Linkages among Industrial Firms in Yerevan, Armenia: A Preliminary Analysis

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Abstract
With the end of socialism in Eastern Europe and the collapse of the Soviet state industrial output fell, unemployment increased, living standards decreased, poverty rates rose, life expectancy decreased and some residents of urban areas returned to subsistence agriculture as a means of survival. These changes had profound effect on the structure of the urban economies of the region. Twelve years after the collapse, many of the former Soviet republics still have not regained the level of industrial and other economic activity they had during Soviet times. The purpose of this research is to investigate whether and how cities of the former Soviet Union can become engines of growth. This article focuses on a study of linkages among industrial firms in Yerevan, Armenia. The theory underlying the study is that both localisation economies of scale and urbanisation economies of scale can foster economic growth in cities. If these economies of scale can be nurtured in former Soviet cities, then those cities should contribute to, if not drive, economic growth. The study examined 108 industrial firms in various industries in the Yerevan economy. To identify linkages, the questionnaire asked whether firms produced intermediate goods for the local economy and whether or not the firms used intermediate goods produced in the local economy. The results of the surveys were then correlated with changes in the level of output in those industries to attempt to gauge if growth were associated with linkages. While the results are mixed on the association of linkages with growth, the surveys do indicate some types of interventions which may be needed in the local economy to spur growth.

Introduction
At the end of socialism in Eastern Europe and the collapse of the Soviet state industrial output fell, unemployment increased, living standards decreased, poverty rates rose, life expectancy decreased and some residents of urban areas returned to subsistence agriculture as a means of survival (EBRD, 1999; O’Brien et al., 1998). Conditions were not uniform in all countries. Some recovered more quickly than others, particularly in Central Europe. Yet in all transition countries difficult conditions persisted for several years, and the economies of many of these countries have yet to make a complete and effective recovery.

To reverse the downward economic trends causing so much hardship across Eastern Europe and Eurasia, governments and individuals in affected countries, international financial institutions and donors expended much effort and many resources. Early efforts were primarily concentrated in three areas: macro-economic stability, price liberalization and privatisation (EBRD, 1999; Stiglitz, 1998; Layard, 1998). Macro-economic intervention was essential to combat the effects of the transition recession. Price liberalization was the logical consequence of the end of the command economy. Privatisation gave as many persons as possible a stake in the new economic regime. Over time, institutional and policy issues were identified as fundamental determinants of successful reform (World Bank, 2002). Institutional changes included land tenure and judicial reform, changes in corporate governance and development of banks and capital markets. Donors also attempted to establish equitable and transparent systems of tax and customs administration.

In addition to macroeconomic and institutional reforms, donors support small and medium-sized enterprises (SMEs) in order to spur growth in transition economies. The European Bank for Reconstruction and Development (EBRD) and the United States Agency for International Development (USAID) have a common strategy to strengthen SMEs. Actions include development of an appropriate competition policy, a business environment rewarding productive effort, business support services and access to capital. USAID programmes provide business services, expand credit opportunities and support non-governmental organizations in efforts to improve the business environment. Specific actions taken in the Central Asian Republics include business and economics education at the university level, formation of business advocacy organizations, reform of banking institutions and micro-finance programmes. (EBRD, 1999; USAID, 2003a and 2003b).
Donors also work to improve the economic life of communities. USAID’s Office of Urban Programmes works in four areas: urban infrastructure, governance, local economic development and health (USAID, 2003c). In Armenia, USAID-funded projects have focused on improving infrastructure and providing short-term employment opportunities (USAID, 2003d). Urban economic development strategies have been designed for the cities of Ijevan and Alaverdi (Urban Institute, 2003). The European Union’s Tacis programme has executed an economic development study of Lori Marz (region) (Tacis, 2001).

These reforms are important for economic growth in the transition countries. However, none of these reform efforts deal specifically with urban economies per se. A review of the transition literature reveals a similar omission of significant emphasis on urban economic policy in transition countries (Pickles et al., 1998; Lavigne, 1999). From the perspective of an urbanist, a failure to deal with city economies is a significant policy omission. This is so because cities are recognized as engines of economic growth (World Bank, 2000; USAID, 2003c). By removing barriers to efficient city economies, cities may generate the kind of growth that will lead to measurable improvement in the lives of city residents in transition countries.

Many authors have demonstrated cities are engines of economic growth. Bairoch (1988), in his historical, worldwide survey of urbanization and economic development, notes urbanization influenced development in a number of ways: encouraging innovations; facilitating monetarization; enabling social mobility; fostering a labour market, especially for skilled labour and expanding markets. Jacobs (1969, p. 6) argued cities are “primary economic organs” and demonstrated cities are places where new work grows from existing work, thus leading to development and transformations of city economies. Henderson, Kuncoro and Turner (1995) empirically supported Jacobs’ thesis. They found a correlation between new high-technology firms and diverse urban areas. More recently, Sassen (2000) has described the crucial contribution cities make in the new world economy, Fujita and Thisse (2002), in their groundbreaking study of agglomeration economies, echo the words of economic historian Bairoch when they note cities “are the main social institutions in which technological and social innovations are developed.”

Following Jacobs, they further recognize cities’ economic bases change over time, leading to a “geographically diverse pattern of economic development” (Fujita and Thisse, 2002, p. 389).

Cities are engines of economic growth because of two kinds of externalities – localization economies of scale and urbanization economies of scale. Localization economies of scale occur when related firms or industries locate in close proximity for mutual benefit. Urbanization economies of scale arise from diverse economic activities. Some urban areas exhibit localization economies of scale, while others demonstrate urbanization economies of scale. Different kinds of firms locate in different cities; depending on the kind of economies of scale they require (Henderson et al., 1995; Bogart, 1998).

Development economists employ concepts similar to externalities. Kasliwal (1995) discusses these externalities, or “linkages,” in the context of economic growth in Southeast Asia. He notes the diffusion of knowledge and technology, the movement of personnel and the development of other networks among firms in terms similar to those used by Jacobs, Henderson, Bairoch and others in describing externalities in urban areas. The genesis of externalities in development economics comes from Albert O. Hirschman. Hirschman discussed backward and forward linkages in the context of industrial development. He described them in this fashion:

- The input-provision, derived demand, or backward linkage effects, i.e., every non-primary economic activity, will induce attempts to supply through domestic production the inputs needed in that activity.
- The output-utilization or forward linkage effects, i.e., every activity that does not by its nature cater exclusively to final demands will induce attempts to utilize its outputs as inputs in some new activities.

Hirschman (1959) notes domestic availability is a “more effective spur” to economic development than importing component parts.

Thus, both the urban economics literature and the development economics literature include the concept of generating economic growth through beneficial externalities among firms. This concept is crucial in the context of transition because if those externalities or linkages can be created, they can stimulate economic activity. The local labour market will be strengthened if local firms can produce for their neighbouring firms. Use of local goods will lower transportation costs, making local goods cheaper. As firms produce more intermediate goods, they create opportunities for other firms to use those inputs in the creation of new final products.

This research is undertaken to determine the extent to which these linkages among industrial firms exist within

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1 The Institute for Urban Economics in Moscow has done some work on municipal economic development. http://www.urbaneconomics.ru/eng/activity/index.html. However, the mainstream literature has little discussion of urban economies in transition countries. One exception to this is the work on Novosibirsk, Russia by Bradshaw et al. (1998).

USAID has sponsored a series of workshops on local economic development entitled “Cities Matter.” This author attended one of those workshops. While they may be helpful in terms of raising consciousness about urban economic development, they do not deal extensively with the economics of local development.
Yerevan, Armenia. If those linkages exist, the research will analyse whether they are associated with growth.

**Linkages in the Soviet Economy**

Soviet economic geography began with Lenin (Lavrishchev, 1969). Lenin’s principles to guide industrial location in the Soviet Union included the following:

- Primary production should be located near sources of raw materials, reducing transportation costs;
- Intermediate and final production facilities should be located near the consumer;
- Economic regions should develop both internal and external economies of scale, including backward and forward linkages;
- Economic activity should be diffused on an equal basis throughout the Soviet Union;
- Industrial facilities should be sited such that the standard of living is equivalent across the Soviet Union (Schiffer, 1989).

These principles, among others, were the basis of Soviet regional geography. However, Soviet industrial organization impeded pure application of the theory. Industries and enterprises in the Soviet Union were subject to one or more levels of government (party) supervision. All-union ministries managed some directly. Others were managed by all-union ministries through corresponding republic ministries. In some cases, industries were supervised by republic ministries if there were no corresponding all-union ministries. At the local level, attempts were made, through planning, to locate industries such that they could reinforce and support each other, as the theory of linkages would dictate (Bergson, 1964; Ohanian, 2002).

Political considerations often overruled the economic theory of industrial location. This occurred in two ways. First, the ministries controlling industries, especially the “power” industries related to defence and heavy industry, could annul local plans and site factories almost at will (French, 1995). Second, in order to keep the individual republics from seceding from the Union, factories were sited such that they were dependent on inputs from factories in other republics. Markets were also located in distant republics or in the COMECON nations. This pattern of remote location of inputs and markets prevented creation of local linkages that could have made individual republics economically independent (Ohanian, 2002). Political considerations of keeping the republics in check outweighed the additional transport costs incurred in this pattern of industrial location. Because transport costs were generally understated in the Soviet economic model (Schiffer, 1989), the additional transport costs imposed by these political considerations were not considered economically significant.

**The Armenian Economy**

The Soviet Armenian economy was structured according to the factors described above, but was also influenced by two unique factors. The first factor was the location of “dirty cities” in Armenia. According to Ohanian (2002), there were seven “dirty cities” in the Soviet Union that produced ecologically dangerous materials. Four of the seven Soviet “dirty cities” were located in Armenia. The “dirty city” policy was instituted to keep these dangerous industries away from European Russia. Armenia’s urban economies were especially dependent on imports of raw materials to support the dirty factories in those cities.

The second unique factor in Armenia’s economy was a large defence component. As much as 40% of the Armenian economy was based on defence work (Soghomonyan, 2002). For example, the factory Basalt produced technical equipment for Soviet submarines (Ohanian, 2002). For strategic reasons, the Armenian defence industry was heavily dependent on inputs from other republics. Its only market, naturally, was the Soviet military.

Notwithstanding its heavy concentration on the defence industry, the Soviet Armenian economy had a significant variety of industries throughout the country, in keeping with at least some of the theoretical principles of Soviet industrial location. The final Soviet GOSPLAN for Armenia shows that energy, food, machine tool, building material, miscellaneous production and printing were found in most regions of the Republic (GOSPLAN, 1987). Armenia thus had a diverse economic base in Soviet times. The industrial structure of Armenia generated a standard of living for its citizens higher than that of other republics (Soghomonyan, 2002).

The state of Soviet Armenian industry can thus be described as both typical of Soviet industry in general, with a wide variety of industries represented throughout the Republic, yet rather more heavily dependent on the centre due to the high concentration of both defence and “dirty” industries. This heavy dependence on inputs and markets from outside Armenia made the Armenian economy extremely vulnerable when the Soviet Union collapsed in 1991.
During transition the Armenian economy has changed dramatically. This can be seen by examining gross domestic product (GDP) and output figures for the eleven-year period from 1990 through 2000. Figure 1 illustrates the GDP and Figure 2 shows output figures for the same period.

Taken together, these two tables show the radical restructuring that took place in the Armenian economy following the dissolution of the Soviet Union. Industry’s contribution to GDP fell by half, while agriculture’s contribution doubled. Agriculture became the employer of last resort as the unemployed took up subsistence agriculture in order to survive (Tacis, 2001).

The effect of this deep structural change on Yerevan was profound. During the period 1990 through 2000 the number of firms in the city increased due to privatisation, but employment in the industrial sector fell dramatically. This is shown in the figures presented in Figure 3.

As can be seen from Figure 3, rates of decline in excess of ninety percent occurred in six of ten industrial sectors, measured by the value of the output. Overall, industrial production in Yerevan fell by almost ninety percent for industry as a whole in the period 1990 – 2000.

**Research Questions**

This research examines two questions:

- Have linkages been created within the urban economy of Yerevan?
- Assuming linkage exist, to what extent have those linkages contributed to growth Yerevan’s economy?
- This research is important for transition cities for two reasons. First, if linkages do exist and if they contribute to economic growth, development policy and programmes should foster those linkages. Second, if these linkages do not exist, the structural flaws preventing their creation should be identified and removed in order to create efficient urban economies.

**Methodology**

This article focuses on linkages among industrial firms in Yerevan, Armenia. Yerevan was selected because of its importance as an urban manufacturing centre during Soviet times and because it is the primate city in Armenia.

Linkages were identified by questioning firms about the source of their inputs and the disposition of their outputs. Firms interviewed were generally selected from the Spyur Business Directory. The Spyur Directory only includes firms registering with Spyur.
Industrial production statistics from the Armenian National Statistics Service (NSS) for the years 1999 – 2002 were used to identify growth in industrial sectors. The NSS uses the NACE classification scheme. Statistics by Marz (region) were first published in 1999. Because Yerevan has the status of a Marz, statistics for Yerevan Marz are city statistics. Adjustments for inflation were made using coefficients provided by the Armenian Ministry of Finance and Economy.

**Results**

With respect to the first question, the survey results showed that to some extent, linkages do appear in Yerevan’s economy. As shown in Figure 4, 39% of the firms surveyed produce intermediate goods for further use in the Armenian economy. Thirteen firms (12%) produce only for export. Fifty-three firms produce final products for use in Armenia’s domestic market. Of the 42 firms producing intermediate goods, 9 firms (8%), produce only intermediate goods.

The survey instrument also asked whether firms obtained intermediate products from Armenian firms. The responses to that question are shown in Figure 5.
<table>
<thead>
<tr>
<th>Manufacturing Category</th>
<th>Number of Firms Surveyed</th>
<th>Number of Firms Producing only Export</th>
<th>Number of Firms Producing only Consumer Goods for the Local Market*</th>
<th>Number of Firms Producing Consumer Goods for the Local Market and Intermediate Goods</th>
<th>Number of Firms Producing only Local Intermediate Goods</th>
<th>Number and Percent of Firms Producing Local Intermediate Goods (Total Columns 5 &amp; 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food/Beverage/Tobacco Processing</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Textiles</td>
<td>7</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>1 (14%)</td>
</tr>
<tr>
<td>Leather Goods/Leather Goods/Feet</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Wood Production</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Paper Production/Printing</td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1 (20%)</td>
</tr>
<tr>
<td>Refined Petroleum</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1 (100%)</td>
</tr>
<tr>
<td>Chemicals</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>3 (37%)</td>
</tr>
<tr>
<td>Rubber/Plastics</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>Non-Metallic Mineral Production</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>3 (50%)</td>
</tr>
<tr>
<td>Basic Metals/Fabricating</td>
<td>22</td>
<td>0</td>
<td>5</td>
<td>14</td>
<td>2</td>
<td>16 (73%)</td>
</tr>
<tr>
<td>Machine Production</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>3 (33%)</td>
</tr>
<tr>
<td>Electrical/Electronics/Optical</td>
<td>27</td>
<td>0</td>
<td>15</td>
<td>5</td>
<td>2</td>
<td>7 (36%)</td>
</tr>
<tr>
<td>Transport</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1 (50%)</td>
</tr>
<tr>
<td>Other Production</td>
<td>14</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>13</td>
<td>53</td>
<td>34</td>
<td>8</td>
<td>42 (39%)</td>
</tr>
</tbody>
</table>

*Firms in columns 4, 5 and 6 may also produce export goods; however, those columns only reflect totals for goods for domestic use.

Figure 4. Percentage of Firms Surveyed Producing Output for Use by Other Firms in Armenia (Surveys conducted by the author)
<table>
<thead>
<tr>
<th>Manufacturing Category</th>
<th>Number of Firms Surveyed</th>
<th>Number of Firms with No Local Input</th>
<th>Number of Firms with only Local Raw Material Input</th>
<th>Number of Firms with both Local Raw Material and Local Intermediate Goods Input</th>
<th>Number of Firms with only Local Intermediate Goods Input</th>
<th>Number and Percent of Firms with Inputs of Local Intermediate Goods (Total Columns 5 &amp; 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food/Beverage/Tobacco Processing</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Textiles</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>14%</td>
</tr>
<tr>
<td>Leather Goods/Shoes</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Wood Production</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Paper Production/Printing</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>15%</td>
</tr>
<tr>
<td>Refined Petroleum</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Chemicals</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>12%</td>
</tr>
<tr>
<td>Rubber/Plastics</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Non-Metallic Mineral Production</td>
<td>6</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>17%</td>
</tr>
<tr>
<td>Metals/Fabricating</td>
<td>22</td>
<td>9</td>
<td>11</td>
<td>1</td>
<td>1</td>
<td>25%</td>
</tr>
<tr>
<td>Machine Production</td>
<td>9</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>44%</td>
</tr>
<tr>
<td>Electrical/Electronics/Optical</td>
<td>27</td>
<td>13</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>33%</td>
</tr>
<tr>
<td>Transport</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other Production</td>
<td>14</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>108</strong></td>
<td><strong>49</strong></td>
<td><strong>34</strong></td>
<td><strong>13</strong></td>
<td><strong>12</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

**Figure 5.** Percentage of Firms Surveyed Using Output Produced by Other Firms in Armenia
(Surveys conducted by the author)
The responses that are shown in the two tables show somewhat incongruous results. Whereas 39% of firms produce intermediate goods for the local market, only 23% of firms procure those goods. In seven industries, 33% or more of firms interviewed produced intermediate goods for the local market. Yet in only three industries did 33% of more of the firms surveyed procure intermediate goods in the local market. The survey results suggest somewhat weak linkages may exist in the Yerevan economy.

Industrial production statistics for Yerevan for the years 1999 – 2002 were examined to determine the relationship between linkages and growth. The growth figures were compared with the survey results to determine if growth occurred in the sectors with the strongest linkages.

The results do not necessarily support the hypothesis. As shown in Figure 6, basic metals/fabricating, non-metallic mineral production, transport, machine production and electrical/electronics/optical production showed impressive growth, 58%, 27%, 495%, 30% and 102% respectively. However, there is no correlation between those growth rates and high rates of linkages. Seventy-three percent of basic metals/fabricating firms do produce intermediate goods, and 50% of firms in non-metallic mineral production and transport produce intermediate goods. Thirty-three percent of machine production firms made intermediate goods, with electrical/electronic/optical at 26%. On the other hand, even though 100% of the firms surveyed in the rubber/plastics sector produced goods for other firms in the Armenian economy, growth in that sector over four years was 1%. Chemical production decreased by 26%, even though 37% of the firms in that industry produced goods for use by other Armenian firms. Thus high growth rates and linkages were not uniformly correlated.

Discussion

A review of the linkage literature in urban economics and in development economics shows no study of linkages in post-Soviet urban economies. The importance of this research lies in determining how the theory of linkages may be applicable to those economies. Because Soviet urban growth did not generally foster traditional linkages, in most cases linkages must be newly created during the transition period.

The survey results do not show significant creation of linkages in Yerevan’s economy. Furthermore, some of the linkages may not be sustainable. For example, many of the intermediate goods produced in the basic metals/fabricating sector are for construction. There is significant construction in Yerevan at present, but financing for that construction comes primarily from outside Armenia, either from donors or from the Armenian Diaspora. Large-scale donor financing of construction is set to end in 2003 (Mkrtchyan, 2003; Soghomonyan, 2002). On the input side, results were also mixed. Six firms, or forty percent, producing goods in the other category used local input, but production in that sector declined over the period in question. Furthermore, two-thirds of those six firms were furniture manufacturers whose primary input from the local market was processed wood products. Only in the machine production and electrical/electronics/optical sectors are increase in output and balanced links on both the output and input side in evidence.

The responses also revealed that even in those cases in which firms use inputs from other local firms, many of those inputs are simply scrap from factories not currently operating. In other instances, inputs drawn from other firms are simply unused raw materials from Soviet times. Thus, the level of actual economic activity between firms which is new production is less than the survey results would indicate.

A further complication is the quality of materials produced in Armenia. Several survey respondents indicated that locally produced goods were either too expensive or of poor quality, or both. For those reasons, they shunned local production and used imported products. Survey results indicate that one reason for the poor quality of local goods is that production equipment is in many cases outmoded. Firms cannot acquire new equipment because of lack of financing. Firms become trapped in a vicious cycle – because they cannot acquire new technology, they cannot produce quality goods, and because they do not produce quality goods they cannot generate the revenues they require to modernize their facilities.

To this author’s knowledge, donors have not yet begun to address the problem of linkages among industrial firms in Yerevan. As noted above, programs exist to support SMEs, but typically they support to retail, craft or tourism firms individually and do not seek to create supply chains within the local economy. The author has no knowledge of any programme by any donor to specifically develop either localization or urbanization economies of scale within or among Armenian urban economies. This seems surprising, given the importance of these externalities for the functioning of an urban economy.

The USAID draft Country Strategy for Armenia for the years 2004 – 2008 does include a component on clustering in the context of expanding the labour market (USAID, 2003e). However, the Strategy has not yet been adopted and it is not known how programmes to support clustering will be designed and implemented. It is assumed that some attempts will be made to link local universities with economic activities. Whether those programmes will address issues of linkages among industrial firms is not yet known.
Conclusion

This study investigates the hypothesis that linkages among firms in transition urban economies will lead to increases in growth. The subject of the study was Yerevan, Armenia. The study sought to determine if linkages exist in Yerevan and, if so, whether they contribute to urban economic growth.

The results of the study indicate that linkages are present, in that firms in the Armenian economy do produce intermediate goods used by other domestic manufacturing and construction firms. However, those linkages are not strong, and structural barriers to the creation of linkages exist. Furthermore, the results are inconclusive as to the effect of the present weak linkages on growth in the Yerevan economy. The survey results indicate (1) barriers to the creation of linkages should be removed, and (2) one way to remove those barriers may be to provide investment in new equipment and technology so that Yerevan’s industrial firms may produce quality products at competitive prices.∗

References


GOSPLAN of the Armenian Soviet Socialist Republic (1987), Yerevan (photocopy of the original in the author’s possession)


∗ There was no refined petroleum in 1999. In order to calculate the percentage, the number 1 was substituted for 0. Hence, the large percentage increase.
Lavrishchev, A. N. (1969) Economic Geography of the USSR, Moscow, Progress Publishers (English translation by David Myshne)
Soghomonyan, P. (2002b) Interviews with the author, May
Tacis (2001) Regional Development Programme for the Lori Marz, Lori Marz, EDAR 9804