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# **COMMUNITY IMPACTS FROM A TEMPORARY MILITARY DEPLOYMENT: THE CASE OF FORT STEWART, GA.**

**By Warren Kriesel and Gina L. Gilbreath**

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## **ABSTRACT**

The rural South has long been a popular location for the installment of military bases. Small Southern communities around these installations have experienced many social and economic changes due to operational changes in the base. Even the slightest alterations have a ripple effect on residents who rely on the base for local economic stability. Although many studies have examined the impacts associated with military base closures, this paper addresses a related but not identical problem. Using a combined rural sociological and agricultural and applied economic perspective, an analysis is made which examines the local social and economic disruption caused by temporary troop deployments from a military base which is the major employer in the rural Southern community. From this multi-disciplinary standpoint, impacts on a Southern rural community are analyzed both in terms of economic dependence of the local civilian population and the social consequences of the troops' absence from the community during a deployment.

## **INTRODUCTION**

In the area of rural development, the decade of the 1990's will be noted for the level of interest in the linkages between local development and national defense policy. Many times, national defense policy can impact a community both socially as well as economically. The rural South will indeed experience many of these local social and economic impacts from shifts in national military policy because numerous military installations are located there.

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Research interest to date has been devoted to estimating the local impacts from closing military posts in rural areas and small communities (e.g., Kempf, et al., 1990; Whitehead, 1991; Muller, Hansen and Hutchinson, 1991, Rowley and Stenway, 1993). Typically, negative community impacts result from reduced government employment, population, retail purchases and local tax base. However, little research has been conducted from a combined rural sociological and agricultural and applied economic perspective on the effects that a temporary troop deployment would have on the local community in which the base is located.

Communities near military bases are the places where local civilians live, raise a family, engage in commercial activity and are employed. As in all communities, the sustainability of community life is dependent upon the provision of goods, services and employment opportunities by local businesses and industries. If local industry is unable to provide these fundamental necessities for the community, then outmigration and depopulation can consequently occur (Poplin, 1979). This economic dependence is what makes communities unique units of analysis to examine in terms of economic development and potential decline.

Industries which occupy center stage of a community also heavily influence the structure of the local economy. Secondary linkages in the occupational structure along with wage linkages of the local labor force to the dominant sector are often shaped by what occurs in the dominant industry of the local economy (Long, 1969). Expenditures in the local economy are also shaped by the wage structure and type and availability of goods and services in the area.

Many times, the shifts that a dominant industry may make are shaped by the agenda of a higher, non-local bureaucracy rather than the needs of the local area and its residents. This, in turn, may influence the employees of the dominant industry of the community to have their loyalties, roles and goals shaped by regional or national imperatives rather than by local obligations. In fact, the employees may view their career paths as connected to the industry's national structure rather than to the local economy (Long, 1969).

In much the same way that community decision makers attempt to attract other major industries, they promote their communities in order to attract military installations. A local government may offer

competitive incentives such as subsidies for infrastructure or public utilities in order to attract a military base (Malecki and Stark, 1988). A military installation may also be located in a particular community as a result of the local congressman's political power in allocating military expenditures.

## **The Military and the Local Community**

As a result of a military base opening, the source of community impact may take many forms. There may either be a consumer-originated impact, a business-originated impact and/or a local government-originated impact (Tiebout, 1966). The rise in total income in an area may also be the direct or indirect result of defense installations. This increased income of local residents will cause greater spending in the community on housing, services and retail consumer items which will call for an expanded work force with greater earning opportunities than before the base opened.

Because of its all-encompassing nature on the locality, it is apparent that a military installation, much like a major industry, may have a significant social impact on the community in which it is located. The military base may be in conflict with the local community as the focus for institutionalized loyalties. The role structure of a community may also change. The military base itself may become the medium for self-actualization for both military personnel and residents of the community. Thus, people in the community may well be more citizens of the dominant employer rather than citizens of the locality in which they live.

A military installation's social and economic dominance in a community and may have a significant influence on the shape that a local economy may take. If the local economy is limited to serving the military clientele, then this lack of economic diversification can cause the community's economy to become vulnerable to short-term economic cycles as well as the long-term cycles created in the larger sector (Markusen, 1985). Also, if the local economy is not diversified, then subsequent costs of alternative strategies for community development must be provided (Marchak, 1983). Therefore, sound economic development plans and decisions require a

great deal of information on the potential for economic growth and decline.

Short-term economic setbacks such as large scale and lengthy military deployments create local economic problems, with adverse impacts felt in terms of reduced retail sales, apartment vacancies and lower government revenues. The focus of this analysis was to develop impact estimates of future troop deployments on a local rural economy in Southeast Georgia.

## **Fort Stewart and Hunter Army Airfield**

Fort Stewart and Hunter Army Airfield are the home of the 24th Infantry Division of the United States Army. Fort Stewart, with 280,000 acres, is the largest military base in the eastern United States; it is spread over parts of five counties in Southeast Georgia. Hunter Army Airfield occupies 5,300 acres on a site 16 miles from Savannah, Georgia. Together, the facilities are home to 25,000 troops.

The Division is part of the Rapid Deployment Force and units from the Division have been deployed on training or combat missions in every year since 1983. Recent deployments have been to the Persian Gulf War and Hurricane Andrew relief effort in Florida. Each deployment episode brings adverse economic impacts in terms of reduced retail sales, apartment vacancies and lower government revenues. Understandably, local public officials are concerned about the region's economic stability and the overall stability of the community.

For planning purposes it is important to know what the impacts of future deployments would be on the local economy. This study answers this question by analyzing the annual expenditures by a 1,000 troop unit, and the annual Army expenses made on their behalf, within an input-output model of the seven-county impact region in southeast Georgia. The 1,000 troop unit was used because its results can be extrapolated to estimate the impacts from future deployments of varying length and size. Although a troop deployment creates significant social dislocation and economic losses, the local economy will continue to experience the positive impacts of being the home of a major military facility. The post does not cease operations, albeit some operations are scaled back. For example, the deployed troops

will continue to have their monthly salaries deposited at local banks. During troop deployments, however, private businesses will scale back their activities although government facilities will continue to maintain their levels of service. These characteristics of a deployment were factored into the study.

## METHODOLOGY

The seven counties that are economically impacted by troop deployments from Fort Stewart and Hunter Army Airfield were examined by using an input-output analysis. These Georgia counties are Liberty, Chatham (including the city of Savannah), Bryan, Evans, Tattnall, Long and McIntosh. Input-output analyses are extremely descriptive tools because they can show a detailed structure of a local economy in terms of industrial sector size, sales, employment and wages, interaction of individual sectors with the larger economy, and prediction of response by endogenous sectors to either planned or unplanned change from exogenous sectors.

An input-output model was chosen for this research for the above reasons and because it is an excellent tool for regional economic analyses and the examination of changes in a local economy. In addition, the input-output model can provide information on the costs and benefits of alternative community development strategies if the local economy experiences growth or decline. The specific input-output model used was the 528-sector IMPLAN model, a software package developed by the U.S. Forest Service (Alward et al., 1991). An advantage of IMPLAN is that it contains data for each county in the United States. It also allows the analyst to tailor a model for the specific counties that experience an impact.

The remainder of this article is organized as follows. In the next section, estimates of the initial local income reduction that would result from deploying 1,000 troops for one year are developed. The following section is a description of how results from the Consumer Expenditure Survey were used to construct a scenario of reduced spending on specific items and explains how these reduced expenditures were assigned to sectors of the input-output model. The next section describes the impact analysis. Finally, the study results are summarized and it is shown how they can be used to estimate the

impacts of future deployments through two examples: (a) deploying 5,000 troops for one year, and (b) a deployment equal to the Persian Gulf episode.

## **Troop Income Estimates**

In impact analysis, the researcher attempts to measure the effect on an impact area, or regional economy, which is due to a given change in economic activity. During a troop deployment the impact area will experience reduced expenditures by troops, and the reduced expenditures are directly related to the income that is lost. Therefore, the first step in this analysis was to estimate the income received by a 1,000 troop unit.

Data on income were obtained from the 24th Infantry Division's Command Data Summary (1991) and the *Army Times* (1991) pay chart. The Command Data Summary provides the numbers of troops in each rank, troops with dependents, and troops living on and off post. The *Army Times* pay chart gives troops' salaries according to their grade, years of service and whether or not they live on post.

More troublesome was accounting for the basic allowance for quarters. Soldiers who live off post receive an allowance (i.e., a rent subsidy) based on their pay grade, and those with dependents receive even more. This meant having to account for the different expenditures by four distinct categories of troops: (1) on post, with dependents, (2) on post, without dependents, (3) off post, with dependents, and (4) off post, without dependents.

The percentages of troops that fall into each category is reported in Table 1, along with the total annual income earned by troops in each of the four main categories. These incomes sum up to the total paid to 1,000 troops. The most striking feature is that only 43 percent of troops fit the traditional description of being single and living in the barracks. A total of 46 percent have dependents, and in those households where there is no spouse the minor dependents must be cared for by a temporary guardian during the deployment. This type of family dispersion may have significant negative impacts on the family structure and its well-being.

**Table 1. Percentage composition of Ft. Stewart and Hunter Army Airfield troops, and annual salary received by 1,000 troops -1991**

	On Post	Off Post
<b><u>Troops With Dependents</u></b>		
Percent Composition	14.66 %	31.51 %
Salary Received	\$2,256,888	\$6,246,773
<b><u>Troops Without Dependents</u></b>		
Percent Composition	43.65 %	10.18 %
Salary Received	\$6,719,861	\$1,890,044

Source: Command Summary Data, March 1991.

## Troop Expenditures

Not only are the troops paid differently by their residential and family status, but their expenditure patterns will also be much different. For example, all troops living off the post will have to pay rent for their housing and all troops with families will have extra food and clothing expenditures. During a deployment, many local expenditures by troop households with dependents will continue, but expenditures by troops without dependents will virtually cease. These considerations were implemented when the income estimates from Table 1 were translated into the expenditure reductions that are reported in Table 2.

Table 2 reports expenditure reductions by the same categories as in the Consumer Expenditure Survey (1990) report. The expenditure reductions represent totals from separate analyses of the four categories of troops. The most important assumption in this process is that troop expenditure patterns are similar to those of civilians, except for the circumstance described below.

Troops at Ft. Stewart and Hunter have access to private and government providers of the goods and services. These providers however have different impacts on the local economy. Private retail outlets use local wholesalers, hire local labor and pay local taxes. The



**Table 2. Total Expenditure Reductions Associated with a 1,000 Troop Deployment, with IMPLAN Assignment of Categories (Bureau of Labor Statistics, 1990).**

Consumer Expenditure Survey Category	Expenditure Reduction	IMPLAN <sup>A</sup> Assignment
<b>Food</b>		
Food at home	\$725,257	PCE 1110
Food away from home	\$632,269	PCE 1120
Alcoholic beverages	\$289,917	IS 112
<b>Housing expenses</b>		
Rented Dwellings	\$584,426	PCE 4200
<b>Utilities</b>		
natural gas	\$88,380	IS 457
electricity	\$267,477	IS 456
fuel oil and other fuel	\$32,548	IS 235
telephone	\$315,672	IS 454
water and other public services	\$50,802	PCE 5830
<b>Household operations</b>	\$99,457	PCE 5911
<b>Housekeeping supplies</b>		
laundry and cleaning supplies	\$39,276	PCE 2500
other household products	\$31,810	PCE 5620
postage and stationery	\$59,658	PCE 5700
<b>Household furnishings and equipment</b>		
household textiles	\$22,645	IS 152
furniture	\$114,842	PCE 5100
floor coverings	\$11,861	PCE 5410
major appliances	\$56,073	PCE 5200
small appliances & housewares	\$21,566	PCE 5500
miscellaneous household equipment	\$138,027	PCE 5610
<b>Apparel and services</b>		
apparel, men and boys	\$196,235	PCE 2320
apparel, women, girls and children	\$321,494	PCE 2310
footwear	\$100,352	PCE 2100
other apparel products and services	\$180,160	PCE 2800

(Table 2 continued on next page)

**Table 2, continued.**

Consumer Expenditure Survey Category	Expenditure Reduction	IMPLAN <sup>A</sup> Assignment
<b>Transportation</b>		
gasoline and motor oil	\$473,411	PCE 8140
vehicle maintenance and repairs	\$288,812	PCE 8130
vehicle rental and licenses	\$13,411	IS 492
public transportation	\$232,872	IS 447
<b>Health care</b>		
health insurance	\$135,252	PCE 6700
medical services	\$188,550	PCE 6300
drugs	\$70,354	PCE 6100
medical supplies	\$29,087	PCE 6200
<b>Entertainment</b>		
fees and admission	\$187,098	PCE 9810
television, radio and sound equipment	\$202,840	PCE 9500
pets, toys, and playground equipment	\$82,196	PCE 9300
other entertainment supplies & services	\$183,442	PCE 9400
<b>Personal care products &amp; services</b>	\$174,966	PCE 3200
<b>Reading material</b>	\$93,656	PCE 9200
<b>Education expenses</b>	\$323,763	IS 507
<b>Tobacco products</b>	\$117,604	PCE 1500
<b>Miscellaneous</b>	\$339,392	IS 488
<b>Cash contributions</b>	\$339,392	PCE 9918
<b>TOTAL</b>	<b>\$7,850,459</b>	

<sup>A</sup> PCE ##### refers to the personal consumption expenditure file, while IS ### refers to the IMPLAN sector that a category was assigned to.

post exchange outlets will also use local wholesalers and hire local labor, but they do not pay taxes. Also, local businesses return profits from sales to their owners, while government retail outlets are run on a cost-recovery basis. Finally, during troop deployments private

businesses will scale back their activities, but government facilities will maintain their levels of service. For estimating the economic impact of troop deployments, the main problem raised by private versus government outlets is in accounting for the retail margin. Therefore, the retail margin was adjusted to reflect patronization of government outlets.

The Command Data Summary lists several categories of goods and services that are purchased directly by the Army. Fort Stewart's Public Affairs Officer indicated that three categories on the list would vary inversely with a troop deployment. Therefore, expenses for these items were put onto the 1,000 troop basis and then assigned to the appropriate IMPLAN sector. Items from the list (with their cost per 1,000 troops) were: personnel travel (\$461,661), materials transportation (\$344,874) and contracts for tires, engines and spare parts (\$1,901,531). Adding together these reductions in direct Army expenses plus the reduced troop expenditures, deploying 1,000 troops for one year would lead to \$10.56 million less direct spending in the seven county region.

## **Results of the Input-Output Analysis**

The reduced expenditures from Table 2 were used as the impact scenario in the input-output analysis. After performing the matching procedure between the expenditure pattern data and the IMPLAN sectors, 240 of the 528 sectors in IMPLAN experienced negative impacts. However, the economy in Southeast Georgia is not diverse and it contains only 209 of the IMPLAN sectors. As a result, of the 240 sectors that potentially are affected by a deployment, only 101 of them are actually present in the local economy. The remainder represent goods and services that must be imported into the region. Therefore, the absence of a varied economy means that a large proportion of the impacts occur outside Southeast Georgia and the resulting multiplier effects are relatively smaller than they would have been in a more diverse regional economy.

Results of the impact analysis are reported in Table 3. Economic effects are reported in terms of direct, indirect, induced and total impacts. Furthermore, five different economic indicators are reported. Each of these measures is explained below.

**Table 3. Local economic impacts and multipliers from deploying 1,000 troops for one year, Fort Stewart and Hunter Army Airfield (1991 \$)**

	Total Gross Output (MM\$)	Wages and Salaries (MM\$)	Total Income (MM\$)	Value Added (MM\$)	Jobs
Direct Impact	8.3097	2.5900	4.1870	4.5845	172
Indirect Impact	1.8761	0.4982	0.9299	1.0339	27
Induced Impact	3.6811	1.0636	1.9380	2.1513	65
Direct + Indirect + Induced Impact	13.8669	4.1519	7.0548	7.7697	266
Type 1 Multiplier	1.2258	1.1924	1.2221	1.2255	1.1570
Type 2 Multiplier	1.6688	1.8131	1.6849	1.6948	1.5465

The difference between direct, indirect and induced impacts can be explained by an example of how an income shock reverberates through an economy. Suppose that restaurants make less sales during a deployment. This change in sales is the *direct* effect. In adjusting to the decreased demand, local restaurants decrease their purchases from other sectors (e.g. local food wholesalers). The wholesalers, in turn, must decrease their purchases of supplies from other sectors (e.g. food processors and farmers). These reduced purchases will affect even more economic activity because farmers produce less by decreasing their inputs of seed, fertilizer, tractors and other farm inputs. Thus, the decreased purchases by restaurants initiates a "chain reaction" of reduced purchases in the local economy. These multiple-round purchases of intermediate inputs are the *indirect* effects of the event.

The direct and indirect effects of the decreased sales by restaurants cause an overall decrease in the area's production of goods and services, which eventually decreases the area's employment and household income. Decreases in employment-related income of households further decreases the demand for consumer goods and

services. The initial reduction in demand (i.e. the direct effect) causes restaurants to hire fewer employees and/or pay lower wages. The decreased wages paid by restaurants will contribute to decreased consumer spending on clothing, food and other items. The economic slowdown that is caused by this additional reduction in consumer purchases is the *induced* effect of the event. Finally, the total economic impact of a change to an economy is the overall measure of economic impact, and it is the sum of direct, indirect plus induced effects.

Table 3 reports direct, indirect and induced impacts by several different measures of an economy's performance. *Total gross output* measures the value of all goods and services produced in a local impact region. *Employee compensation* is wages and salaries paid to employees of firms and businesses located in the impact region. *Total income* is employee compensation plus profits, rents, royalties, interest, and related payments that accrue to owners of property, firms, and businesses in the region. *Value added* is the sum of employee compensation, indirect business taxes and property income.

In Table 3, the impact analysis shows that the 1,000 troop deployment's direct impact on total gross output (\$8.31 million) is less than the \$10.56 million spending reduction. The direct effect was expected to be less than the spending reduction because some expenditures are for items which must be imported into the seven county impact region. For example, about 30 percent of troops' private gasoline purchases impact the economy through the local wholesale and retail margins, while the remaining 70 percent of the purchasing value is used to pay for imported gasoline.

The indirect effects on total gross output from this troop deployment equals \$1.87 million, and the direct plus indirect effect equals \$10.18 million. Looking at the indirect effects in the other economic indicators, wages and salaries would drop by \$3.09 million, total income would drop by \$5.11 million and value added to the region would decrease by \$5.62 million. The induced effects come into play as consumers (i.e. households) react to their wages being reduced. The induced effect on total gross output equals \$3.68 million for a total effect of \$13.87 million. These indirect and induced impacts are calculated (respectively) from the type 1 and type 2 multipliers associated with each IMPLAN sector that undergoes a

change in its final demand. It is easy to calculate overall type 1 and type 2 multipliers for this deployment scenario. Using figures from Table 3, the type 1 output multiplier is found by dividing the direct plus indirect impacts (\$10.1858 million) by the direct impact (\$8.3097 million) for a result of 1.2258. The type 2 output multiplier is found by dividing the direct plus indirect plus induced impacts (\$13.8669 million) by the direct impact for a result of 1.6688.

In Table 3, this process has been applied to all five measures of regional performance. Interpreting these overall multipliers is straight forward. The type 1 wages and salary multiplier of 1.1924 says that for each dollar reduction in wages (typically in retail services) that results from a deployment, another \$0.19 wage reduction is indirectly felt in the economy. The type 2 jobs multiplier of 1.5465 says that for each person unemployed during a deployment (again, typically in retail services) another 0.54 job is lost through the indirect and induced impacts. It should be noted that the impact multipliers from Table 3 are relatively small, i.e. none are larger than two. Again, this is because of the nature of the non-diverse economy in Southeast Georgia, and the fact that the ripple effects are "leaked" outside of the region through the importation of goods and services.

Finally, an illustration is provided of how these impact results can be used to estimate the future impacts of deployments of various durations and magnitudes. For example, if 5,000 troops were deployed for 9 months, the impact on total gross output would be: (a) \$13.8669 million times (b) 0.75 of one year, times 5, resulting in a \$52 million reduction in regional gross output. 14,000 troops deployed for eight months (comparable to the Persian Gulf War) would lead to: (a) \$13.8669 million times (b) 0.66 of one year, times 14, resulting in a \$128 million reduction in regional gross output. This same method can be applied to any of the other economic indicators from Table 3.

## SUMMARY AND CONCLUSIONS

This study has estimated the economic impacts from deploying 1,000 troops from Fort Stewart and Hunter Army Airfield for one year. This was done by an in-depth analysis of troop expenditure patterns within an input-output model of the seven-county impact

region in Southeast Georgia. Local annual expenditure reductions by troops were estimated to be \$7.85 million, and direct Army expenditure reductions totaled \$2.71. Therefore, deploying 1,000 troops for one year would lead to a \$10.56 million reduction in expenditures in the seven county Southeast Georgia region.

The impact analysis showed that the region's lack of a broad economic base leads to smaller impacts than other more economically diverse areas may experience. In particular, of the 240 adversely affected sectors, only 101 of them are actually present in the local economy. The absence of a varied economy means that a large proportion of these impacts occur outside of Southeast Georgia. Taking the total gross output measure, the \$10.56 million expenditure reduction leads to a \$8.3 million direct impact. The input-output calculated a \$1.8 million indirect effect so that regional gross output will *decrease* \$10.18 million during a deployment. Although these impacts are smaller than what would occur in a more diversified region, the impacts on the Fort Stewart area would be quite noticeable because the local economy is dominated by service and retail businesses and these sectors have become quite dependent on troops' spending.

Still, Liberty County, the home to Fort Stewart, is in an excellent position to make informed decisions about community and economic development prospects. The key for decision makers is to understand regional trends in order to facilitate a better planning and evaluation process. However, the leaders of the community must be open to change. They must be able to respond to new opportunities, markets and technologies in order for the planning process to work.

Indeed, Liberty County has many advantages over other counties in Georgia. First, the county is adjacent to a metropolitan area which has educational, shopping and cultural opportunities. In addition, Liberty County is located near a major interstate highway which connects it to many major cities in the eastern United States. Second, Liberty County's tax rate is quite low compared with the Georgia and U.S. averages. Also, the county has a consistently low unemployment rate and competitive manufacturing wages. Third, Liberty County has a successful industrial development track record, according to the Georgia Department of Industry, Trade and Tourism. In 1987, three firms moved their operations to the area, while in 1989 two firms

located in Liberty County (one of which generated 500 new jobs). This clearly indicates that the decision makers in Liberty County are successful in attracting new industry.

Although Liberty County has many advantages over other communities in Georgia, some areas need refining if Liberty County and the surrounding six county area are to avoid the economic vulnerability caused by troop deployments from Fort Stewart and Hunter Army Airfield. In order to address these concerns, the researchers have specific recommendations for local decision makers in order to enhance their industrial recruitment activities.

For businesses looking to locate in an area, educational attainment is a predictor of what skill levels the residents have along with how productive the labor force will be. Since educational attainment for residents in Liberty County is low compared with national averages, this must be improved. This low educational level, however, is not necessarily a reflection on the quality of the local school system; rather it is a burden that can be placed on the family, the neighborhood and the community (Monk, 1990). All levels of training should be encouraged, including high school, vocational and college training. Again, this can be accomplished by encouragement at home, involvement in PTA and other community education-related activities.

Liberty County also has an excellent business and industrial park that is well-suited for attracting new industries. Furthermore, there must be a continued emphasis on developing facilities needed for industrial expansion, including the local infrastructure. The continued development will increase Liberty County's economic base, reduce the unemployment rate, attract new residents and have a positive impact on the existing service economy.

The information provided in this study along with the recommendations that the researchers have made allows Liberty County to be in a position to improve its prospects for recruiting business and industry. Whether by increasing taxes or acquiring grant funds, the area could become even more attractive by investing in infrastructure, education or developmental enhancing projects. With these economic improvements, the area could become more economically diversified and, as a consequence, less likely to be vulnerable to economic decline due to military deployments.



## *Southern Rural Sociology*

### **Implications for Future Research**

This study has attempted to illustrate the impact a local economy would have if the major industry withdrew from the area for a period of time. Still, some business and local economic considerations must be made in order to address the problems of diversification and potential local economic vulnerability. First, how can the heavy local reliance on the military sector be decreased and what types of alternative economic development strategies exist? Secondly, do the local existing industries fit a slow, fast or no-growth pattern and how are these types of industries performing in other states in the region? Finally, are there realistic opportunities for shifting purchases from non-local suppliers to local suppliers in the local economy? If these questions are addressed by further research which merges the perspectives from rural sociology and agricultural and applied economics, then Liberty County and other rural counties with military bases may be in a better position to diversify their local economies and become less vulnerable to local and national economic trends.

### **Endnotes**

1. A difficult aspect of this analysis was matching these 41 expenditure categories to the 528 IMPLAN sectors. In only a few cases does a Survey category match an IMPLAN sector. For example, "Natural Gas" is a match with IMPLAN sector 457, "Gas Production and Distribution". However, expenditures on most categories must be "margined" (i.e. expressed in terms of producer prices) to the production, transportation and marketing sectors. Furthermore, the Survey categories are quite broad and they frequently encompass more than one IMPLAN production sector.

Fortunately, the IMPLAN authors have supplied 93 external files that describe "Personal Consumption Expenditure". These files are capable of taking expenditures for food, for example, and expressing them in terms of direct impacts on 67 food production, transportation, and retail sectors that are in IMPLAN. The results of the matching procedure are shown in the right side column of Table 2, as either (a) the IMPLAN sector number (denoted IS###), or (b) the Personal Consumption Expenditure file number (denoted PCE###) that served to bridge the Survey's category to IMPLAN.

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