

Synergy:

Defining Economic Opportunities, Potential, and Challenges Confronting the US-Mexico Border Regions and Strategies for Enhanced Prosperity

Methodology Summary

The Perryman Group (TPG) is currently in the process of performing a study of economic opportunities and challenges in the US-Mexico border region. This document provides a brief overview of the analysis and methodology that will be used.

Key Analysis Areas

Data compilation and research:

A dataset of requisite data for this analysis will be compiled including economic and demographic data for all of the US and Mexican border states as well as information regarding key issues affecting the potential for cooperation within the border region.

Review of relevant studies:

Typical research methods will be utilized to identify relevant studies of issues of interest for this assessment. Studies will be reviewed to determine validity of methods used and likely value of the findings; to the extent studies shed light on the issues of interest, key findings will be incorporated. In particular, any recent economic development studies performed in the ten states will be evaluated.

Meetings with key leaders in US and Mexico border states:

The project team is meeting with key leaders (both in the public sector and the private sector) to explore potential areas for enhanced cooperation as well as barriers to such efforts including conditions and patterns which are influencing US-Mexican relations, whether positively or negatively. Potential areas of interest include issues related to trade, workforce training and mobility, security, infrastructure, and others.

Evaluation of trade potential and potential synergies:

Using the models described below, TPG will evaluate the current economic linkages and trade potential among the border regions of the US and Mexico and their impacts on business activity (including output and employment by industry). Potential synergies that can be achieved by additional value capture of trade potential between the border states of the US and Mexico, and the resulting

economic impact by industry will also be assessed using the models described below. While these systems were originally developed for the United States, they can be readily be adapted to other areas and have been used in prior studies in Europe, Asia, South America, Canada, and Mexico.

Evaluation of workforce flows:

Labor market characteristics of the border states, the dynamics of cross-border workers, and the resulting economic consequences will be evaluated. To the extent possible, workforce flows will be analyzed with regard to types of workers, industries, and other variables of interest. The economic benefits of this workforce will be quantified using TPG's impact assessment model described below.

Evaluation of potential cooperative efforts:

Based on issues identified in discussion with key leaders in the US and Mexican states, empirical studies, data patterns, and other information, TPG will devise scenarios reflecting the potential effect on trade and other business activity of enhancing cooperative efforts between US and Mexican states. These scenarios will likely describe the potential improvement in economic conditions which could be achieved through actions such as (1) facilitating workforce flows and thereby improving economic outcomes, (2) working together to enhance infrastructure, (3) promoting trade flows within the region, or (4) cooperating to enhance security. These scenarios will be projected over a long-term forecast horizon (likely 2040) using the econometric model described below. In addition, key trends with the potential to influence future cooperation (both positive and negative) will be assessed, including areas such as the environment, security, and others identified within the course of the study. Key barriers to cooperation will be analyzed, with commentary and analysis regarding the costs associated with each. One objective of this phase of the analysis will be to identify and work to eliminate barriers to cooperative efforts, while enhancing the positive potential influences.

Data Sources

US data sources likely to be utilized include the US Bureau of the Census (State Trade Data), the US Bureau of Labor Statistics, and the US Bureau of Economic Analysis.

Mexican data sources include the Instituto Nacional de Estadística, Geografía e Informática (INEGI).

International sources of information such as the Organisation for Economic Co-operation and Development and the World Bank may also be utilized.

To the extent necessary, additional data sources may be identified and utilized as appropriate. In particular, any relevant information from agencies within the individual states which is not available from other sources will be examined and potentially utilized.

Models to be Used

Dr. M. Ray Perryman, founder and President of The Perryman Group, developed key models and techniques to be used in this study in the late 1970s and early 1980s and has consistently maintained, expanded, and updated them since that time. All of these models have been extensively peer-reviewed and are used on an ongoing basis by major corporations and governmental entities throughout the world.

US Multi-Regional Impact Assessment System

The US Multi-Regional Impact Assessment System (USMRIAS) is designed to measure the multiplier (or “ripple”) effects of an economic stimulus through the economy. It has been used in hundreds of applications and public policy studies in all 50 states and numerous foreign countries, and enjoys an excellent reputation for reliability and credibility. The system has submodels that reflect the unique industrial structure and characteristics of all US border states, with extension modules that provide extensive detail for each of the six Mexican border states. The USMRIAS is somewhat similar in format to the Input-Output Model of the United States and the Regional Input-Output Modeling System, both of which are maintained by the US Department of Commerce. The model developed by Dr. Perryman, however, incorporates several important enhancements and refinements. Specifically, the expanded system includes (1) comprehensive 500-sector coverage for any county, multi-county, or urban region; (2) calculation of both total expenditures and value-added by industry and region; (3) direct estimation of expenditures for multiple basic input choices (expenditures, output, income, or employment); (4) extensive parameter localization; (5) price adjustments for real and nominal assessments by sectors and areas; (6) measurement of the induced impacts associated with payrolls and consumer spending; (7) embedded modules to estimate multi-sectoral direct spending effects; (8) estimation of retail spending activity by consumers; (9) extension

capabilities to countries throughout the world (including Mexico); and (10) comprehensive linkage and integration capabilities with a wide variety of econometric, real estate, occupational, and fiscal impact models, thus permitting dynamic simulations. The system has been used in over 1,000 applications, is highly regarded by major corporations and governmental entities throughout the world (and used by ten US Cabinet Departments), and has been peer reviewed on numerous occasions, including a recent article in the Journal of Medical Economics. In the present analysis, the submodels used reflect the unique industrial structure and characteristics of the study areas in the US and Mexico, and will be used to examine the relationships among various supplier and customer networks for which can facilitate cross border trade and to estimate the potential economic impact and multiplier effects of various endeavors. As noted above, this system is readily adaptable to areas beyond the US and has been used in prior applications throughout the world.

US Multi-Regional Industry-Occupation System

The US Multi-Regional Industry-Occupation System (USMRIAS) translates standard data on employment by industry into estimates of occupational categories at a highly detailed level. The modeling process begins with the industry-occupation coefficients compiled by the US Department of Labor based on extensive surveys of operating patterns in thousands of firms and other secondary sources. As an example, a typical tire plant of a given size requires machinists, mechanics, plant managers, administrative staff, custodial staff, shipping personnel, and numerous other types of workers. By compiling this information across the entire economy, a matrix is created which allows the data on employment by industry (which is regularly compiled) to be translated into employment by occupation. Dr. Perryman has taken this basic structure and linked it specifically to the economy of every metropolitan area, region, and county in the US with extensions to all areas of Mexico, accounting for productivity and production patterns in each area. It is also regularly updated to reflect evolving patterns. The system can be fully integrated with historical employment data and the projections obtained from the various econometric models maintained by The Perryman Group. It can also be linked to results from the US Multi-Regional Impact Assessment System. Thus, the industry-occupation system is a flexible mechanism to allow extensive evaluations of workforce characteristics and patterns. It is highly detailed, providing results for approximately 700 occupational categories. In the present study, it will be used as a tool to estimate various linkages among the areas.

Econometric Modeling Systems

The Texas Econometric Model was originally developed by Dr. Perryman to provide detailed industry-level forecasts for the Texas economy and has since been extended to other areas (including the US and Mexico border states). It is used to provide ongoing forecasts and is formulated in an internally consistent manner designed to permit the integration of relevant global, national, state, and local factors into the projection process. It is the result of more than three decades of continuing research in econometrics, economic theory, statistical methods, and key policy issues and behavioral patterns, as well as intensive, ongoing study of all aspects of the global economy. It is extensively used by scores of federal and state governmental entities on an ongoing basis, as well as hundreds of major corporations. The firm has also performed specialized forecasts for dozens of corporate clients. In this study, it will be used for projecting various economic and demographic variables and to provide a baseline for the trade and labor market analysis.

Multi-Regional Trade Potential Assessment System

The Perryman Group's Multi-Regional Trade Potential Assessment System is designed to measure the volumes of trade among various geographic areas. It is based on the capacity of each area to provide goods based on current production patterns and the economic responses which typically occur with expanded efforts to promote trade. The basic modeling technique employed in this aspect of the study is known as dynamic general equilibrium analysis, which essentially makes use of a complex set of modeling resources, including both the large-scale impact assessment (dynamic input-output) and econometric systems previously described. Dr. M. Ray Perryman, founder and president of The Perryman Group, was instrumental in the development of the techniques required in this process (see, for example, M. Ray Perryman, "A Comprehensive Model of Multi-National Trade Patterns: Theory and an Application," *The Journal of Systems Research*, 1993), and the firm has employed them to examine trade relationships on multiple occasions throughout the world.

This approach permits systematic consideration of such factors as (1) inter-industry trade flows, (2) intra-industry integration, (3) price responses, (4) welfare effects that span the entire economy, (5) productivity stimulation, (6) trade efficiency, (7) historical and projected patterns in the competitiveness of the areas being examined, (7) anticipated industrial composition of the relevant region as it evolves over time in a dynamic context, and (8) supply chain and payroll implications of the expanded activity.

Because a general equilibrium framework, by its very nature, provides a solution for the entire spectrum of changes occurring as a result of an external stimulus, it is not necessary or appropriate to estimate separate impacts within the context of the USMRIAS. This system is useful, however, in that reverse simulations may be used to solve for measures beyond overall output changes, such as income, expenditures, and employment, in a manner that fully accounts for the underlying dynamics of the basic solution and changes in factor resource allocation and productivity over time.