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The Estimated Economic Impacts of a Mortgage Banking Firm in Hillsborough County, Florida

An Analysis Performed by

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Preface

This study was commissioned by the Corporate Business Development section of the Hillsborough County Economic Development Department and performed by the Center for Economic Development Research, College of Business Administration, University of South Florida. The purpose of the report is to quantify the estimated economic impact to Hillsborough County by a type of financial service firm moving into the county. The Center for Economic Development Research provides information and conducts research on issues related to economic growth and development in the Nation, in the state of Florida, and particularly in the central Florida region. The Center serves the faculty, staff, and students of the College of Business Administration, the University, and individuals and organizations in the Tampa Bay region and statewide. Activities of the Center for Economic Development Research are designed to further the objectives of the University and specifically the objectives of the College of Business Administration.

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Executive Summary

This study quantifies the economic impact in Hillsborough County of a type of financial services firm. The Hillsborough County Economic Development Department (HCEDD) provided the parameters of the hypothetical firm for the study. If this type of firm could be attracted to the county, there would be a gain of jobs, labor income, and production within the county. Specifically, we examine the quantifiable economic impact of capital investment and operations by a mortgage banking firm. The impact is measured by employment, labor income, and output. These are three measurements of the same phenomenon just like weight, density, and shape are all ways to measure a solid.

The parameters for the mortgage banking firm are 499 workers in North American Industrial Classification System (NAICS) Industry 522292 (Real Estate Credit). The workers in this firm will earn a total of \$33,857,150 per year in labor income. The work facility costs \$29,406,086 to build and another \$12,602,608 to equip.

We estimate the total economic impact of the firm in Hillsborough County for a construction phase (non-recurring) and for an operations phase (recurring year over year).

During the construction phase, the construction and equipping activities generate jobs for about 882 workers who earn \$32.4 million in labor income and produce output valued \$77.6 million.

For the operations phase, we estimate the economic impact of the firm and calculate multipliers. A multiplier indicates the proportional increase in a measurement of impact given a direct level of change introduced in an economy. For example, an Employment multiplier of 2.0 means that for each job a new firm brings, another job is created elsewhere in the economy so that the total increase is two jobs for every one job at the new firm. The greater the multiplier, the bigger a new firm's "bang" on the economy.

We calculate Employment, Labor Income, and Output multipliers. For the mortgage banking firm, the multipliers are 1.774, 1.383 and 1.494, respectively.

We also estimate the absolute values of the annual economic impacts of the firm. During the operations phase, a mortgage banking firm generates jobs for about 885 workers who earn \$46.8 million in labor income and produce output valued at \$103.7 million.

I. Introduction

This study quantifies the economic impact in Hillsborough County of a mortgage banking type of financial services firm. If this type of firm could be attracted to the county, there would be a gain of jobs, labor income, and production within the county. This study estimates these impacts if a firm opened for business and all their employees lived in the county.

Specifically, we examine the quantifiable economic effects of capital investment and operations by a mortgage banking type of financial services firm. Because of the circulation of funds within the county's economy, the overall impact of the economic activities is a multiple of the initial, or first round, of production. That is, there are links among the various commercial elements of Hillsborough County's economy. Through these links, second and subsequent rounds of production occur following the initial productivity by a new firm.

In Section II, we describe the parameters for the type of firm. The Hillsborough County Economic Development Department (HCEDD) provided the parameters to CEDR. We consider all employment as continuous, so that our quantifiable estimate of the firm's operations may be measured and understood as an annual occurrence. That is, as long as the firm's doors remain open, the quantifiable impact will continue year to year.

We analyze each of the parameters using the IMPLAN ProfessionalTM Impact Analysis Software (IMPLANTM), a widely accepted application of input-output analysis that relies on historical data for making estimates of impact. We use Type II multipliers for the analysis. A description of the IMPLANTM model, including multipliers, is in Appendix A.

We explain the estimated economic impact to the county attributable to the mortgage banking firm in Section III. The impact is measured by employment, labor income, and output. These are three measurements of the same phenomenon just like weight, density, and shape are ways to measure a solid. The impact on employment is measured in terms of jobs. Labor income, which is aggregated from all sources, including employment income and proprietors' income, is denominated in 2002 dollars. Output, akin to sales, is also measured in 2002 dollars.

The measures of economic impact include the direct, indirect, and induced effects. For example, when a firm purchases locally produced milk, the dairy, in turn, must spend a portion of the funds received from the firm to hire workers, buy milking machines, and pay for veterinary services. The first round, or initial, spending produces a direct effect on the county's economy. The effects of subsequent spending by businesses, such as the purchase of milking machines and veterinary services, are called the indirect effects. And, workers' spending, which becomes possible due to their incomes motivated by direct and indirect expenditures, leads to induced effects. So it goes, round by round, with the initial spending by the firm having a multiple effect on employment, labor income, and output within the county.

These rounds of spending continue within the county until the initial expenditures that were made by the firm "leak" out of the county's economy. Leaks occur due to taxes, savings, and spending

for goods and services produced outside of Hillsborough County.

II. Parameters for Analysis

We show the parameters for the hypothetical firm, as provided by the HCEDD, in **Table 1**, below.

The parameters for the mortgage banking firm are 499 workers in North American Industrial Classification System (NAICS) Industry 522292 (Real Estate Credit).¹ The workers in this firm will earn a total of \$33,857,150 per year in labor income. The work facility costs \$29,406,086 to build and another \$12,602,608 to equip.

Table 1
Parameters of Hypothetical Firm

Mortgage Banking Firm		Sq. Ft.	Employees	Avg. Unit Cost	Capital Investment	Wages
Model:						
Activities:	Mortgage Banking					
Commercial	Class A Office & Support Space					
	Construction	154,188		\$ 191	\$ 29,406,086	
	Equipment	154,188		\$ 82	\$ 12,602,608	
	Employees		499	\$ 67,850		\$ 33,857,150
Totals		154,188	499		\$ 42,008,694	\$ 33,857,150

We analyze the construction of work facilities using IMPLANTM Industry 38, Commercial and Institutional Buildings, which is a part of NAICS Industry Sector 23, Construction.

Then, we analyze the equipment expenditure for the firm using IMPLANTM Industry 390, Wholesale Trade, which equates to NAICS Industry Sector 42, Wholesale Trade.

A mortgage banking firm produces output categorized by NAICS Industry 522292, Real Estate Credit. We analyze output in this industry using IMPLANTM Industry 425, Non-depository Credit Intermediation and related activities, which equates to the NAICS Industries 5222 and 5223.

¹ The North American Industry Classification System (NAICS) has replaced the Standard Industry Classification (SIC) system. NAICS was developed jointly by the U.S., Canada, and Mexico to provide new comparability in statistics about business activity across North America.

III. Estimated Economic Impact of a Financial Services Firm

This section explains the estimated economic impact in Hillsborough County of operations and capital investment by a hypothetical mortgage banking firm.

The construction phase of this project requires capital investment of \$29,406,086 for the work facility and \$12,602,608 for equipment. We present the results of analysis of the construction phase in **Table 2** for the work facility and **Table 3** for the equipment.

Table 2
Construction of \$29,406,086 Commercial and Institutional Building
in Hillsborough County, Florida
Results of IMPLAN Analysis

	Employment	Labor Income (2002\$)	Output (2002\$)
Direct	383.6	\$ 13,744,914	\$ 29,406,086
Indirect	130.1	4,862,240	11,268,393
Induced	196.6	6,173,508	17,453,159
Total	710.3	\$ 24,780,662	\$ 58,127,638

The construction of the \$29.4 million work facility will result in over \$58.1 million of increased output generated in Hillsborough County during the year of the construction phase. The construction phase generates employment for about 710 workers who will earn almost \$24.8 million in labor income.

Table 3
Furnishing of \$12,602,608 of Equipment through
Wholesale Suppliers in Hillsborough County, Florida
Results of IMPLAN Analysis

	Employment	Labor Income (2002\$)	Output (2002\$)
Direct	83.8	\$ 4,627,587	\$ 11,444,430
Indirect	28.0	1,077,305	2,683,813
Induced	60.3	1,892,776	5,351,077
Total	172.1	\$ 7,597,668	\$ 19,479,320

We estimate that of the \$12.6 million investment in equipment, purchased through wholesalers, about \$11.4 million will be purchased in Hillsborough County. This generates an increase in output in Hillsborough County of over \$19.4 million. This is a one-time increase as a part of the construction phase. The equipment purchases generate about 172 jobs paying almost \$7.6 million in labor income.

When the construction phase is complete, the mortgage banking firm begins operations. We show the economic impact of the operation of a single mortgage banking type of financial services firm in **Table 4**.

Table 4
 Operations of a Mortgage Banking Firm
 in Hillsborough County, Florida
 Results of IMPLAN Analysis

	Employment	Labor Income (2002\$)	Output (2002\$)
Direct	499.0	\$ 33,857,150	\$ 69,419,872
Indirect	142.9	5,328,157	12,692,746
Induced	243.3	7,641,251	21,602,622
Total	885.2	\$ 46,826,558	\$ 103,715,240

The 499 workers employed by the firm are the direct effect. These workers annually earn almost \$33.9 million and produce output valued at more than \$69.4 million. Of the direct output produced by the 499 workers, almost \$47.7 million is consumed locally (Hillsborough County), while the remaining \$21.7 million is consumed in domestic trade destinations elsewhere in the United States. The indirect effect of local suppliers to the firm is 143 new jobs paying about \$5.3 million and producing sales of almost \$12.7 million each year. The induced effect of workers' consumption expenditures on the local economy are 243 new jobs with income approximately \$7.6 million and sales around \$21.6 million each year.

For the operation of the mortgage banking firm, we develop a multiplier that summarizes the direct, indirect, and induced impacts, which combine to produce its total effect. **Table 5** shows multipliers for the mortgage banking firm.

Table 5
 Operations of a Mortgage Banking Firm
 in Hillsborough County, Florida
 IMPLAN Multipliers

	Employment Multiplier	Labor Income Multiplier	Output Multiplier
Direct	1.000	1.000	1.000
Indirect	0.286	0.157	0.183
Induced	0.488	0.226	0.311
Total	1.774	1.383	1.494

We calculate the multipliers by dividing a Total measurement of impact by the Direct effect for that measurement. For instance, we find the mortgage banking firm's Total Employment Multiplier of 1.774 by dividing Total Employment of 885.2 by the Direct Employment of 499.0. The interpretation of this multiplier is that for every job generated at the mortgage banking firm, another 0.774 jobs, or a total of 1.774 jobs, are generated for Hillsborough County's economy. We similarly interpret the Total Labor Income and Total Output multipliers.

Appendix A.

Regional Economic Development Impact Analysis

*The Center for Economic Development Research (CEDR), College of Business Administration, University of South Florida (USF), uses the **IMPLAN Professional**TM Social Accounting and Impact Analysis Software (an input-output model) for economic impact analyses. Data (year 2002 currently available) for each county in the state of Florida are available. County-wide data may be aggregated to focus on a region, such as the 7-county region - Hernando, Hillsborough, Manatee, Pasco, Pinellas, Polk and Sarasota - of special importance to the USF community. The following article briefly explains the economic impact analysis and the assumptions upon which the analysis is based.*

The Impact Analysis.

Economic impact analysis is based on conditional, predictive models of the form: If ...then... An input-output model is one type of model used in impact analysis. Other generally accepted models are the economic base model and the income-expenditure model. Compared with the input-output model, both the economic base and income-expenditure models are limited in application to small economic regions in which the interdependencies (sales/purchase relationships) between producing sectors are insignificant.

Interindustry relationships were first described in 1758 by the Frenchman Francois Quesnay, founder of the physiocratic or “natural order” philosophy of economic thought. The physiocrats depicted the flow of goods and money in a nation, and thus made the first attempt to describe the circular flow of wealth on a macroeconomic basis. Wassily Leontief was born in Russia in 1906 and first studied economic geography at the University of St. Petersburg before moving to Berlin and China. He came to the United States in 1931 and, after a brief 3-month stint at the National Bureau of Economic Research in New York, he was hired by Harvard University. At Harvard, Professor Leontief undertook a research project that encompassed a 42-industry input-output table showing how changes in one sector of the economy lead to changes in other sectors. From this research, he developed the concept of multipliers from input-output tables, and was subsequently awarded the Nobel prize in economics in 1973 for his development of input-output (I-O) economics.

The historical transactions data in the I-O model represent the sales and purchases between sectors that occurred over an estimation period. These data describe each sector’s “purchases” and “sales” linkages with the rest of the economy. For each productive sector the transaction data take into account all sales revenue and costs, with the difference between revenue and costs being profit, which is a part of value added. (Total value added to a product at each stage of its production is the sum of wages and salaries, rents, profits, interest, and dividends.) The historical transaction or descriptive data are used to create the *descriptive* model of information about local economic interactions called *regional economic* accounts. These accounts, or transaction tables, describe a local economy in terms of the flow of dollars from purchasers to producers within the defined region.

For example, an increase in government purchases (first round) of output from the “manufacturing” sector of a region may require the “manufacturing” industry, in order to expand output, to purchase (second round) factor inputs from other sectors of the regional economy. In turn, these other sectors may have to purchase (third round) inputs to deliver the supporting production of factors to the “manufacturing” sector. The rounds of spending will continue with each round becoming increasingly weaker in its impact because of leakages from the region attributable to imports, savings, and taxes.

The first round is called the direct effects of the change in final demand (consumption) in a sector(s) of the economy. The second and subsequent rounds are collectively referred to as the indirect effects of interindustry purchases (reduction in purchases) in response to direct effects.

The *open* I-O model just described does not take into account changes in spending in the region, in response to the direct effects, for household consumption. Changes in spending from households as income or population increases (decreases) due to changes in the level of production are called induced effects.

Induced effects are incorporated into the I-O descriptive model by forming a *closed* model. That is, transactions of the household sector are made endogenous to the model by treating households as a producing sector. The household sector sells its labor to the other producing sectors and purchases factor inputs, i.e. consumption expenditures, in order to maintain its labor.

There are two steps in impact analysis using the I-O model. First, the descriptive model is created; then, the predictive model is derived from the descriptive model. The descriptive model contains information about interindustry transactions called the *regional economic accounts*. The information describes the flow of dollars from purchasers to producers within the region.

In addition to the regional economic accounts, the descriptive I-O model includes the *social accounts*. Social accounting data include, for example, taxes paid by businesses and households to government, and transfer payments from government to businesses and households. Trade flows also are a part of the social accounts.

Trade flows describe the movement of goods and services between the region and the rest of the world, that is imports and exports. The analyst must choose between *regional purchase coefficients* (RPCs) or supply/demand pooling. RPCs are econometrically derived to predict local purchases based upon a region’s characteristics. In contrast, *supply/demand pooling* presumes everything that can be purchased locally, will be. Hence, it will lead to larger multipliers than RPCs, because the leakages for imports are less. (The analyst also decides if local purchase coefficients - LPCs - are to be applied to an event during impact analysis. If the LPCs were to be applied, the model’s RPCs are used to determine how much of the first-round expenditure is used to purchase local products and how much is for imported items. Otherwise, the RPCs are applied to second and subsequent rounds of spending only.)

The regional economic accounts and social accounts are used to build *multipliers*. The multipliers are the *predictive* I-O model. A set of multipliers are expected changes in output for each industry in the model given a one dollar change in final demand for any particular industry or commodity.

A multiplier measures the effects of a change in final demand(s) in a region. The change in economic activity is called the *impact*. The impact is essentially the expected or predicted consequence of a change in final demand(s) within the region due to a single event or a group of events. A group of related events may be referred to as a project.

A Type I multiplier measures the direct and indirect effects of a change in economic activity. It only captures interindustry effects within the region. In addition to the direct and indirect effects, a Type II multiplier captures the induced effects of changes in household income and expenditures. A Type III multiplier also captures direct, indirect, and induced effects. However, the Type III multiplier estimates the induced effects based upon changes in employment. It assumes the region is at full employment, then each job added or subtracted by the impact is associated with the region's average expenditures per person. A Type II multiplier is most commonly used in impact analyses.

Personal consumption expenditures (PCE) are spending by households and are strongly related to total personal income. Total personal income is income from all sources, including employment income and transfer payments that are based on place of residence. Because of commuting patterns, PCE in a region may not be strongly related to employment income in that location. Hence, the income based induced effects of the Type II multiplier are normally adjusted so that a regional average amount of transfer payments is associated with a change in employment income. Such multiplier is called a Social Accounting Matrices (SAM) Income multiplier. However, suppose that an increase (decrease) in employment income is not anticipated to be associated with a corresponding change in regional transfer payments. For instance, it may be believed that an increase in final demand will only generate low paying jobs. Then, it is likely that the under-employed will be hired and transfer payments will not increase in the region. Accordingly, a Specific Disposable Income may be applied to the Type II multipliers. That is, the change in household consumption expenditures is estimated by disposable income, which is defined as a specified (by the analyst) percentage of employment income.

A change in final demand may be applied to an industry or to a commodity. Industries are businesses producing goods and services; commodities are the goods and services being produced. An industry can make more than one commodity. An industry usually is named for the primary, by value, commodity it produces. Commodities produced by an industry, other than its primary commodity, are called secondary commodities or by-products. An industry applied change in final demand has a direct effect on the selected industry only. A commodity applied change in final demand directly affects all industries that produce the commodity, whether as a primary or secondary commodity. The analyst chooses between an industry or commodity applied change in final demand. The choice is appropriately based on the circumstance for the

change in final demand. The choice will affect the predicted impact.

As an alternative to estimating the economic impact of a change in final demand (“at the factory door”), the analyst may estimate the impact of a change in sales and employee payroll for a particular institution, e.g. state/local government education, or business sector. Then, a typical expenditure pattern for the institution or industry is generated to assess the economic impact of the change in sales and payroll. (If the event under study is believed to have an atypical expenditure pattern, this alternative approach is inappropriate. Instead the analyst should specify the expenditure pattern of the institution or industry in detail.) Using this alternative approach, the direct effect on final demand, i.e. output, in the region will be less than the change in sales. This happens because the model includes the institution’s or industry’s production function and final demand is an estimate of the value, in producer prices, of the factor inputs needed to generate the specified change in level of sales. The difference between the estimated change in final demand and the change in sales is total value added. Also, with this approach, the induced effects are interpreted as resulting from a change in household spending by the suppliers of the institution’s or industry’s factor inputs (first round) as well as subsequent rounds of interindustry sales/purchases.

Margins are used to convert purchaser prices to producer prices. Margins depend on the consumer. For example, households pay the full retail margins, but government may pay little or no retail margins because it has more buying power than individual households. Margins split a purchaser price into appropriate producer values, each value impacting a specific industry. For example, the purchaser price of a tire at an automotive retailer includes the producer price at the factory door plus transportation costs, the wholesaler’s markup, and the retailer’s markup. Unless edited by the analyst, margins used in impact analysis are national averages.

A deflator may be used to convert expenditures to the base year (estimation period) used to calculate predictive multipliers and to inflate the reports of impact analysis to the current year. Deflators are associated with commodities, and are also used to adjust margin values.

A predicted regional impact may be gauged in terms of output (a change in production measured in dollars), of employment (a change in employment measured by number of jobs), or of personal income (a change in income from all sources, including employment and transfer payments, for persons residing in the region).

I-O Model Assumptions.

The following are the fundamental assumptions of the I-O model. First, it is assumed that the proportions in which each sector purchases its inputs from all other sectors are invariant over the period of analysis. The implications of this assumption are unchanged technology, constant relative prices, no shift in the mix production activities within sectors, and no new significant firm has moved into or out of the region.

Second, the I-O model assumes linear production functions, that is a sector's inputs remain in proportion to its output. This implies that no industry enjoys economies of scale. Third, each sector of the regional economy is assumed to be homogeneous. An increase (decrease) in a sector's final demand will always have the same impact on the economy. And fourth, in the closed I-O model, it is assumed that the household sector's marginal propensity to consume equals its average propensity to consume.

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