the formal labor supply component.

For some occupations, formal supply represents a large portion of total supply -- especially when state licensure is involved or a specific educational program is essential for occupational competency (e.g., nurse, dental hygienist, or lawyer). In many occupations, however, formal supply represents a much smaller portion of total supply, especially where skills may be easily learned on-the-job or for those occupations which require few specific skills. Also, there exists little empirical evidence which estimates the proportion of total supply represented by the formal supply in any given occupation.

Increasingly workers are acquiring skills from employer-supplied training programs. Graduates of Motorola University, or those persons who become Novell or Microsoft Certified, are theoretically part of the formal labor supply and yet there are no counts of such graduates. As the labor market places more emphasis on whether a worker *has* the necessary skills, rather than *how* they were acquired, the prospects are becoming more dim for counting all formal program completers as a percentage of all persons in the labor market with certain skill sets.

There are two additional fallacies in estimating state and regional labor supply based on formal credentials/education. When an individual exits from a higher education institution the formal supply count is commonly ascribed to the county or labor market area in which that institution is physically located. However, especially when a public four year university is involved, it is likely that not all those graduates will remain in that same region. Graduates from Texas A&M University are an excellent example of a large public university located in a small, rural setting where the majority of students either return to their county of origin or gain employment outside of the Bryan-College Station labor market. In what geographic area should TAMU graduates be counted? This is equally troubling when including graduates from colleges that are not in Texas but fall near a regional border. Clearly there are graduates from Oklahoma universities whose students seek employment in Texas and yet they are not counted as part of the Texas formal labor supply.

The second fallacy is that persons exiting with a degree in a particular college major or formal credential are limited to being part of the labor supply only for those occupations that are traditionally associated with that major. This is especially true for multidisciplinary degrees. For example, an engineering graduate is presumed to be part of the labor supply for Engineers or Engineering Technician positions. However, because of the quantitative skills acquired as part of the college curriculum, that graduate might compete for a wide range of jobs that require math or analytical skills, such as actuary or statistician. This is particularly challenging in the case of sociology, liberal arts, political science or related majors which allow/require students to acquire computer-related or statistical skills along the way. A person with a psychology degree, for example, would not ordinarily be assumed as part of the labor supply for a database management position. And yet, if data processing and data base management skills were required for one or more classes, that person might easily get a job as an entry level Data Base Administrator. Obviously, making common assumptions as to the limits of a persons employability based on a credential or major can cause enormous inconsistencies at best in any labor supply estimate.

Even more difficult to estimate is the number of persons who are new entrants or reentrants to the labor force and have skills gained through informal mechanisms (or, perhaps, no formal skills at all). These net labor force additions represent an unknown quantity, and their contribution to the total supply for any occupation varies according to the particular nature of the occupation. Although most new entrants and reentrants

to the labor force tend to be unemployed initially while engaging in job search, it is difficult to estimate the percentage of those who could be counted as part of the total supply of a given occupation.

By far the most difficult flows to measure are occupational and geographic transfers. This is particularly difficult at the local level where flows tend to be more exaggerated and people move quickly across local geographic boundaries (i.e., traveling to the next county). The number of persons who are qualified and seeking employment in one occupation while currently employed in another is almost impossible to estimate. For occupations requiring no formal training and few specific skills, the available labor force is often defined by the wage rate offered by a specific employer or the location of a specific job opening. In other words, the count of the net occupational transfers is in continual flux.

Geographic transfers are equally difficult to measure. They come in two basic forms: (1) transfers into an area with a job already in hand, and (2) transfers into an area seeking employment. In the second case, these individuals could fall either in the new entrants category if they are seeking immediate employment with current skills or into the education/program completer category if they are postponing employment for additional training. In the case of part-time workers concurrently engaging in additional formal training, these persons would be extremely difficult to estimate and parse by occupation.

It is notable that there may be a significant overlap of persons across occupational categories in real life situations. One example of this might be a woman working part-time in a lower skill job or taking community college classes to accommodate a family situation. Even though she may have the skills and credential to compete for a higher level, full-time job she has voluntarily accepted work in a different occupational area. Because individual free will dominates employment choices and is not always executed rationally (maximizing personal income), such situations are very difficult to quantify; especially when combined with a dearth of appropriate data. Most current attempts at measuring supply have settled for estimating as many of these flows as possible and eliminating double counting.

Although these measures might not be an accurate reflection of occupational supply, they do have some merit in at least the consistency of their approach toward occupations. Because the level of supply and contributions of any one flow may vary considerably according to the occupational skills required, this feature tends to be overshadowed. Given the existing state of available data, estimating projected occupational supply is one of the most difficult tasks facing a labor market analyst.

Whole treatises have been written around effective higher education and worker preparation practices and the challenges associated with quantifying occupational supply/demand equilibrium. These analyses do not even begin to address personal

qualities and attitudes that make the difference between a qualified worker and just another applicant. In addition, such analyses cannot differentiate between a qualified applicant with a computer science degree who has mastered Virtual Studio, perhaps a critical hiring requirement, from a similar graduate who does not have that particular knowledge. These are aspects that can only be ascertained through individual contact.

Because there is any number of paths to knowledge acquisition, statistically translating programs to occupations results in one-to-many relationships. Meaning, a program graduate may qualify (be prepared) for multiple occupations, resulting in duplicate number of graduates for different occupations on the report — i.e. a program of study may appear multiple times on the report in different occupational areas.

The greatest challenge to this kind of analysis is that some higher education programs of study simply do not translate very well into specific occupational preparation. Among them are: Multi-Interdisciplinary Studies, English Language and Literature, Liberal Arts and Sciences, General Studies, and Humanities. Program “majors” such as Sociology, Psychology, Political Science, History, etc. offer similar problems. Studies conducted by the TWC/LMCI department have shown that graduates from these disciplines can end up working in a wide variety of jobs that may have little or no direct relationship with the major. In these cases, the crosswalk between occupations and programs of study essential to supply/demand analysis is not particularly helpful. The table below presents this concept as a matrix. Each educational program falls in one of the matrix cells. Note that many programs of study simply have little direct relationship to specific occupations in the labor market and thus are not suited to supply/demand analysis.

One occupational area that is particularly difficult to analyze is teachers because of the diversity of majors that produce teachers. In Texas a person can graduate from any major and can get a job as a teacher provided they get certified. Although CIP codes specifically for teachers are available, there are significant numbers of graduates that eventually work as teachers who are reported under other majors.

If there is a bottom-line to this discussion it is that it is statistically possible to determine, in a general sense, occupations where there are clearly insufficient graduates from associated fields of study. In other cases, and indeed in most instances, such determinations are meaningless.

| SUPPLY DEMAND ANALYSIS Occupation to Program Relationship Matrix | | | |
|--|--|--|--|
| | Direct Connection | Limited Connection | Weak Connection |
| Oversupply | Definitive oversupply of graduates relative to expected demand; strong market relationship between CIP and SOC(s) suggests limiting additional investments in this program. 1A | Apparent oversupply of graduates relative to job demand in most related occupations. Likely intense competition for limited related job opportunities. Moderate occupational ties require identification of special market links prior to added investments. 2A | Data indicates oversupply of graduates likely, but the weak connection to specific occupations nullifies S/D data analysis. Possible candidate for revision or deactivation. 3A |
| Balanced | Balanced supply of graduates relative to expected demand. Job competition for newly minted graduates will be competitive but opportunities in some related occupations exist. 1B | Apparent balanced supply of graduates relative to job demand in most related occupations. Data indeterminate relative to labor surplus or shortage situation. Added program review requisite to determine if greater labor market opportunities are present due to emerging and evolving occupations. 2B | Data indicates balanced supply of graduates likely, but the weak connection to specific occupations nullifies S/D data analysis. Review occupational connections in crosswalk to determine possible job market opportunities 3B |
| Undersupply | Definitive undersupply of graduates relative to labor market demand. Data indicates likely shortages. Program is a strong candidate for additional resources and targeted recruitment efforts to increase supply. 1C | Apparent undersupply of graduates relative to job demand in at least one closely related occupation. Job opportunities likely to exist in at least one related occupation. More research worthwhile to determine possible added labor market connections. 2C | Data indicates undersupply of graduates likely, but the weak connection to specific occupations nullifies S/D data analysis. Related jobs may exist but not directly connected to this program. Review crosswalk for possible occupational links. 3C |
| Direct = Definitive connection between education program and one or more occupations Limited = Some connection to one or more occupations; no direct relationships Weak = Poor or ill-defined connection between program and specific occupations | | | |

Estimating Labor Demand

Estimating labor market demand is not as problematic as labor supply but has its own set of challenges. On the demand side, projected estimates of occupational demand have generally been developed according to the two major ways jobs openings occur: growth and replacement (labor turnover). These estimates are actually surrogates for true demand since prevailing wages and general economic conditions, in theory, play a large role in whether or not an employer undergoes employment growth. Job openings due to labor turnover can be estimated by using industry or occupational separation rates, available from a variety of sources. They presume, of course, that the rates of turnover will continue into the projected period at similar rates. Once the number of openings due to turnover has been estimated, the number of job openings due to growth must be similarly projected. Openings due to growth can come from any number of econometric or linear projections models. They are, however, simply projections based on the known demand equilibrium position i.e. base year employment. By estimating the number of job openings due to labor turnover and due to growth, total projected occupational employment estimates can be generated.

It is important to note that, while the procedure of developing occupational

employment projections is relatively straightforward; this does not represent a complete picture of total projected occupational demand. Projected demand must also account for *current job openings*. Since current job openings are not represented in the base year data (only current employment) there will at any given time be current job openings which are not projected or measured. This estimate of projected occupational employment is, however, often used as a surrogate measure of projected occupational demand where the number of current available openings is assumed as a constant.

Not only are current job openings never factored in to most estimates of labor demand, but there are several additional problems inherent with the projections process. Almost by definition, projections have an error term or a range of reliability. Not surprisingly, the farther out in time one projects employment data the more likely that error term will grow. If the employment projection is made far enough out in time, intervening economic conditions, exogenous shocks and changing general economic assumptions can render a set of projections almost obsolete. The easiest illustration is what happens to employment in the Texas economy when the price of oil falls to levels much lower than the underlying assumption of the projections. As the oil and gas industry suffers, so too do many related industries. Thus, such an exogenous economic shock can completely inviolate a set of occupational projections.

This becomes a delicate balance especially when occupations requiring complex skill sets are involved. For example, it takes five years to get a Bachelor's degree in interior design. Thus, from both a program planning and an individual decision-making perspective, it is insufficient to know about the demand for Interior Designers today; the key is what the demand will be five years from now. But it is much more difficult to project the demand five years hence than it is for a shorter term.

The final demand consideration is the changing skills requirements for occupations. It is relatively easy to assign the level of education required for each occupation in the current labor market. But, given the churning discussed previously, will the amount or proficiency level of education required today be the same five or ten years hence? For some occupations that answer will be affirmative, for others the educational requirements might vary notably. From a labor supply/demand perspective it may be a heroic assumption to ascribe the education level, credential or instructional mode of today to an occupational projection for ten years down the road.

Matching Labor Supply and Labor Demand

Improvements in data collection, cross-walking techniques, and data manipulation are helping some analysts do a better job of assessing supply relative to labor market demand, especially at aggregate levels of occupational detail. No where in the country however has this type of precise measurement been achieved within an acceptable confidence range. By and large, the preceding concerns have not been resolved successfully. As the labor market continues to change, and as occupational titles

increasingly fail to represent a uniform set of skills across employers and geographies, the notion of a numerical supply/demand calculation is becoming increasingly meaningless.

For purposes of workforce planning, calculating occupational supply/demand ratios does not provide a reasonable alternative to the analysis of industrial sectors with job openings potential, vis-à-vis the labor market targeting model. Each local Board or agency has its own concerns and restrictions regarding specific occupational wage rates, career ladders, training appropriateness, provisions for disabled workers, etc. Even if the exact supply/demand equilibrium position could be ascertained for an occupational category by using this approach, the analyst still would not be able to readily identify and confirm the specific industries and firms likely to employ these workers. Because employer contact lists are accessed only through their industrial affiliation, the industry categories for which the imbalances should be identified must be the starting place for any labor market analysis.

And, on the labor supply front, just because a skill shortage exists in a particular occupational field does not mean that the educational pipeline will be filled by willing students. It is also informative to note that not all labor shortages emanate from the supply side -- some are driven by demand side issues. In some cases, such as nurses and teachers, there are actually sufficient numbers of skilled persons available -- but many of these choose not to practice in their professions due to wage, work environment, or business practice considerations. Thus, even if exact supply/demand equilibrium were determined, there is no assurance that the solution to a shortage situation would be a larger supply pipeline.

The technical issues discussed above have only touched the surface of the many problems and concerns associated with estimating labor supply and demand. Below is a list of additional critical questions and difficulties with quantifying a labor supply/demand equation:

1. What is the operational definition of labor supply and demand? Should every person who has appropriate skills to fill a given job be included in the labor supply for that occupation -- regardless of their current job? Are occupations a reasonable construct for investigating labor supply?
2. How do people acquire skills -- formal, informally? Is it one measure? Where is the line drawn between formal and informal education? Which formal credentials should be assigned to which occupations? What degree of fit is necessary before someone with a particular educational credential is deemed as part of the labor supply for any given occupation? How do you treat liberal arts, Plan II or other multi-disciplinary degrees?
3. How much skill is required to do most jobs? In Texas roughly 43 percent of all

- employment requires less than 1 month of on the job training. If an occupation requires relatively little educational preparation or skill training what keeps a person from being part of the labor supply for scores of occupations?
4. How many people are currently working at jobs for which they were specifically trained? How many people would still be qualified for the jobs they have given changing technology, equipment or business practices? If churning is really an important concept shouldn't all supply/demand analysis be performed at the skill level, and not the occupation, level?
 5. How did you make your last job decision? Are you capable of doing more jobs than the one you currently hold? Would you be willing to change jobs for the right amount of money, prestige, shorter commute time or better benefits? Is there any way you could have been counted as being part of the available supply for your present job or a mythical new job?
 6. Many of the data items necessary to estimate all the labor supply components are simply not collected by any public or private entity. Thus there will always be technical issues such as (1) what skills have been brought into the state or area from migrating people? (2) how do we measure/count skills acquired through informal sources, including private employer training? (3) what percent of those acquiring skills actually go to work directly after completion? In a training-related occupation? (4) how do we solve intuitively simple but statistically complex definitional issues of labor market data? For example, from a postsecondary perspective, what is a program "completer"? If a person leaves an educational program early but has mastered enough of the key skills to have obtained a job in a related field, should they be part of the formal labor supply? (5) what mechanisms are in place that allow us to say which specific occupations program completers actually enter?
 7. Do we measure labor market equilibrium based on occupations or jobs? What is the purpose of supply/demand matching? Is the goal of public education to impart knowledge, as measured by a credential, or is it occupationally-specific preparation, which must be measured based on the number of persons getting a job related to their education and training? Is the societal bottom line of public education to prepare sufficient numbers of persons with the skills that are expected to be in demand by employers? Shouldn't individual free will continue to dominate education and career choices? What about the acquisition of higher education knowledge for knowledge sake?
 8. How far is government willing to go to collect sufficiently detailed and timely data to monitor and affect labor supply/demand imbalances at the state level? Where should the line be drawn between using public dollars to address existing skill imbalances and the intrusiveness of data collection? Should skill

imbalances be assessed and controlled at the state or regional level level? Is education a personal choice based on interest, educational merit and financial considerations or should it be more directive like the European model?

A Texas policy maker and erstwhile parent once suggested that using quantitative supply and demand analysis to guide public policy was like directing the career choices of his own teenager. There are simply too many unknown factors to control the situation.

In addition to the above labor market considerations, there are some critical parameters that must be addressed before even an exemplary supply/demand analysis can be applied in public policy. Here are four policy decisions that transcend the role of the market analyst.

1. To what extent should higher education be responsive to labor market demand? Does every educational program have to meet certain market demand criterion e.g. available job openings to be offered at a college? If so, what happens to art, literature and classic Greek language programs? If not, where do you draw the line between designating some programs as purely educational/avocational and those that must meet labor market demand criteria? Truth is, supply/demand matching only works for technical degree programs and falls completely apart for all social sciences, liberal arts and even general business. But exempting one university major compared to another as a “technical” major opens up a very complex discussion.

2. Should market demand be viewed as a statewide or a regional concept? For example, in which regions (what’s a region!?) should each college’s graduates be counted as part of the labor supply? Where do you place UT and TAMU graduates? If UT and TAMU are preparing “global citizens” as each claims, what regional labor market demand metric does one assign to their graduates? If they are part of the supply for each region of the state, how do you address the problem of multi-counting of the same grads across regions – especially since many grads are not infinitely mobile, i.e. there are some communities in which they prefer not to live.

3. There are basic conceptual differences between academic programs of study and labor market demand/occupational skill needs that transcend this supply/demand matching notion. It is one thing to ascertain which occupations and skill sets are most in demand statewide and regionally based on labor market demand projections. However, which college majors (educational programs) prepare students for which occupations? This is an easy question for Nursing and Engineering, the two examples that are cited most often in this kind of strategic conceptualization. However, for the 93% of college grads that are not in nursing or engineering, how does their education relate to the labor market, e.g. for the 9,246 grads from Multi/Interdisciplinary Studies, which occupations should be factored

in to the labor market demand side of the assessment? Should the market demand for high school teachers be a part of the demand side of every university program?

4. The 800 pound gorilla in this supply/demand living room is a simple question: How many is enough? Is the answer one skilled/educated person per expected opening? Five? Ten? One cannot determine how many more/fewer graduates are needed to meet labor market demand until one determines the target ratio of graduates per opening.

Assume a very compliant university administrator who commits to produce as many graduates as the Governor needs in any given field of study. The question she might ask would be the appropriate target for how many graduates are needed in each field of study. If there are projected to be 100 job openings in the service region for this university each year for the next 5 years (500 total, not counting current job openings), does the administrator gear up her goals for 500 graduates or 1:1 ratio? 1,500 graduates or 3:1? The private sector HR community likes to see 10-12 qualified applicants for each job opening. Should the target be 10:1 or 5,000 graduates? Until there is an answer to this question, the data are not actionable for policy purposes.

Given the range of technical, data, and philosophical concerns over supply/demand analysis, there appears to be insufficient rationale for attempting the quantification of occupational labor market supply/demand equilibrium or projected net flows. In this case, that which seems to be so easy and logical on the surface is far from it in practice.