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Marcellus Shale and Local Economic Activity: What the 2013 Pennsylvania State Tax Data Say

Emily O'Coonahern, Kirsten Hardy, and Timothy W. Kelsey

October 8, 2014

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I. Introduction

Development of Marcellus shale has brought many changes to parts of the Commonwealth since drilling began in select Pennsylvania counties in 2007. It is evident that this drilling for natural gas economically benefits the shale companies and energy industry; however, the local economic impacts of shale gas development activity are not quite as obvious. This analysis aims to identify the extent to which local economies have been affected by examining the Pennsylvania State Tax data- including residents' personal taxable income and the state sales tax collections.

Throughout the development of Marcellus shale, there has been ongoing discussion that many of the shale related jobs have gone to nonlocals. The concern is that these outsiders are the ones gaining the economic benefits and therefore the money is not staying within the local economies where the drilling is taking place. For the purposes of this analysis, we are not aiming to compare the economic benefits that nonlocals receive and are instead solely focusing on data that only accounts for local residents.

The Pennsylvania Department of Revenue has several data series that focus on permanent county residents alone. The Department releases aggregate Personal Income Tax data at the county level, which is compiled directly from personal income tax returns of taxpayers who self-identify as being a resident of that particular county. This information allows for analysis on how much income resulting from Marcellus shale development remains within a county. Additionally, the Department of Revenue releases data on state sales tax and realty transfer tax collections within each county. This information offers further understanding on how Marcellus shale development is affecting local economies.

This report provides basic analysis of state tax information between the years 2004-2013 as reported in the Department of Revenue's 'Pennsylvania Tax Compendium.' This report updates similar analyses conducted in previous years (Costanzo and Kelsey, 2011; Costanzo and Kelsey, 2012; and Hardy and Kelsey, 2013). Although shale development activity in Pennsylvania is still within its first decade and therefore relatively early to fully understand long run economic impacts, this report provides a more current perspective on Marcellus shale activity in relation to local income.

II. Method of Analysis

Counties were sorted into one of four categories using Pennsylvania Department of Environmental Protection data on the number of wells drilled during the study years. Changes in income reported on tax returns and state tax collections within each county were calculated using the Department of Revenue data, adjusting for inflation using 2007 dollars, followed by the calculations of the average changes within each county. Differences in dates for the data availability resulted in the tax analysis being conducted for different comparison years for some taxes. The most recent currently available Personal Income Tax data is from the calendar year 2011, while the most recent currently available state Sales and Realty Transfer Tax data is from the 2012/2013 fiscal year (July 1 through June 30).

For analysis of the Personal Income Tax, we grouped counties by those with more than 90 Marcellus wells between 2007 and 2011; 10 to 89 Marcellus wells; 1 to 9 Marcellus well; and no Marcellus wells (see Appendix A for a complete list of the counties). For the Sales Tax and Realty Transfer Tax analysis we grouped counties by those with 150 or more Marcellus wells, 10 to 149 Marcellus wells, 1 to 9 Marcellus wells, and no Marcellus wells drilled between July 1, 2004 and June 30, 2013. These

categories were selected due to how the counties clustered by well counts and are consistent with the categories used in the previous three versions of this report (Costanzo and Kelsey, 2011; Costanzo and Kelsey, 2012; Hardy and Kelsey, 2013). In comparison to the most recent version of this report (Hardy and Kelsey, 2013), six counties changed from one category to the other for analysis of Personal Income Tax; four moved from the 10-89 wells group to the 90+ group. Only three counties changed well count categories when broken down for analysis of Sales Tax and Realty Transfer Tax; two of which moved from the 10-149 wells groups to the 150+ group.

To see how tax collections are changing over time, we compared these results to previous years' analysis. We chose to take a closer look at the percent change in state Sales Tax and Realty Transfer Tax from the years 2004 to 2013 to detect long-term trends in Marcellus shale development. Additionally, we calculated the changes in Personal Income Tax data from 2004 to 2011 on a per tax return basis as well as percent change over time.

It is important to note that the data reflect tax collections by the state government within each county; county governments cannot levy these taxes. In addition, the Earned Income tax available to municipalities and school districts is much narrower than the state Personal Income Tax analyzed in this study, only including wage and salary, and net profit income. The analysis should not be viewed as reflecting what is occurring with tax collections by local governments and school districts.

III. Taxable Personal Income of County Residents

The Commonwealth's Personal Income Tax is a levy on personal income- including wages and salaries, interest, investment income, and leasing and royalty income. Social security and pension income are exempt from the tax, so such income is not reported by the Department of Revenue. Data on the tax is released by the Department of Revenue separately from sales, realty, and other state tax information, with the release typically lagging a year behind information on these other taxes. The most up-to-date Personal Income Tax data at the time of writing is for the 2011 tax year (note that this is two years older than data on the other taxes). Because the Department of Revenue aggregates this data by the residence of the taxpayer (not the county where they may work), the data solely reflects the earnings of county residents; earnings and other income of non-local workers who commute into the county or those whose legal residence is outside of Pennsylvania is not included in the county totals.

In addition to total personal income, it is important to consider how specific types of income have changed in relation to Marcellus shale activity, which helps to clarify the distribution of benefits form the natural gas development. This further analysis identifies the changes in the three types of income subject to the personal income tax most likely to be affected by Marcellus drilling activity including Gross Compensation (e.g. wages and salaries); Rents, Royalties, Patents and Copyrights income; and Net Profits income.

A. Total Personal Income

The number of Personal Income Tax returns filed by residents statewide declined an average of 2.4 percent at the county level between 2007 and 2011, with counties with the most Marcellus shale activity performing at about this level (see Table 1). The counties with low to medium Marcellus shale activity (1 to 9 wells and 10 to 89 wells) experienced larger average decreases in the number of tax returns filed than the counties with the highest Marcellus concentration (90+ wells). Counties with no Marcellus wells had the smallest average decrease in the number of returns filed, meaning that these counties didn't experience as great of a reduction in the number of taxpayers when compared to the other counties on average.

Total taxable income reported in the counties with the most Marcellus activity outperformed the state average when adjusted for inflation, increasing an average of 4.3 percent compared to a 4.4 percent average decrease in taxable income statewide at the county level. Of the top twelve Marcellus counties however, just seven showed positive changes in taxable income, with four of those positive changes being quite large (see Appendix B). Bradford, Tioga, Susquehanna, and Greene County experienced average increases of 25.4 percent, 25.4 percent, 12.7 percent, and 14.4 percent in total taxable income, respectively (these values are adjusted for inflation with respect to 2007 values). Of the top Marcellus counties that experienced decreases of average taxable income, Fayette and Armstrong were the only two with declines greater than the state average, with 5.3 percent and 16.8 percent in total taxable income average decreases, respectively.

Table 1. Percent Change in Taxable Income Subject to the Personal Income Tax, by Drilling Activity

Level of Marcellus Activity in County	**2007 to 2011**	
	Average Change in Taxable Income Adjusted for Inflation (number of counties)	**Average Change in Number of Returns from County Residents**
More than 90 Marcellus wells	4.3% (12)	-2.4%
10 to 89 Marcellus wells	-1.5% (11)	-2.7%
1 to 9 Marcellus wells	-6.3% (14)	-4.5%
No Marcellus wells	-8.1% (30)	-1.3%
State Average Change at the County Level	-4.4% (67)	-2.4%

Sources: PA DEP; PA Dept. of Revenue, Personal Income Tax Statistics

B. Gross Compensation (wages and salaries)

Gross compensation includes all reported wages and salaries. Between the years of 2007 and 2011, total gross compensation to residents in counties with 90 or more Marcellus wells on average increased more when adjusting for inflation than in those counties with fewer or without wells (see Table 2). In fact, the counties with 90 or more wells were the only group to experience a positive average change in gross compensation during this time period. For example, gross compensation increased an average of 1.4 percent between 2007 and 2011 in counties with more than 90 Marcellus wells, compared to a 3 percent average decrease in counties with no Marcellus wells. This increase could indicate increasing wage rates, residents working a greater number of hours at maintained wages, or a combination of both factors in these high Marcellus Shale activity counties. Nine of the twelve counties in the group with 90 plus wells also individually had a positive change in gross compensation from 2007 to 2011 (See Appendix B).

The average number of tax returns reporting such income (e.g. wages and salaries), which reflects total employment of county residents, declined for the state as a whole by 1.4 percent. Such a decline similarly occurred for all the averages of different county groupings of Marcellus wells. This average number of returns declines could be explained by the national economic recession in 2008 and 2009, when unemployment peaked.

That gross compensation in high drilling counties increased while the number of returns reporting employment income decreased suggests that Marcellus shale development has a larger effect on the total wages and salaries received by county residents than it does on the number of county residents employed. This could occur if the demand for labor exceeds the local supply and therefore drives up local wages or hours worked.

Table 2. Percent Change in Gross Compensation, by Drilling Activity

Level of Marcellus Activity in County	**2007 to 2011**	
	Average Change in Gross Compensation Adjusted for inflation (number of counties)	**Average Change in Number of Returns Reporting this Income**
More than 90 Marcellus wells	1.4% (12)	-1.1%
10 to 89 Marcellus wells	-0.8% (11)	-1.3%
1 to 9 Marcellus wells	-4% (14)	-3.2%
No Marcellus wells	-3% (30)	-0.8%
State Average Change at the County Level	-2.1% (67)	-1.4%

Sources: PA DEP; PA Dept. of Revenue, Personal Income Tax Statistics

C. Rents, Royalties, Patents and Copyrights

Lease and royalty payments from gas companies to mineral right owners are categorized on state tax forms as 'rents, royalties, patents and copyrights' income. In the initial years of gas development when the companies obtain the rights to drill and before much drilling and infrastructure development occurs, it would be expected that lease dollars will exceed royalties. As the development matures and most mineral rights have been leased, more wells are drilled and start producing, the proportion of royalty dollars should increase and the share of leasing dollars should drop.

Changes in both the number of tax returns and reported rents, royalties, patents and copyrights income varied substantially between the counties (Table 3). Counties with 90 or more Marcellus wells had the highest average increases in returns (40.3 percent) along with the highest average change in taxable income (299.6 percent). Counties without any Marcellus wells also experienced average growth in both of these areas but it was notably less than that of the counties with wells (9.3 percent average increase in number of returns and 10.3 percent increase in average total taxable income).

Table 3. Percent Change in Rents, Royalties, Patents and Copyrights, by Drilling Activity		
Level of Marcellus Activity In County	**2007 to 2011**	
	Average Change in Rents, Royalties, Patents and Copyrights Income Adjusted for Inflation (number of counties)	**Average Change in Number of Returns Reporting this Income**
More than 90 Marcellus wells	299.6% (12)	40.3%
10 to 89 Marcellus wells	106.7% (11)	19.5%
1 to 9 Marcellus wells	154.6% (14)	17.9%
No Marcellus wells	10.3% (30)	9.3%
State Average Change at the County Level	108.1% (67)	18.3%
Sources: PA DEP; PA Dept. of Revenue, Personal Income Tax Statistics		

Some of the royalty income increase in non-Marcellus counties is likely related to Marcellus activity, because land being developed for Marcellus includes second home and recreational land owned by Pennsylvanians living outside of Marcellus counties and land owned by the Commonwealth. Furthermore, a number of the counties in the southwestern area of Pennsylvania have histories of coal mining and shallow natural gas drilling, at which time many of the landowners sold the mineral rights of their land. Public records documenting these transactions typically are kept at the individual property level rather than being aggregated, making it difficult to identify the proportion of surface owners who do not own the mineral rights beneath their property, much less the proportion of such mineral right owners who live outside the county.

It is important to note that two previous tax reports found much larger average changes in rents, royalties, patents and copyrights income. From 2007 to 2009, for example, counties with the most Marcellus drilling experienced an average increase of 441.5 percent (Costanzo and Kelsey, 2012), while this was an average increase of 460.8 percent from 2007 to 2010 (Hardy and Kelsey, 2013). This could indicate that increases from rents, royalties, patents, and copyrights have peaked for most of the high-activity Marcellus counties. Charts 1a and 1b depict year-to-year average percent changes for number of returns and income. Chart 1b emphasizes a dramatic spike between 2007-2008 for counties of high Marcellus activity, but the average changes since them have been much smaller.

Chart 1a. Average Percent Change in Number of Tax Returns with Rent, Royalty, Patent and Copyright Income

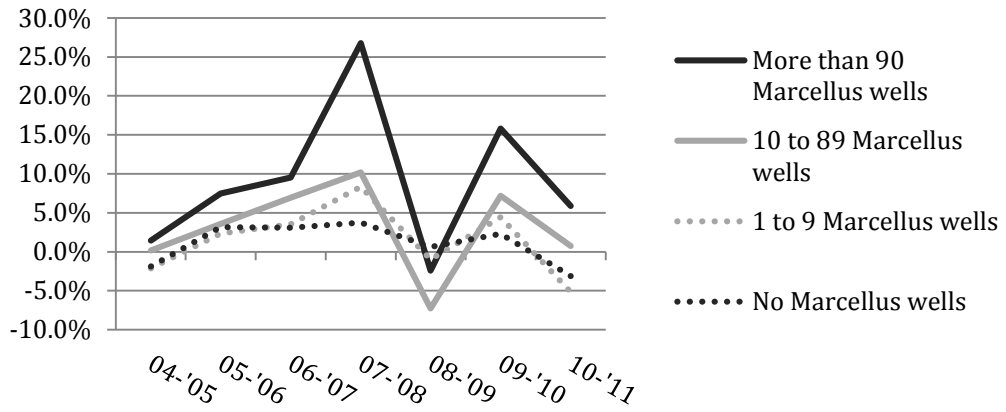
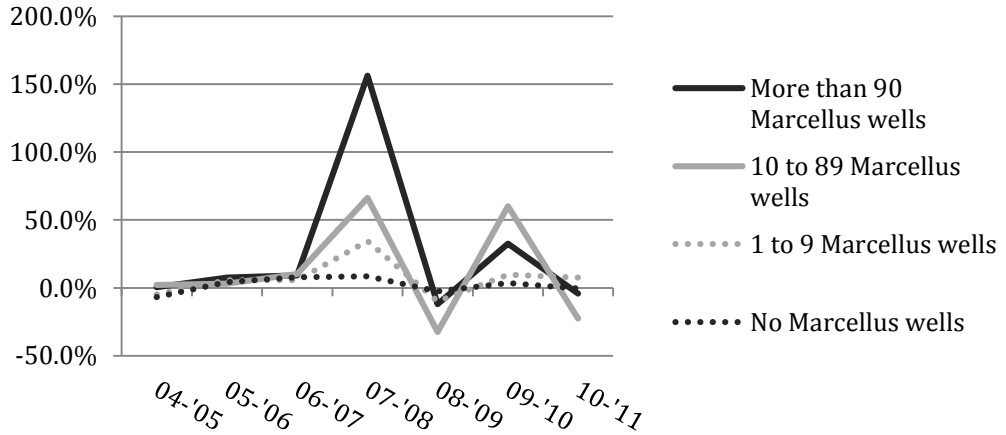


Chart 1b. Average Percent Change in Rent, Royalty, Patent, and Copyright Income ($) in 2007 Dollars



D. Net Profits

Net profits are the profits from the operation of a business that is owned by a resident taxpayer. The state tax data indicates that net profits income on average increased more in high and medium drilling counties from 2007 to 2011 when compared to averages from counties with little to no Marcellus drilling activity (Table 4). In particular, net profits income in counties with 90 or more Marcellus wells increased an average of 20.7 percent while net profit income in counties with no wells decreased an average of 3.7 percent.

It is important to note that the number of tax returns reporting net profit income on average declined in the counties with Marcellus activity. This suggests that the increasing local profits were spread across fewer locally owned businesses, indicating that perhaps locally owned businesses have a lower survival rate in Marcellus counties. Anecdotes from some drilling counties suggest that this could be due to a variety of outside factors including increased competition from non-local firms that have moved into the counties due to the Marcellus activity, local businesses merging with outside companies, owners

discontinuing their business to work for Marcellus and potentially make more money, or local businesses consolidating with competitors. Due to the limited data available, however, there is no way to confirm these theories within the scope of this report.

Table 4. Percent Change in Net Profits, by Drilling Activity

Level of Marcellus Activity In County	2007 to 2011	
	Average Change in Net Profits Income Adjusted for Inflation (number of counties)	**Average Change in Number of Returns Reporting this Income**
More than 90 Marcellus wells	20.7% (12)	-3.9%
10 to 89 Marcellus wells	8.9% (11)	-1.2%
1 to 9 Marcellus wells	-5.1% (14)	-5.3%
No Marcellus wells	-3.7% (30)	0.8%
State Average Change at the County Level	2.5% (67)	-1.7%

Sources: PA DEP; PA Dept. of Revenue, Personal Income Tax Statistics

E. Composition of Total Income

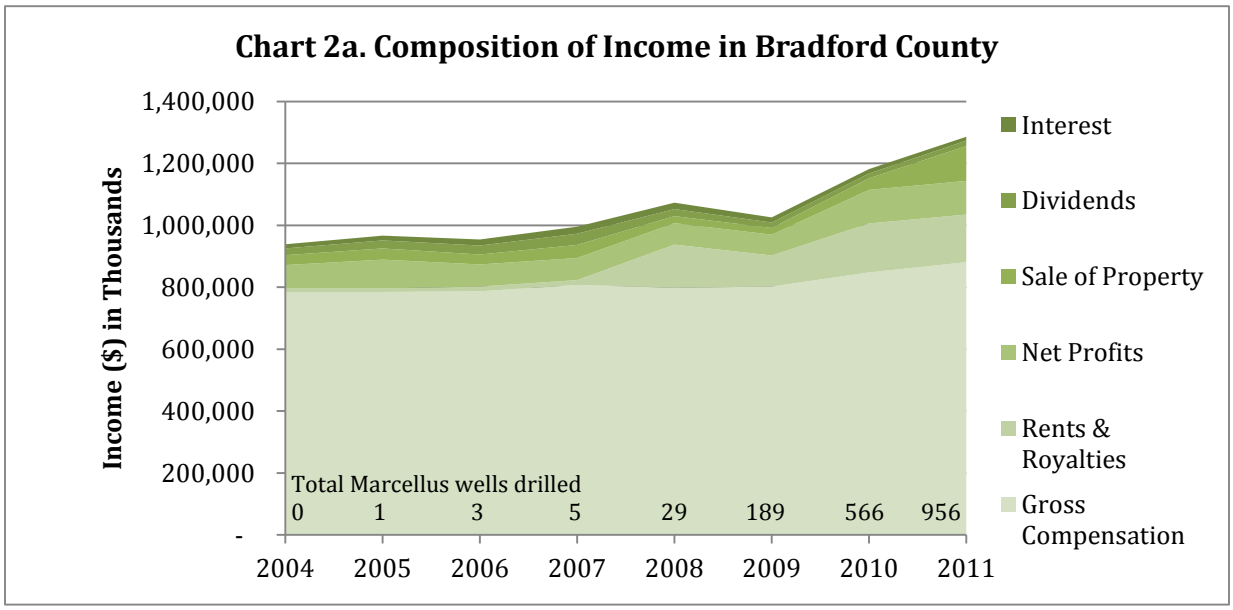
Average changes in the composition of residents' total income in Pennsylvania counties are shown in Table 5. In 2004, prior to the boom in Marcellus shale development, the average composition of income across all Pennsylvania counties was fairly similar, with gross compensation accounting for around 82 to 85 percent of total taxable income. In 2011, several years after the boom in development, the composition of income between counties with a great number of Marcellus shale development and counties with little to no development is quite different. In counties with Marcellus shale activity, rents, royalties, patents and copyrights income on average has become a much larger share of total local taxable income. In counties with 90 or more wells, it went from 1.3 percent of total income in 2004 to 5.5 percent in 2011. Additionally, while the share of income from sales of property declined in counties with little or no Marcellus wells over the 8-year period, in counties with large or medium amounts of Marcellus wells the share of income from sales of property increased from 2004 to 2011.

Table 5. Proportion of Sources of Total Income 2004 to 2011, by Drilling Activity; adjusted for inflation

	90 or more Marcellus wells		10 to 89 Marcellus wells		1 to 9 Marcellus wells		No Marcellus wells		Pennsylvania	
	2004	2011	2004	2011	2004	2011	2004	2011	2004	2011
Gross Compensation	84.6%	79.3%	81.6 %	78.6%	84.6 %	82.3%	83.5 %	84.0%	82.2 %	81.5 %
Rents & Royalties	1.3%	5.5%	1.5%	3.2%	1.3%	3.9%	1.2%	1.3%	1.2%	1.6%
Net Profits	7.9%	9.3%	8.9%	10.2%	7.8%	8.6%	8.3%	9.1%	8.4%	9.7%
Sale of Property	3.4%	3.6%	4.5%	4.9%	3.3%	2.5%	4.0%	2.8%	4.7%	3.7%
Dividends	2.0%	1.7%	2.3%	2.1%	2.1%	2.0%	2.0%	1.9%	2.4%	2.3%
Interest	1.6%	1.2%	1.8%	1.5%	1.7%	1.3%	1.6%	1.4%	1.6%	1.3%

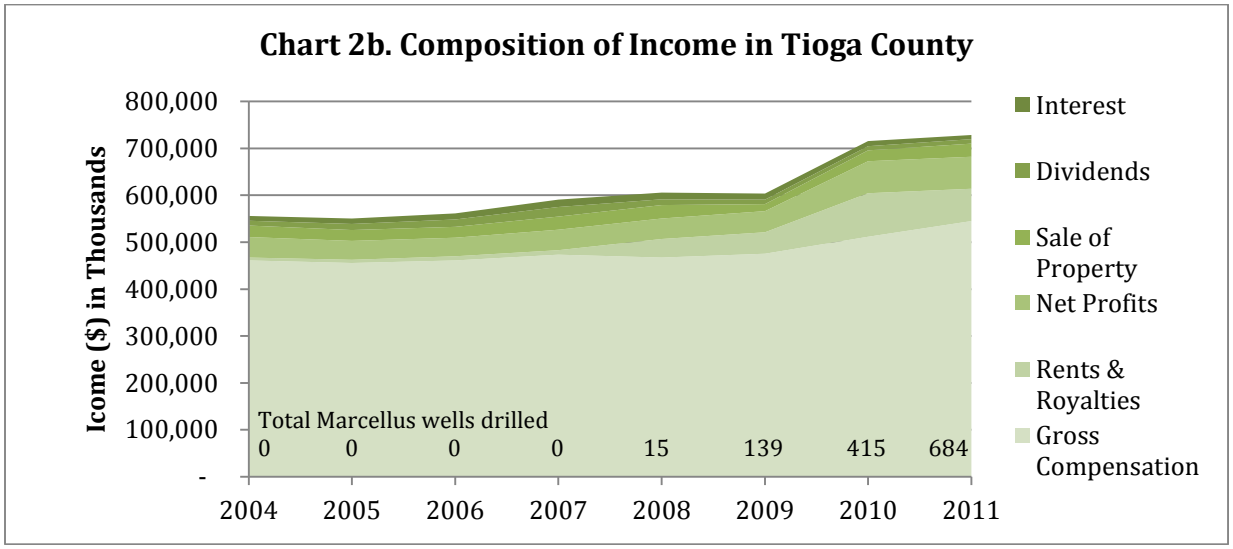
Sources: PA DEP; PA Dept. of Revenue, Personal Income Tax Statistics

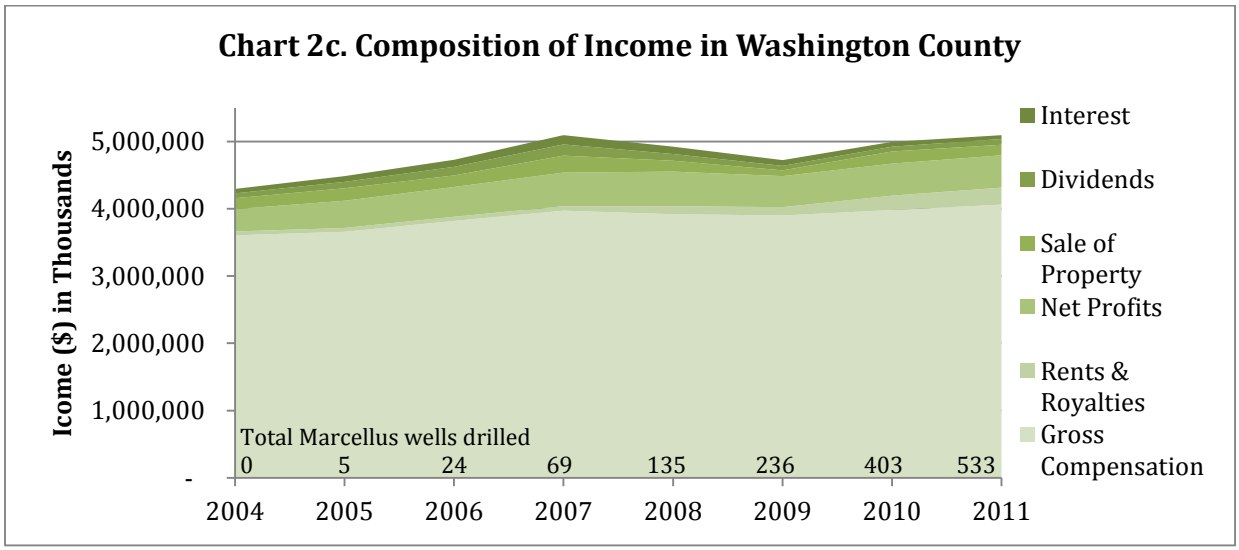
The impacts of Marcellus activity on total income are best seen in the counties with the most Marcellus development. As of 2011, the four counties with the most Marcellus wells were Bradford, Tioga, Washington, and Lycoming. In Bradford County, the majority of Marcellus drilling activity happened from 2009-2011. The county has experienced significant economic impacts, with a 25.4 percent increase in total taxable income between 2007 and 2011 (adjusted for inflation). Much of this increase is due to lease and royalty income (see Chart 2a), which increased 960.5 percent during this same time period. The sale of property also increased by 165.5 percent from 2007 to 2011, suggesting that either more real property was sold, market prices have increased a great deal, or a combination of both factors.

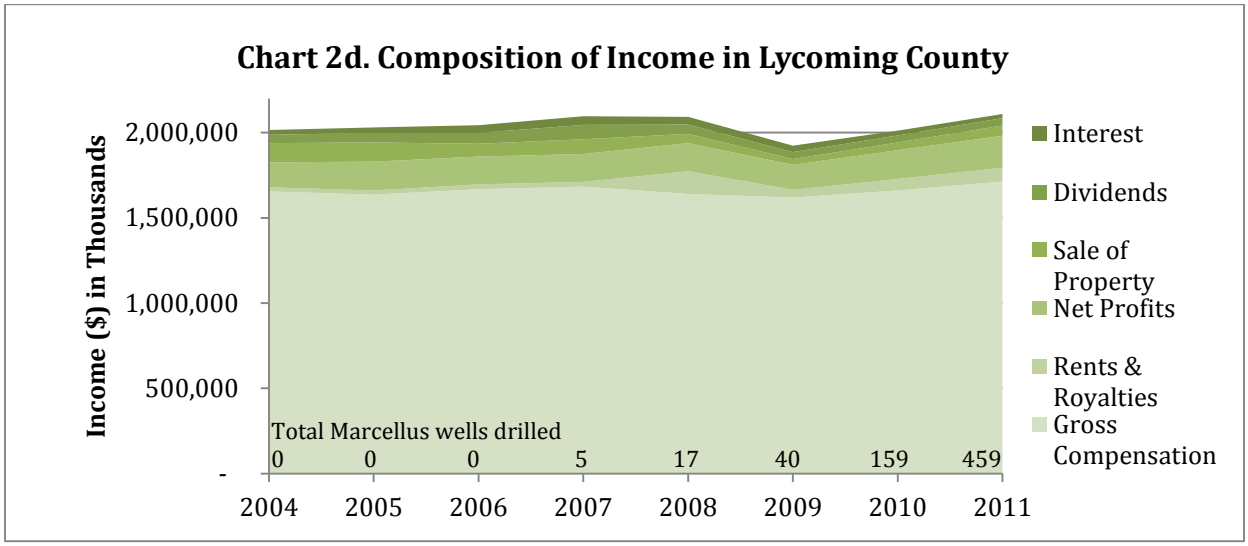


A similar pattern of growth in income exists from rents, royalties, patents, and copyrights can clearly be seen in Tioga County (see Chart 2b). This pattern is still present, yet less dramatic in Washington and Lycoming as well (charts 2c and 2d). As the number of Marcellus wells increased within a county, the proportion of income from rents, royalties, patents and copyrights income also increased. Like Bradford, Tioga County didn't begin to experience significant Marcellus activity until 2009. Washington's timeline of significant Marcellus development began slightly before, in 2007. The less dramatic increases in

income seen in Washington County could be due to their more gradual increase in Marcellus activity compared to the other counties, that the county has a much larger population than the other high drilling counties, or fewer local residents owning mineral rights. Lycoming on the other hand, just experienced its substantial increase in Marcellus activity in 2011, so it is still early to clearly deduce local economic income growth. However, even during the moderate Marcellus activity from 2008-2010, the graphs indicate some increase in sales of property, net profits, and rents, royalties, patents and copyrights.







IV. Local Retail Sale Activity (State Sales Tax Collections)

Sales Tax collections are a marker of the level of retail activity occurring within a county. Higher local retail sales mean more state sales tax collections, while declining local retail sales mean lower collections (though changes in sales tax collections don't perfectly track retail sales because food and clothing are excluded from the tax). The state sales tax data indicate collections in counties with high Marcellus activity on average outperformed collections in counties with little or no Marcellus activity. State collections in counties with 150 or more Marcellus wells drilled between July 1, 2007, and June 30, 2013, for example, experienced an average increase of 14.2 percent (see Table 6) compared to an average decrease of 13.1percent in counties with no Marcellus activity during the same time period. This signifies that counties with much more Marcellus activity, on average, are experiencing large increases in retail activity than are those without such activity.

There were several dramatic increases between 2007 and 2013 that particularly stand out; Sales Tax collections in Greene County increased by 73.6 percent, collections in Bradford increased by 45.4 percent, and collections in Susquehanna increased by 35.2 percent when adjusting for inflation (see Appendix D). Even though not all counties with substantial Marcellus activity experienced such large increases in retail activity, those with Marcellus activity on average greatly outperformed the counties with little or no Marcellus activity. Of the 28 counties in 2013 with no Marcellus activity, all but one experienced decreases in state Sales Tax.

Table 6. Average Change in State Sales Tax Collections, by Marcellus Activity				
Level of Marcellus Activity in County	**Percent Change; adjusted for inflation** (number of counties at level of Marcellus activity)			
	July 1, 2007 to June 30, 2010	**July 1, 2007 to June 30, 2011**	**July 1, 2007 to June 30, 2012**	**July 1, 2007 to June 30, 2013**
150 or more Marcellus wells	7.6% (5)	17.8% (6)	26.9% (8)	14.2% (10)
10 to 149 Marcellus wells	-4.2% (13)	1.2% (16)	2% (19)	-5.2% (17)
1 to 9 Marcellus wells	-4.5% (13)	-5.6% (15)	-4.5% (11)	-5.7% (12)
No Marcellus wells	-10.9% (36)	-9.7% (30)	-12.6% (29)	-13.1% (28)
State Average Change at the county level	-7% (67)	-3.7% (67)	-2.4% (67)	-5.7% (67)

V. Realty Transfer Tax Collections

Pennsylvania's Realty Transfer Tax is one percent tax on the sale of real estate (many municipal governments and school districts also levy a local realty transfer tax). Changes in Realty Transfer Tax collections result from changes in the average value of sold properties, changes in the number of sales, or a combination of both.

State Realty Transfer Tax collections in counties with 150 or more wells on average increased 3.1 percent between 2007 and 2013 when adjusting for inflation (see Table 7). This is the only grouping of counties that experienced an average increase in collections during this time period. Counties with no Marcellus drilling decreased an average of 28.3 percent decline during the same period of time. This suggests that realty activity and value in counties of high Marcellus activity is much greater than those with little or no activity. This is especially noteworthy since the realty sector experienced some of the biggest setbacks during the 2008 economic downturn. McKean and Greene counties had the largest percent increase from 2007 to 2013, with 85.6 and 41.9 percent respectively.

Table 7. Average Change in State Realty Transfer Tax Collections, by Marcellus Activity				
Level of Marcellus Activity in County	**Percent Change; adjusted for inflation** (number of counties at level of Marcellus activity)			
	July 1, 2007 to June 30, 2010	**July 1, 2007 to June 30, 2011**	**July 1, 2007 to June 30, 2012**	**July 1, 2007 to June 30, 2013**
150 or more Marcellus wells	-17.4% (5)	-0.8% (6)	26.5% (8)	3.1% (10)
10 to 149 Marcellus wells	-13.8% (13)	-19.8% (16)	-18.5% (19)	-11% (17)
1 to 9 Marcellus wells	-22.2% (13)	-21.9% (15)	-30.8% (11)	-25.7% (12)
No Marcellus wells	-30.6% (36)	-37.8% (30)	-35.2% (29)	-28.3% (28)
State Average Change at the county level	-24.7% (67)	-26.6% (67)	-22.4% (67)	-18.7% (67)
Sources: PA DEP; PA Dept. of Revenue, Tax Compendium				

VI. Implications

The Pennsylvania Department of Revenue data show major tax collection patterns and thus local income effects associated with Marcellus Shale development. Counties with a large amount of Marcellus Shale drilling activity witnessed, on average, much larger percentage increases in residents' personal income and sales, and smaller declines in realty transfer tax collections than Pennsylvania counties with little or no Marcellus activity. The 25.4 percent increase in total taxable income between 2007 and 2011 in both Bradford and Tioga counties is especially noteworthy, especially since this is the largest percent increase of all Pennsylvania counties during this time period and Bradford and Tioga are also the counties with the most Marcellus activity during that time period (see Appendix B). Personal income statewide decreased an average of 7.6 percent at the county level, indicating that major economic benefits from Marcellus shale development are going to local residents, regardless of the presence of 'non-local' workers.

There were important differences between the types of taxable income. While there were increases in gross compensation income for workers, these increases tended to be much lower on average than the increases experienced in rents, royalties, and copyrights income, both proportionally and in real numbers when compared to the increases of other sources of income. This may reflect the presence of non-residents who take their wages out of the county. It is also important to note that in the high drilling activity counties, wages and salaries (represented by Gross Compensation tax data) are increasing faster than total employment of county residents. In other words, it would suggest that much of the employment effect for local residents from Marcellus work is either higher wages or more hours worked for existing workers, rather than from new hiring.

The proportionally large increases in rents, royalties, patents, and copyrights income since 2007 indicate that much of the local economic benefit of Marcellus activity is going to residents who own the mineral rights. Increases in this income tended to be much larger in the northeast region of the Commonwealth than in the southwest. This likely reflects the major prior history of mineral, oil, and gas development in

the southwest, and the resulting severing of mineral rights. Additionally, the data suggest that these local economic benefits may have peaked for many counties, at least in the short run.

The increases in sales tax collections are particularly important, because they indicate that Marcellus development is very positively affecting the local retail sector in counties with such activity. The increases in Sales Tax in several counties between 2007 and 2013, particularly in Greene (73.6 percent) and Bradford (45.4 percent) are especially remarkable. This, combined with the slight decline in number of residents reporting net profits income suggest that although many of the Marcellus counties are experiencing increased retail spending, the spending is occurring over fewer locally owned businesses. Those retail businesses that are surviving, however, are likely seeing increased spending and experiencing greater incomes because of this.

It is important to note that this analysis finds correlations between Marcellus shale activity and local economic activity; it does not prove that Marcellus shale activity has caused these economic changes. There was wide variation between counties within the same levels of drilling activity, so the experience of any individual county is different from the averages. Economic activity in these counties is affected by a wide variety of factors that extend beyond just Marcellus shale, and therefore drilling by itself cannot fully explain all the changes and differences between counties. However, the cross-tab analysis does convey general trends and influences associated with Marcellus development.

Since the state data was compiled at the county level, this analysis does not examine how the economic benefits within individual counties are distributed to residents. Per capita analysis can hide important differences in the experience of taxpayers and distribution of Marcellus economic impacts. Evidence suggests that major differences exist, specifically between large landowners and low income residents who rent (see, for example, Kelsey, Metalf and Salcedo, 2012). Additionally, the Department of Revenue data lacks specific detail, such as the types of property transfers that have led to changes in realty transfer tax collections. There likely would be different implications if the realty transfers predominantly were larger commercial and industrial properties, versus predominantly smaller, single-homeowner type properties.

This analysis still only reflects the early stages of natural gas drilling and does not include the cost impacts of Marcellus development, such as on the local cost-of-living or the environment. It also does not consider the impact of Marcellus development on local government and school district tax collections, since royalty and leasing income is exempt from the local earned income tax, and local jurisdictions cannot levy sales taxes.

There has been much discussion about the local benefits of Marcellus shale development to Pennsylvania residents and the debate about the benefits going to non-Pennsylvania residents. The analysis in this report shows that regardless of benefits received by non-Pennsylvanians, residents in counties with much Marcellus activity on average are receiving economic benefits from the shale development, with taxable incomes on average rising faster than in counties without the development.

Written by Emily O'Coonahern, Kirsten Hardy and Timothy W. Kelsey, Ph.D. The authors are an undergraduate student in Penn State's Community, Environment and Development program, a Penn State alumna from the Community, Environment and Development program, and a Professor of Agricultural Economics, at The Pennsylvania State University.

No external funding was used for this research.

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Appendix A. Counties by Drilling Activity							
County Groupings for the Personal Income Tax Analysis (based on Marcellus wells drilled between January 1, 2007 and December 31, 2011)				**County Grouping for the Sales and Realty Transfer Tax Analysis (based upon Marcellus shale wells drilled between July 1, 2007 and June 30, 2013)**			
90 or more wells	**10 to 89 wells**	**1 to 9 wells**	**0 wells**	**150 or more wells**	**10 to 149 wells**	**1 to 9 wells**	**0 wells**
Armstrong	Cameron	Allegheny	Adams	Armstrong	Allegheny	Bedford	Adams
Bradford	Centre	Beaver	Berks	Bradford	Beaver	Blair	Berks
Butler	Clarion	Bedford	Bucks	Butler	Cameron	Cambria	Bucks
Clearfield	Clinton	Blair	Carbon	Fayette	Centre	Columbia	Carbon
Fayette	Elk	Cambria	Chester	Greene	Clarion	Crawford	Chester
Greene	Indiana	Columbia	Crawford	Lycoming	Clearfield	Huntingdon	Cumberland
Lycoming	Jefferson	Forest	Cumberland	Susquehanna	Clinton	Lackawanna	Dauphin
Susquehanna	McKean	Huntingdon	Dauphin	Tioga	Elk	Luzerne	Delaware
Tioga	Potter	Lackawanna	Delaware	Washington	Forest	Mercer	Erie
Washington	Somerset	Lawrence	Erie	Westmoreland	Indiana	Venango	Franklin
Westmoreland	Sullivan	Luzerne	Franklin		Jefferson	Warren	Fulton
Wyoming		Venango	Fulton		Lawrence	Wayne	Juniata
		Warren	Juniata		McKean		Lancaster
		Wayne	Lancaster		Potter		Lebanon
			Lebanon		Somerset		Lehigh
			Lehigh		Sullivan		Mifflin
			Mercer		Wyoming		Monroe
			Mifflin				Montgomery
			Monroe				Montour
			Montgomery				Northampton
			Montour				Northumberland
			Northampton				Perry
			Northumberland				Philadelphia
			Perry				Pike
			Philadelphia				Schuylkill
			Pike				Snyder
			Schuylkill				Union
			Snyder				York
			Union				
			York				
Source: PA DEP, Office of Oil and Gas Management, Wells Drilled by County							

Appendix B. Changes in Taxable Income, by County (adjusted for inflation*), 2007 to 2011					
County	Marcellus Wells Drilled 2007-2011	Change in Taxable Income	Change in Gross Compensation Income	Change in Rents, Royalties Patents and Copyrights Income	Change in Net Profits Income
Pennsylvania	*4828*	*-7.6%*	*-2.3%*	*37.1%*	*-0.1%*
Adams	0	-4.5%	0.1%	14.1%	-7.3%
Allegheny	9	-4.9%	1.3%	31.9%	5.9%
Armstrong	99	-16.8%	-11.5%	13.8%	-26.9%
Beaver	7	2.9%	5.7%	200.2%	10.0%
Bedford	1	-6.2%	0.8%	-18.0%	-23.7%
Berks	0	-12.2%	-5.0%	-15.6%	-5.6%
Blair	6	-7.0%	-11.5%	1481.6%	-3.7%
Bradford	956	25.4%	9.0%	960.5%	71.9%
Bucks	0	-7.7%	-3.3%	12.3%	6.5%
Butler	103	0.3%	1.8%	144.3%	10.2%
Cambria	6	-5.0%	-4.1%	22.6%	-0.6%
Cameron	15	-11.9%	-9.7%	168.4%	8.4%
Carbon	0	-11.4%	-6.9%	-0.5%	-15.9%
Centre	61	-2.2%	4.1%	29.6%	2.7%
Chester	0	-6.7%	4.6%	20.6%	2.3%
Clarion	20	-6.2%	-4.2%	117.6%	-0.8%
Clearfield	128	-1.6%	3.3%	34.7%	-2.4%
Clinton	87	7.8%	9.9%	4.8%	28.3%
Columbia	3	-10.0%	-5.2%	11.6%	-7.5%
Crawford	0	-8.9%	-2.9%	2.9%	-1.4%
Cumberland	0	-13.0%	-7.2%	2.3%	-5.1%
Dauphin	0	-6.6%	-2.4%	11.8%	-4.3%
Delaware	0	-14.5%	-6.3%	-9.7%	-8.9%
Elk	58	-5.1%	-1.4%	8.1%	12.0%
Erie	0	-6.0%	-2.6%	4.9%	3.8%
Fayette	181	-5.3%	-3.1%	48.5%	-2.6%
Forest	6	17.1%	-1.1%	24.8%	1.4%
Franklin	0	-6.9%	0.7%	8.2%	-3.2%
Fulton	0	-11.2%	-5.6%	17.9%	-4.3%
Greene	406	14.4%	3.3%	575.3%	14.6%
Huntingdon	1	-11.2%	-8.7%	7.0%	-7.6%
Indiana	39	-11.1%	-4.7%	1.3%	-22.8%
Jefferson	28	-5.7%	-1.9%	25.5%	3.0%
Juniata	0	-3.3%	0.5%	42.6%	-5.9%
Lackawanna	2	-5.1%	-2.7%	11.2%	-1.4%
Lancaster	0	-9.5%	-4.3%	10.7%	-5.6%
Lawrence	2	-10.1%	1.0%	14.1%	-1.5%
Lebanon	0	-9.9%	-4.3%	4.9%	-9.3%
Lehigh	0	-12.5%	-6.8%	5.0%	-9.8%
Luzerne	2	-7.4%	-8.4%	282.1%	2.7%

Lycoming	459	1.0%	1.8%	184.0%	14.3%
McKean	54	3.2%	-4.8%	23.7%	-18.0%
Mercer	0	-8.4%	-4.4%	11.3%	15.9%
Mifflin	0	-0.4%	4.7%	9.6%	-2.6%
Monroe	0	-13.0%	-6.2%	-11.2%	-22.5%
Montgomery	0	-14.6%	-6.8%	17.2%	-4.7%
Montour	0	-3.5%	3.4%	7.6%	-17.1%
Northampton	0	-4.6%	-0.4%	23.8%	-0.3%
Northumberland	0	-5.2%	-3.2%	22.0%	14.6%
Perry	0	-13.5%	-11.9%	17.6%	-11.3%
Philadelphia	0	-2.8%	-1.2%	9.9%	13.8%
Pike	0	-1.0%	3.6%	2.8%	-4.2%
Potter	69	3.8%	-1.2%	136.7%	79.5%
Schuylkill	0	-7.4%	-5.4%	18.7%	16.5%
Snyder	0	-11.1%	-7.4%	22.0%	-12.6%
Somerset	19	3.2%	0.2%	59.4%	-2.5%
Sullivan	41	7.9%	4.8%	598.4%	8.3%
Susquehanna	453	12.7%	2.0%	433.2%	39.2%
Tioga	684	25.4%	15.1%	636.9%	80.8%
Union	0	-7.4%	-1.2%	22.7%	-13.0%
Venango	2	-4.3%	1.5%	31.6%	1.7%
Warren	3	-11.7%	-6.2%	24.3%	-11.2%
Washington	533	0.7%	2.3%	292.3%	4.5%
Wayne	5	-25.2%	-19.1%	40.0%	-35.0%
Westmoreland	184	-2.8%	1.5%	32.3%	9.3%
Wyoming	96	-1.7%	-8.2%	239.5%	35.8%
York	0	-6.3%	-3.2%	3.3%	-10.1%

Sources: PA DEP; PA Department of Revenue, Personal Income Tax Statistics, 2007 and 2011.
****Inflation adjusted to 2007***

Appendix C. Proportion of Tax Returns Reporting Specific Types of Taxable Income, 2011					
County	Marcellus Wells Drilled, 2007-2011	Total Taxable Income	Gross Compensation	Rents, Royalties, Patents & Copyrights	Net Profits
Pennsylvania	*4828*	*100%*	*81.5%*	*1.6%*	*9.7%*
Adams	0	100%	84.7%	1.4%	7.8%
Allegheny	9	100%	80.3%	1.4%	9.9%
Armstrong	99	100%	85.5%	2.1%	7.5%
Beaver	7	100%	88.3%	2.5%	6.2%
Bedford	1	100%	84.1%	1.6%	10.2%
Berks	0	100%	84.9%	1.3%	8.4%
Blair	6	100%	82.4%	2.3%	9.7%
Bradford	956	100%	70.8%	12.4%	10.0%
Bucks	0	100%	81.1%	1.2%	10.6%
Butler	103	100%	82.4%	2.8%	8.9%
Cambria	6	100%	86.8%	1.3%	7.8%
Cameron	15	100%	81.5%	3.3%	6.2%
Carbon	0	100%	89.0%	1.2%	6.2%
Centre	61	100%	81.1%	2.4%	9.1%
Chester	0	100%	78.2%	1.2%	11.1%
Clarion	20	100%	80.4%	5.2%	9.5%
Clearfield	128	100%	85.5%	2.0%	8.9%
Clinton	87	100%	86.3%	1.6%	8.5%
Columbia	3	100%	86.6%	1.7%	7.1%
Crawford	0	100%	82.4%	2.0%	11.1%
Cumberland	0	100%	82.4%	1.3%	9.9%
Dauphin	0	100%	87.2%	1.0%	7.2%
Delaware	0	100%	80.5%	1.1%	10.2%
Elk	58	100%	83.7%	1.3%	9.4%
Erie	0	100%	82.6%	1.6%	9.5%
Fayette	181	100%	84.5%	2.6%	7.9%
Forest	6	100%	60.4%	29.1%	7.0%
Franklin	0	100%	84.1%	1.4%	8.6%
Fulton	0	100%	86.9%	1.2%	8.0%
Greene	406	100%	76.4%	8.1%	7.1%
Huntingdon	1	100%	86.7%	1.6%	7.4%
Indiana	39	100%	81.7%	2.6%	10.3%
Jefferson	28	100%	77.6%	2.6%	14.6%
Juniata	0	100%	81.9%	2.0%	10.8%
Lackawanna	2	100%	83.4%	1.7%	9.3%
Lancaster	0	100%	77.9%	1.8%	13.1%
Lawrence	2	100%	82.0%	4.6%	8.4%
Lebanon	0	100%	85.2%	1.4%	8.7%
Lehigh	0	100%	85.4%	1.2%	7.5%
Luzerne	2	100%	85.2%	1.3%	8.5%
Lycoming	459	100%	81.5%	3.9%	8.9%

McKean	54	100%	71.0%	1.7%	8.6%
Mercer	0	100%	83.3%	1.8%	9.7%
Mifflin	0	100%	85.6%	1.2%	10.0%
Monroe	0	100%	89.7%	1.1%	6.5%
Montgomery	0	100%	74.4%	1.5%	12.3%
Montour	0	100%	88.3%	1.0%	6.6%
Northampton	0	100%	85.0%	1.2%	7.6%
Northumberland	0	100%	86.0%	1.2%	7.8%
Perry	0	100%	89.1%	1.1%	6.5%
Philadelphia	0	100%	86.4%	0.7%	7.8%
Pike	0	100%	86.9%	1.0%	7.3%
Potter	69	100%	76.1%	3.5%	15.6%
Schuylkill	0	100%	84.6%	1.1%	11.1%
Snyder	0	100%	82.4%	1.5%	11.0%
Somerset	19	100%	73.9%	2.2%	11.0%
Sullivan	41	100%	70.9%	8.8%	9.6%
Susquehanna	453	100%	70.9%	10.4%	11.3%
Tioga	684	100%	74.3%	9.4%	10.7%
Union	0	100%	78.8%	2.0%	12.4%
Venango	2	100%	85.3%	1.9%	8.1%
Warren	3	100%	81.2%	1.5%	11.2%
Washington	533	100%	79.4%	4.9%	10.2%
Wayne	5	100%	79.6%	2.7%	9.9%
Westmoreland	184	100%	83.2%	1.8%	9.1%
Wyoming	96	100%	76.5%	5.8%	11.2%
York	0	100%	84.7%	1.3%	6.7%
Source: PA DEP; PA Department of Revenue, Personal Income Tax Statistics 2011					

Appendix D. Local Collections of Sales Tax and Realty Transfer Tax (adjusted for inflation*), 2007 and 2013							
County	Marcellus Wells Drilled, July 1, 2007 to June 30, 2013	Sales Tax Collections ($ thousands)			Realty Transfer Tax Collections ($ thousands)		
		07-'08 Collections	12-'13 Collections	% Change	07-08' Collections	12-'13 Collections	% Change
Pennsylvania	*6851*	*$8,496,554*	*$8,031,746*	*-5.5%*	*$491,897*	*$359,195*	*-27.0%*
Adams	0	22,247	20,589	-7.5%	4,359	2,398	-45.0%
Allegheny	30	562,098	532,552	-5.3%	38,326	34,820	-9.1%
Armstrong	172	10,661	9,783	-8.2%	820	978	19.3%
Beaver	26	26,721	24,044	-10.0%	4,582	3,621	-21.0%
Bedford	1	18,758	19,402	3.4%	1,013	735	-27.5%
Berks	0	176,189	136,064	-22.8%	15,265	8,614	-43.6%
Blair	6	76,681	78,459	2.3%	3,446	2,173	-37.0%
Bradford	1188	12,144	17,656	45.4%	1,306	1,384	5.9%
Bucks	0	209,788	200,857	-4.3%	39,326	27,319	-30.5%
Butler	219	66,424	67,933	2.3%	7,590	6,960	-8.3%
Cambria	7	43,031	32,454	-24.6%	2,433	1,284	-47.2%
Cameron	15	552	434	-21.3%	117	55	-52.6%
Carbon	0	13,719	13,047	-4.9%	2,435	1,254	-48.5%
Centre	64	38,851	34,395	-11.5%	6,008	4,252	-29.2%
Chester	0	198,318	185,221	-6.6%	36,447	28,659	-21.4%
Clarion	24	9,174	8,802	-4.1%	656	494	-24.8%
Clearfield	149	20,717	20,065	-3.1%	1,538	1,137	-26.1%
Clinton	98	6,430	7,150	11.2%	732	652	-11.0%
Columbia	3	19,132	18,055	-5.6%	1,451	1,299	-10.5%
Crawford	3	15,550	15,638	0.6%	1,250	1,160	-7.2%
Cumberland	0	144,455	135,242	-6.4%	13,796	9,090	-34.1%
Dauphin	0	163,094	157,127	-3.7%	7,226	7,838	8.5%
Delaware	0	163,183	163,813	0.4%	25,969	20,114	-22.5%
Elk	64	5,384	5,349	-0.7%	519	445	-14.3%
Erie	0	81,573	66,250	-18.8%	5,963	4,487	-24.8%
Fayette	238	30,735	27,369	-11.0%	1,791	1,401	-21.8%
Forest	22	1,082	745	-31.1%	115	153	32.9%
Franklin	0	36,077	28,166	-21.9%	6,535	3,770	-42.3%
Fulton	0	2,513	1,504	-40.2%	310	290	-6.4%
Greene	567	4,524	7,856	73.6%	778	1,104	41.9%
Huntingdon	1	5,777	5,274	-8.7%	914	678	-25.8%
Indiana	41	19,696	18,443	-6.4%	1,168	1,035	-11.4%
Jefferson	37	8,461	8,847	4.6%	628	473	-24.6%
Juniata	0	4,043	3,694	-8.6%	468	411	-12.2%
Lackawanna	2	63,389	64,842	2.3%	5,079	4,266	-16.0%
Lancaster	0	215,159	197,367	-8.3%	20,300	14,818	-27.0%
Lawrence	29	23,325	23,701	1.6%	1,563	1,084	-30.7%
Lebanon	0	37,472	32,739	-12.6%	4,765	3,371	-29.3%
Lehigh	0	160,691	120,914	-24.8%	16,343	11,388	-30.3%
Luzerne	2	97,936	83,642	-14.6%	8,806	5,279	-40.0%

Lycoming	763	32,087	34,392	7.2%	2,737	2,707	-1.1%
McKean	64	22,766	23,803	4.6%	474	880	85.6%
Mercer	8	28,180	27,131	-3.7%	2,054	1,639	-20.2%
Mifflin	0	7,260	7,166	-1.3%	738	608	-17.6%
Monroe	0	40,007	34,056	-14.9%	7,717	3,930	-49.1%
Montgomery	0	398,340	341,551	-14.3%	56,950	35,447	-37.8%
Montour	0	4,598	4,371	-4.9%	635	475	-25.1%
Northampton	0	63,566	57,879	-8.9%	14,019	7,857	-44.0%
Northumberland	0	60,917	30,696	-49.6%	1,478	1,219	-17.5%
Perry	0	5,380	4,934	-8.3%	1,025	807	-21.3%
Philadelphia	0	455,387	429,616	-5.7%	58,689	43,837	-25.3%
Pike	0	10,111	9,809	-3.0%	3,512	1,957	-44.3%
Potter	70	4,710	3,147	-33.2%	368	331	-10.0%
Schuylkill	0	32,153	24,302	-24.4%	2,693	1,659	-38.4%
Snyder	0	10,737	8,791	-18.1%	969	800	-17.4%
Somerset	26	16,160	16,214	0.3%	2,251	1,317	-41.5%
Sullivan	73	1,069	1,188	11.2%	251	236	-6.1%
Susquehanna	753	8,022	10,849	35.2%	1,025	1,073	4.7%
Tioga	820	7,582	7,617	0.5%	952	967	1.6%
Union	0	11,375	10,513	-7.6%	1,086	1,039	-4.3%
Venango	5	16,284	14,043	-13.8%	2,517	1,482	-41.1%
Warren	5	11,122	12,924	16.2%	680	592	-12.9%
Washington	870	57,854	64,243	11.0%	6,583	6,719	2.1%
Wayne	5	30,748	23,752	-22.8%	626	483	-22.9%
Westmoreland	248	113,119	96,800	-14.4%	8,826	7,615	-13.7%
Wyoming	133	7,290	7,595	4.2%	566	608	7.4%
York	0	121,182	101,562	-16.2%	20,339	12,171	-40.2%

Sources: PA DEP; PA Department of Revenue, Tax Compendium 2007 and 2011.
****Inflation adjusted for 2007 dollars***