

Pennsylvania High-Growth Study

Prepared for: Team Pennsylvania Foundation

Submitted by: Dr. Gary Kunkle, Outlier LLC

July, 2012



Background

Outlier LLC on behalf of the Team Pennsylvania Foundation (TeamPA) conducted this analysis during the Spring of 2012. The purpose of the project is to help TeamPA and its stakeholders gain a better understanding of the growth opportunities and outreach challenges presented by Pennsylvania's High-Growth Companies. This study is a follow-on to a similar study conducted by Outlier LLC for Team PA in 2009.

Team Pennsylvania Foundation is a non-partisan charitable non-profit created in 1997 to bridge the gap between government and the private sector and allow both sides to partner for the betterment of the Commonwealth of Pennsylvania.

This study relies upon data from the Edward Lowe Foundation's YourEconomy.org and the National Establishment Time Series (NETS). It begins by evaluating all establishment and employment growth in Pennsylvania over the 2000-2010 period. It then evaluates five-year growth patterns of all for-profit companies in operation in the Commonwealth in 2010 (the most current available data). High-Growth Companies are identified by a history of sustained growth: two or more years of growth during the 2005-2010 period. Operational, demographic, and relocation patterns of these companies are evaluated in comparison with all other Pennsylvania companies.

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Key Findings:

1. From 2000 to 2010 the Pennsylvania economy, like the US as a whole, suffered scale destruction among existing businesses. The number of large resident businesses (500 or more employees and headquartered in Pennsylvania) shrank by 23.1% while their employment declined 26.7%. The number of Pennsylvania branches of out-of-state headquarters declined by 9.4% and employment fell by 15.7%. In contrast, the number of self-employed grew by 65.8%, while businesses with between 2 and 9 employees grew 46% in number and 22.7% in employment. Thus, the presence of larger companies has diminished while the proportion of companies with little or no scale has greatly increased.
2. A small proportion of Pennsylvania businesses were responsible for the overwhelming share of new job growth over the 2005-2010 period. Looking back five years at all business establishments in Pennsylvania in 2010, the top 1% created 495,193 net new jobs, or 195% of all jobs created by surviving companies. However, as we shall see, the majority of this job creation is from companies with single small scale expansions rather than from sustained growth over the period.
3. Job growth at the business level is cumulative: the more times a company grows, the more total jobs they tend to add over time. On average, companies that grew only once added 7 new jobs over the past five years, whereas those that grew twice added an average of 15, and those that grew three times added 21 jobs. This implies that economic development should place greater emphasis on helping companies grow more frequently.
4. High-growth companies, or 'Higros', are those that have grown twice or more over the past five years. These are the only businesses that have *repeatedly* increased scale in recent years. While they represent only 0.9% of Pennsylvania's business establishments, they created 44% of all net new jobs from surviving businesses during the study period.
5. When they began the period, Higros were about the same age as other companies but had considerably higher sales, employment, and sales-per-employee. By the end of the period, they had expanded both employees and sales while the average non-Higro shrank. They also tended to have developed more complex organizational structures, were more likely to be headquarters or branch plants, and were suffering weaker credit ratings than other businesses.

* 'Establishments' refers to each separate location with employment. Approximately 90% of Pennsylvania's establishments are 'stand-alone', meaning all of an organization's employment is at one location. This study begins by looking at for-profit, non-profit, and government establishments over a ten-year period in order to assess total state-wide employment change. It then considers just for-profit establishments (also referred to as 'businesses' or 'companies') over the most recent five-year period of data.

Key Findings (continued)

6. Higos are more likely than other companies to be in the 10 to 2,999 employee size range. When compared with non-Higos, they have slightly less proportional representation among Services industries, considerably less in Agriculture, similar in Construction and Mining, but are nearly twice as strongly represented in Manufacturing.
7. Manufacturing Higos are most numerous in Industrial Machinery and Equipment, Fabricated Metal Products, and Printing and Publishing. They are most over-represented in Electronic and Other Electric Equipment when compared with other companies. There are strong concentrations of Higo Manufacturers in Chester, Lancaster, York, Westmoreland, Butler, Lehigh, Erie, Luzerne, Northampton, Mercer, Lebanon, and Schuylkill counties.
8. Higos are more likely to change their operational profiles than other companies, particularly their industry focus and headquarters. They are also far more likely to export and/or import, have a foreign parent, and engage in government contracting than other companies. Higos are over-represented among both minority-owned and woman-owned businesses.
9. All but one of Pennsylvania's 67 counties has one or more Higos. The average county has 104 Higos, with Allegheny county having the most (796) and Sullivan counties having none. The distribution of Higos across Pennsylvania counties appears to be predominately determined by county population.
10. Higos are more likely to be indigenous to Pennsylvania than other companies. While the vast majority of Higos did not relocate over the period, Higos were still twice as likely to relocate as other firms. Most of these moves were within the same county. Among all movers, Higos tend to be larger when they relocate. More than half of cross-border relocations occurred between Pennsylvania and neighboring states, particularly New Jersey. Of some concern, Higos that recently left Pennsylvania were more likely to be larger and manufacturers than Higos that did not leave.

Supporting Data and Explanation

Establishment and Employment Change in Pennsylvania (2000-2010)

ESTABLISHMENTS	2000	2010	Change	Percent
TOTAL	563,577	775,727	212,150	37.6%
Noncommercial	50,605	56,778	6,173	12.2%
Nonresident	33,621	30,465	-3,156	-9.4%
Resident	479,351	688,484	209,133	43.6%
Self-Employed (1)	139,380	231,158	91,778	65.8%
Stage 1 (2-9)	265,217	387,119	121,902	46.0%
Stage 2 (10-99)	69,404	65,495	-3,909	-5.6%
Stage 3 (100-499)	4,618	4,149	-469	-10.2%
Stage 4 (500+)	732	563	-169	-23.1%

JOBS	2000	2010	Change	Percent
TOTAL	7,033,713	6,717,624	-316,089	-4.5%
Noncommercial	1,139,074	1,142,595	3,521	0.3%
Nonresident	1,375,910	1,160,083	-215,827	-15.7%
Resident	4,518,729	4,414,946	-103,783	-2.3%
Self-Employed (1)	139,380	231,158	91,778	65.8%
Stage 1 (2-9)	975,889	1,197,125	221,236	22.7%
Stage 2 (10-99)	1,628,734	1,563,777	-64,957	-4.0%
Stage 3 (100-499)	831,898	731,776	-100,122	-12.0%
Stage 4 (500+)	942,828	691,110	-251,718	-26.7%

Source: YourEconomy.org

Note: the remainder of this analysis will focus on 737,738 for-profit establishments alive in 2010. These are the 775,727 Pennsylvania establishments alive in 2010, minus 37,989 classified as Post Offices (SIC 43); Museums, Galleries, Gardens (84); Membership Organizations (86); and Government Services (91-99).

Between 2000 and 2010 the total number of Pennsylvania establishments grew by 37.6% while employment fell 4.5%¹.

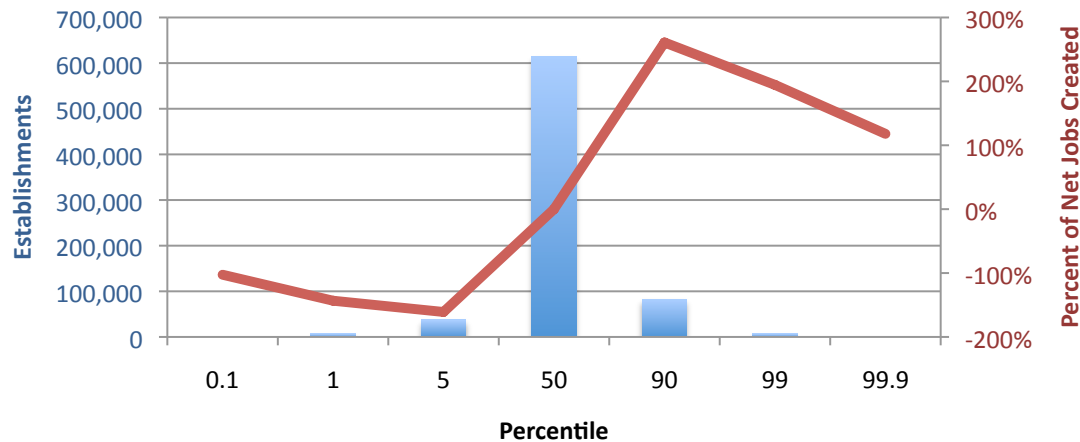
Commercial non-resident (branches of out-of-state HQs) suffered declines of 9.4% in number and 15.7% in employment². The largest commercial resident establishments also suffered declines of 23.1% in number and 26.7% in jobs³.

Growth was primarily concentrated among smaller establishments, particularly those below 10 employees, and among non-commercial establishments.

The overall conclusion is that the period was a time of **scale destruction** in the private sector: larger firms and branches of out-of-state multi-location firms shrank in size and number while many more small start-ups took their place. This increased the number of business establishments, reduced average business size, and shrank overall employment.

- 1) In the same period, the number of US establishments grew by 61.4% and employment grew 1.2%.
- 2) For the US, -8.4% and -15.3%.
- 3) For the US, -23.1% and -26.5%.

Distribution of Absolute Job Growth



Absolute growth is total job change (2005-2010) at each establishment in business in Pennsylvania in 2010.

Note: This does not count jobs lost during the period due to closures or relocations out-of-state. It counts job changes at all existing businesses and new establishments from the year after their birth or relocation into the state. Thus, unlike the previous slide which considers all sources of job changes, these surviving companies demonstrated positive net growth.

Percentile	0.1	1	5	50	90	99	99.9	Totals
<i>Cut-Off</i>	-80	-5	-1	0	1	12	99	
Establishments	752	7,478	37,407	615,421	82,910	7,468	742	735,738
% Establishments	0%	1%	5%	84%	11%	1%	0%	100%
Mean Jobs Created	-347	-49	-11	0	8	66	405	0.35
Sum Jobs Created	-261,241	-364,799	-409,614	0	664,187	495,193	300,145	254,573
% of Jobs Created	-103%	-143%	-161%	0%	261%	195%	118%	100%

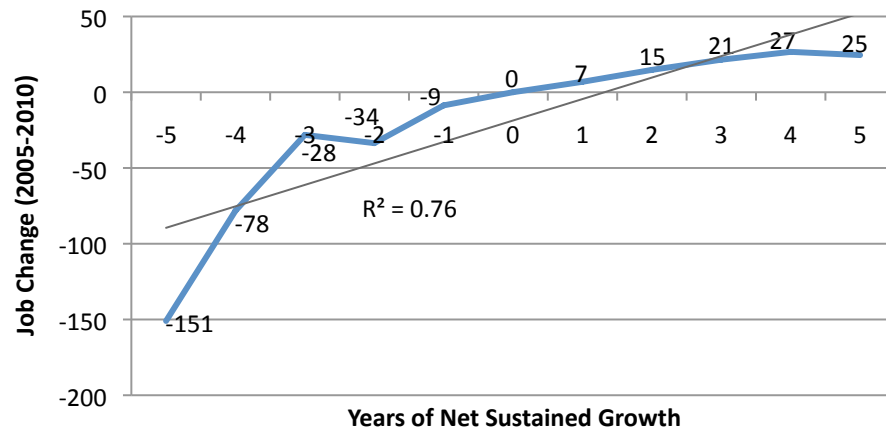
Source: National Establishment Time-Series; analysis by Outlier LLC

Absolute job growth among surviving businesses is a **Power Law** distribution, where the majority of establishments are found at the mean and a disproportionate share of job creation and destruction is found among a relatively small number of establishments in the tails.

In the chart above, the horizontal axis (X) is the percentage of establishments at a given level (percentile) of job creation; the left vertical (Y1) is the corresponding number of establishments at a given level of X; and the right vertical (Y2) is the percent of net jobs created or destroyed at a given level of X.

For example, 84% of all establishments are found at the mean (50 Percentile) averaging 0 jobs created over the five years. At the 99 Percentile however, **the top 1% of establishments created 495,193 net new jobs – or 195% of all net new jobs created over the period.**

Total Jobs Created by Years of Growth



Job growth tends to be a cumulative process. The more years a firm grows over a period, the more new jobs they tend to accumulate. This process builds capacity scale at the business-level.

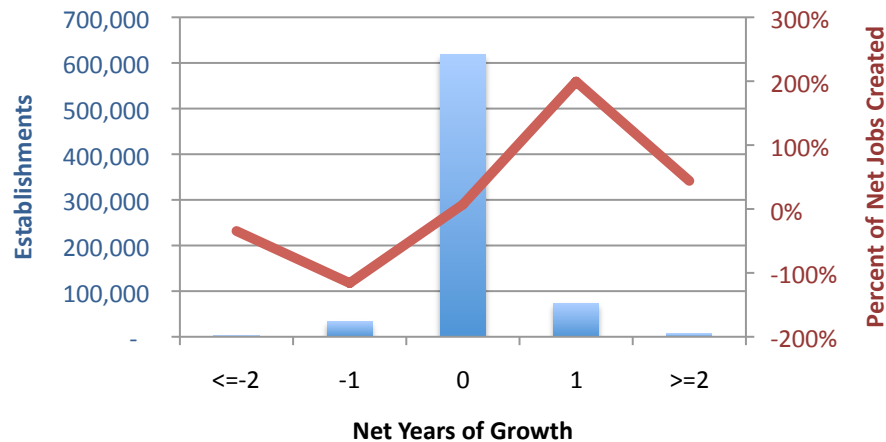
In the chart to the left, the horizontal (X) shows the number of years establishments grew, shrank, or stagnated employment over the 2005-2010 period. The vertical (Y) shows the total amount of job change over the period.

For every additional year of growth, establishments tended to add more total jobs over the period. For example, establishments that grew once added, on average, only 7 new jobs over the period, whereas those that grew three times added an average of 21 new jobs.

The relationship between years of growth and total job change is strong. Note the upwardly sloping line with an R^2 of 0.76. In other words, 76% of the variation in the amount of total jobs added by establishments over time can be attributed to the number of years they grew.

The implication is fairly obvious: if we want companies to add more jobs over a period, we should help them **repeat growth** rather than pursuing single growth events.

Distribution of Net Sustained Growth



Cut-OFF	<=-2	-1	0	1	>=2	Totals
Establishments	2,053	34,036	619,008	73,690	6,951	735,738
% of Establishments	0.3%	4.6%	84.1%	10.0%	0.9%	100.0%
Mean Jobs Created	-43	-9	0	7	16	0.35
Sum Jobs Created	-87,788	-295,102	17,845	507,568	112,050	254,573
% of Jobs Created	-34%	-116%	7%	199%	44%	100%

Net years of growth measures how many years a company grew, minus the number of years they declined. We can hereby distinguish the employment contributions between the many companies with one-time growth and the relatively few with sustained growth.

Net sustained growth also exhibits a **Power Law**, where most companies have no years of growth but the relatively few with growth or contraction are responsible for almost all the change in overall employment.

Note: The horizontal (X) axis shows truncated tails of the distribution when compared to the previous slide, by grouping establishments with -2 or less years of growth and those with 2 or more together. This is for illustrative purposes due to the very small number of establishments with extreme values.

Only 1% of establishments alive in Pennsylvania in 2010 had two or more net years of growth over the past five, yet they were responsible for 44% of all new jobs created by surviving businesses. On average, these establishments added 16 new jobs over the period, compared with only 7 new jobs among those that grew only once.

Thus, **high-growth companies (Higros) are those 6,951 businesses that had net growth twice or more times over the past 5 years.** These are the businesses that have repeatedly added scale in Pennsylvania, despite the overall trend of scale destruction shown in the first table.

Comparing Higos to Other Businesses

Characteristics	Higos	Others
Age 2010	10.6	10.4
Sales 2010	\$3,943,258.24	\$996,697.13
Sales 2005	\$2,151,909.02	\$1,382,395.27
Change	\$1,791,349	(\$385,698)
Emps 2010	27.3	8.2
Emps 2005	14.8	11.4
Change	12.5	-3.2
Sales/Emp 2010	\$144,442	\$121,995
Sales/Emp 2005	\$145,596	\$121,263
Change	\$(1,154)	\$732

Characteristics	Higos	Others
Proprietorship	8.5%	18.6%
Partnership	8.2%	4.3%
Corporation	36.6%	21.2%
Branch	11.7%	7.4%
Headquarters	4.3%	2.5%
Standalone	84.1%	90.1%
Private	96.0%	97.9%
Public	4.0%	2.1%

Characteristics	Higos	Others
PayDexMin 2010	68.27	69.33
PayDexMax 2010	74.98	75.03
Spread	6.71	5.7

Note: For most of these comparisons, the direction of causality between a business trait and sustained growth is not certain. It may be that sustained growth is more likely if a company possesses these traits, or it may be that these traits are more likely to appear if a firm undergoes sustained growth. For many traits, there is likely to be a positive feedback process whereby growth tends to reinforce these traits and vice versa.

Higos started slightly larger but grew, while non-Higos ('Others') shrank.

Higos were about the same age as others but somewhat larger at the beginning of the period. Higos added new workers and sales while others shrank. Higos also had a considerably higher ratio of sales per employee, but this ratio tended to decline as they expanded while others gained.

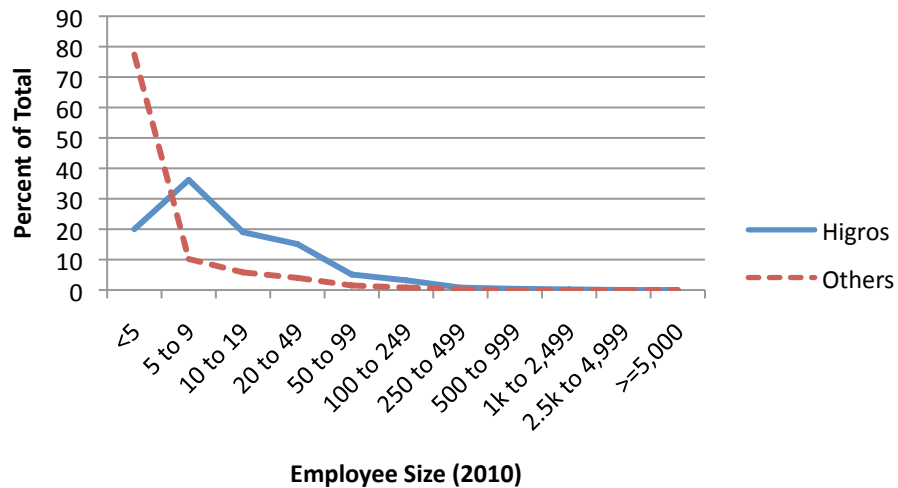
Higos are more likely to have a more complex organizational structure than other businesses.

Higos were less likely to be sole proprietorships and more likely to be partnerships or corporations. While the majority of both groups are Standalones (all operations at one location), Higos are more likely to be HQs and/or branches than others. Higos are twice as likely to be public companies, and about 50% more likely to be corporations.

Higos tend to have weaker credit ratings than other companies.

The D&B PayDex scores were lower, on average, for Higos than other companies and the spread between the minimum and maximum scores during 2010 was wider.

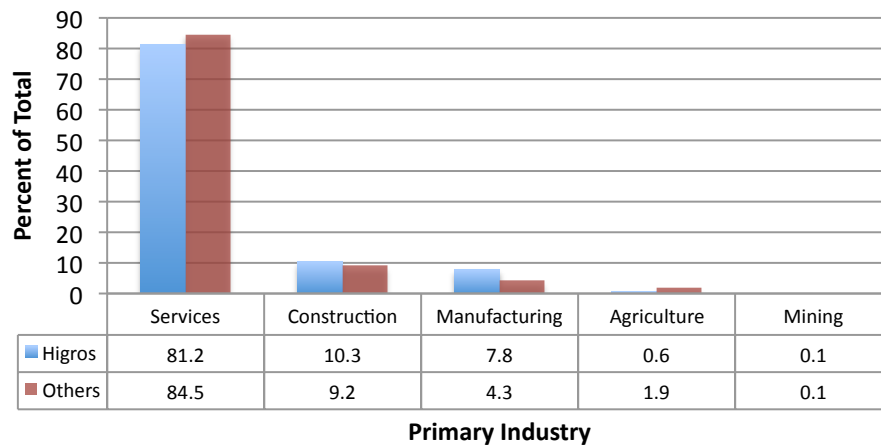
Size of Higos and Others



Higos' recent sustained growth has resulted in more scale, on average, than other businesses.

Higos are more heavily represented among medium-sized establishments than are non-higos. This is true for the entire size range of 5 to 2,999 employees.

Industry of Higos and Others



Higos are nearly twice as strongly represented among Manufacturing.

The industry distribution of Higos and others is fairly similar for Services, Construction, and Mining, although Higos are under-represented in Agriculture. In sharp contrast, Higos are significantly over-represented in Manufacturing.

Manufacturing 2-Digit SIC	All Establishments	Higros	Percent Higros
21 TOBACCO PRODUCTS	23	1	4.3%
36 ELECTRONIC & OTHER ELECTRIC EQUIPMENT	1,587	47	3.0%
33 PRIMARY METAL INDUSTRIES	949	23	2.4%
34 FABRICATED METAL PRODUCTS	2,745	64	2.3%
38 INSTRUMENTS AND RELATED PRODUCTS	1,349	31	2.3%
35 INDUSTRIAL MACHINERY AND EQUIPMENT	4,519	99	2.2%
37 TRANSPORTATION EQUIPMENT	704	15	2.1%
32 STONE, CLAY, AND GLASS PRODUCTS	1,345	28	2.1%
31 LEATHER AND LEATHER PRODUCTS	198	4	2.0%
30 RUBBER AND MISC. PLASTICS PRODUCTS	957	19	2.0%
20 FOOD AND KINDRED PRODUCTS	1,672	30	1.8%
25 FURNITURE AND FIXTURES	793	14	1.8%
26 PAPER AND ALLIED PRODUCTS	562	9	1.6%
27 PRINTING AND PUBLISHING	4,913	62	1.3%
24 LUMBER AND WOOD PRODUCTS	2,711	32	1.2%
22 TEXTILE MILL PRODUCTS	524	6	1.1%
39 MISCELLANEOUS MANUFACTURING INDUSTRIES	3,211	36	1.1%
28 CHEMICALS AND ALLIED PRODUCTS	1,429	15	1.0%
29 PETROLEUM AND COAL PRODUCTS	232	2	0.9%
23 APPAREL AND OTHER TEXTILE PRODUCTS	1,235	8	0.6%
Totals	31,658	545	1.7%

There is at least one Higro in every Manufacturing industry segment.

On average, 1.7% of every Manufacturing segment's businesses are Higros.

Industrial Machinery and Equipment has the most Higros, followed by Fabricated Metal Products and Printing and Publishing.

While Tobacco Products had the highest concentration of Higros given the total number of establishments, this is somewhat misleading because there is only one Higro present. However, firms in Electronic and Other Electric Equipment are over-represented among Manufacturing Higros, with almost twice the average proportion.

County	All Higos	Manufacturing Higos	Percent
Allegheny	796	47	5.9%
Montgomery	610	38	6.2%
Chester	385	35	9.1%
Bucks	460	35	7.6%
Lancaster	337	30	8.9%
York	241	28	11.6%
Philadelphia	530	26	4.9%
Westmoreland	212	24	11.3%
Butler	126	17	13.5%
Lehigh	205	17	8.3%
Erie	136	16	11.8%
Luzerne	157	16	10.2%
Northampton	147	14	9.5%
Berks	220	12	5.5%
Delaware	256	12	4.7%
Mercer	44	10	22.7%
Lebanon	62	9	14.5%
Washington	121	9	7.4%
Schuylkill	54	8	14.8%
Average	104	8	7.8%

The average Pennsylvania county has 8 Higo Manufacturers.

In the average county, 7.8% of Higos were Manufacturers. Counties that are over-represented in Manufacturing Higos (both by number and proportion) include Chester, Lancaster, York, Westmoreland, Butler, Lehigh, Erie, Luzerne, Northampton, Mercer, Lebanon, and Schuylkill.

Characteristics	Higos	Others
Changed HQ	9.8%	4.1%
Changed SIC	17.2%	6.7%

Higos tend to more frequently change ownership and market characteristics than other businesses.

Higos were twice as likely to have a HQ change (usually due to acquisition) and twice as likely to refocus their product lines by changing their primary industry code.

Characteristics	Higos	Others
Export	1.6%	0.5%
Import	2.7%	0.8%
Both E&I	0.9%	0.2%
Gov't Contractors	5.0%	1.0%
Foreign Owned	1.9%	0.6%

Higos tend to have wider marketplace scope than other firms.

Higos are about 3-times as likely to export, 3-times to import, and 4-times as likely to do both. They are also 3-times as likely to engage in government contracting, and 5-times as likely to be foreign-owned (often using their parents as distribution channels).

Characteristics	Higos	Others
Minority Owned	2.5%	1.5%
Woman Owned	9.8%	9.1%

Higo ownership is more diverse than other businesses.

Higos are more than twice as likely to be owned by minorities and slightly more to be owned by women than other companies.

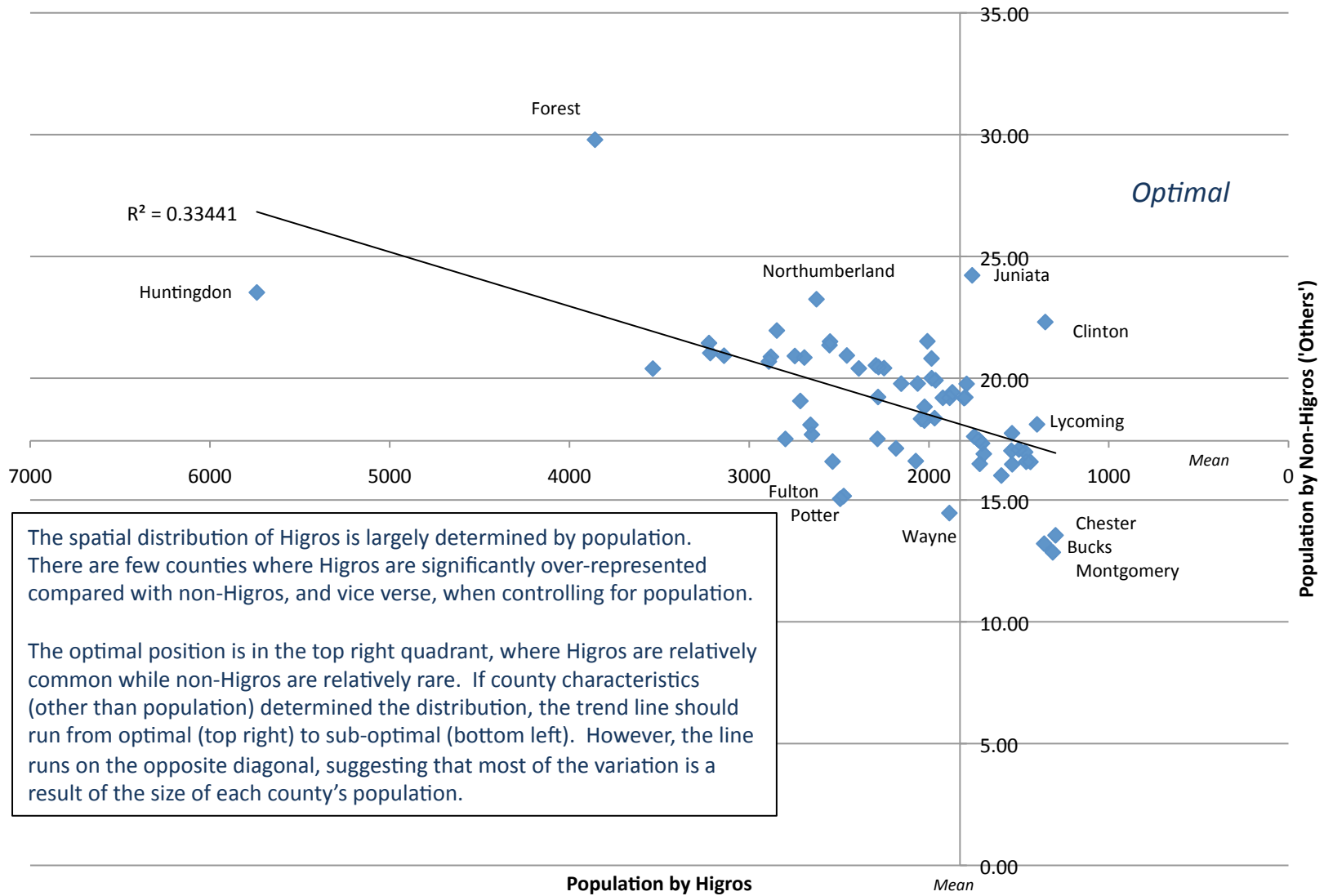
Rank	County	Higro Count
1	Allegheny	796
2	Montgomery	610
3	Philadelphia	530
4	Bucks	460
5	Chester	385
6	Lancaster	337
7	Delaware	256
8	York	241
9	Berks	220
10	Westmoreland	212
11	Lehigh	205
12	Dauphin	183
13	Cumberland	164
14	Luzerne	157
15	Northampton	147
16	Lackawanna	143
17	Erie	136
18	Butler	126
19	Washington	121
	Average	104
63	Potter	7
64	Fulton	6
65	Cameron	3
66	Forest	2
67	Sullivan	0

66 of Pennsylvania's 67 counties has at least one Higro.

Allegheny County has the most Higos (796) while Sullivan County has none. The average county has 104 Higos. Nineteen counties have more than average.

One-third of all of Pennsylvania's Higos are located in just four counties (Allegheny, Montgomery, Philadelphia, and Bucks).

County Population by Higos and Others



The spatial distribution of Higos is largely determined by population. There are few counties where Higos are significantly over-represented compared with non-Higos, and vice versa, when controlling for population.

The optimal position is in the top right quadrant, where Higos are relatively common while non-Higos are relatively rare. If county characteristics (other than population) determined the distribution, the trend line should run from optimal (top right) to sub-optimal (bottom left). However, the line runs on the opposite diagonal, suggesting that most of the variation is a result of the size of each county's population.

Characteristics	Higros	Others
Changed County (1990-2010)	7.5%	3.7%
within State	93.3%	91.5%
from another State	6.7%	8.5%
Last Move	2004	2002

Characteristics	Higros	Others
Avg Emps at move	15.7	13.2
Avg Sales at move	\$2,300,994	\$1,781,768

Higros are more than twice as likely to relocate than other firms.

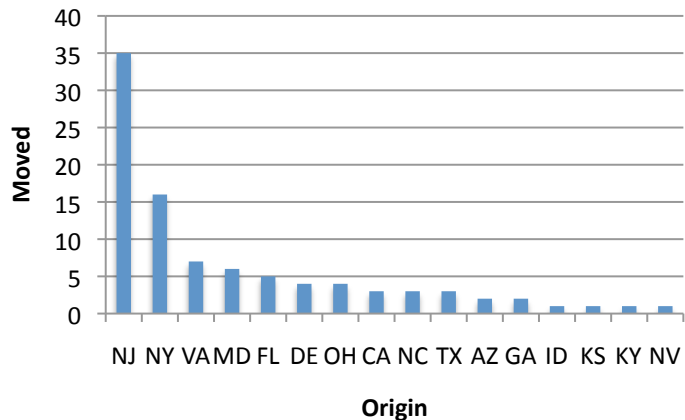
While most Higros did not move over the past 20 years, Higros are more likely than others to relocate.

A higher proportion of Higros are indigenous to Pennsylvania than other companies, as evident from their lower number of relocations from other states.

Higros tend to be larger when they move.

The average relocating Higro had more employees and higher sales than other relocating companies.

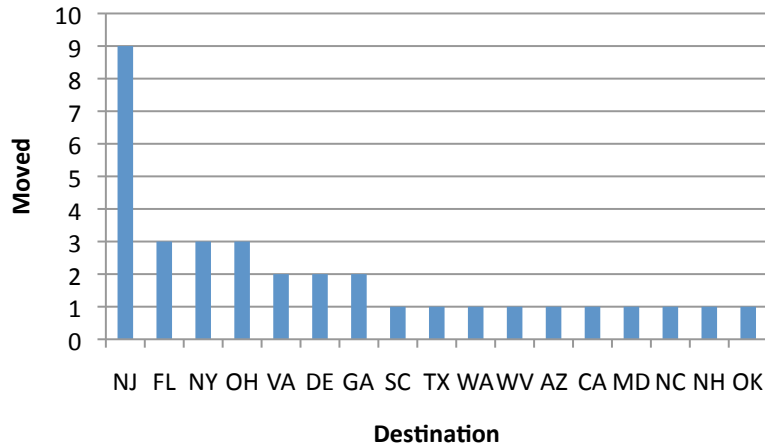
Origin of Inbound Higros



Higros tend to relocate into Pennsylvania from neighboring states.

The primary state of origin of Higros moving into Pennsylvania are New Jersey and New York. When Maryland, Delaware, and Ohio are included, 69% of inbound Higros came from neighboring states.

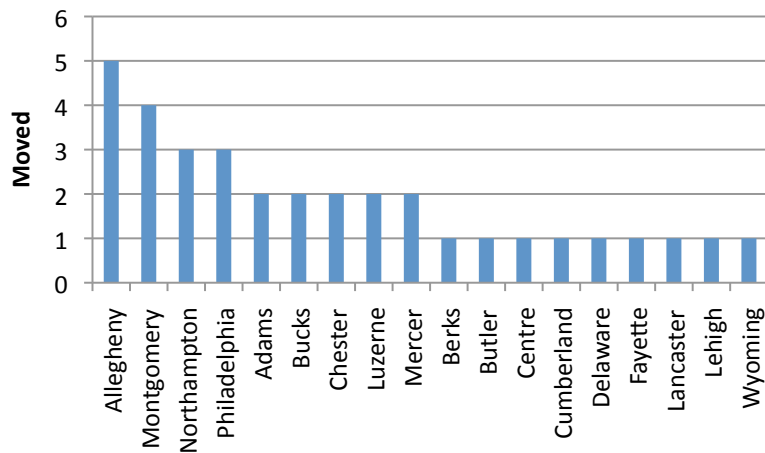
Destination of Outbound Higos



Higos tend to relocate to neighboring states.

Since 2010, 34 of Pennsylvania's Higos relocated to other states. More than half (53%) of outbound PA Higos moved to neighboring states. The primary state of destination was New Jersey which received the same number of Higos as the next three states combined.

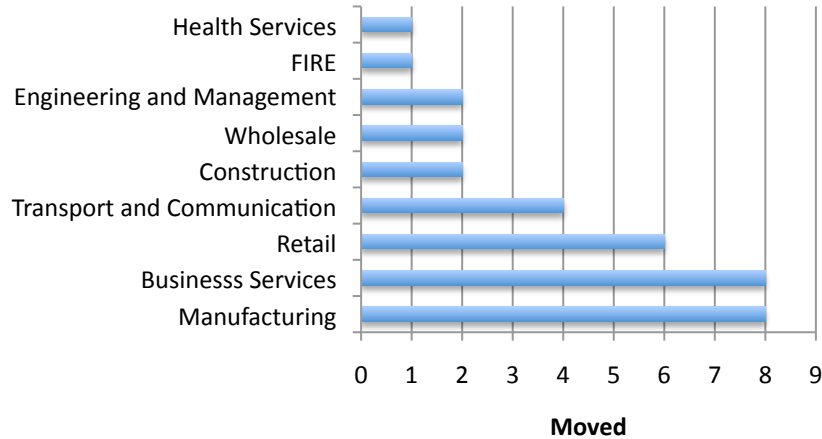
County of Origin of Outbound Higos



Higos tended to relocated away from counties with Higo concentrations.

Allegheny, Montgomery, and Philadelphia represent three of the four top counties of origin of Higos that left the state, but they are also the three counties with the greatest number of Higos.

Industry of Outbound Higos



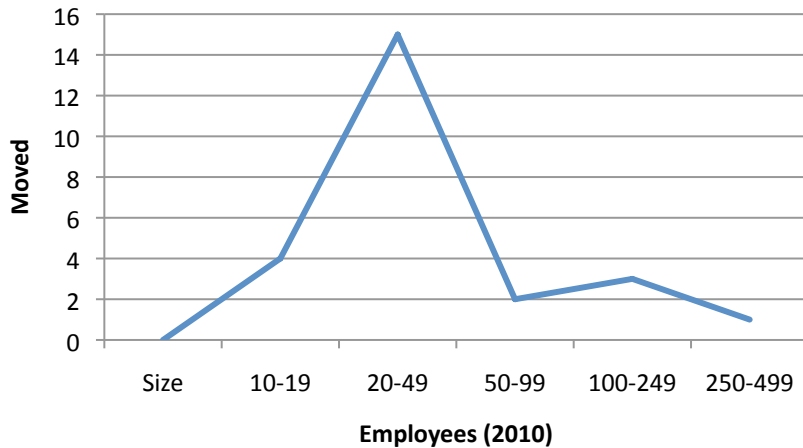
Outbound Higos tend to be larger, more complex, and are more likely to be manufacturers.

24% of outbound Higos were Manufacturers compared with 8% of all Higos. Thus, an outbound Higo is about three-times as likely to be a Manufacturer than a Higo that did not leave the state.

The size range of 20 to 49 employees had the most outbound Higos compared with the size range of 5 to 9 which had the most of all Higos. Outbound Higos were, on average, four times larger than Higos that did not leave the state.

12% of outbound Higos were HQs compared with 4% of non-outbound Higos. In other words, Outbound Higos were about three-times as likely to be a HQ than those that did not relocate. Outbound were only slightly more likely to be Branches (15% vs. 12%), and less likely to be Standalone (74% vs. 84%).

Size of Outbound Higos



Category	Moved	Percent
Standalone	25	74%
Branch	5	15%
Headquarters	4	12%
All	34	100%