The Impact of Trade Transaction Costs on Palestine

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Abstract

The economy of Palestine is burdened by stifling trade transaction costs. Geographical fragmentation, frequent border closures, the absence of a seaport, and checkpoint controls are impediments to both internal and external trade. Better political relations between Israel and the Palestinian Authorities, the construction of a seaport in Gaza or of a corridor between the West Bank and the Gaza Strip, or trade facilitation may all lower trade transaction costs.

We use a general equilibrium model to quantify the effect of a 50 percent reduction in trade transaction costs. The effects are substantial: income would increase by over 20 percent, exports by 55 percent. The results suggest that policies (diplomacy or investment in infrastructure) to lower trade transaction costs have big payoffs.

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1 Introduction

Palestine is a small, resource-poor economy. As the 40 km (25 miles) Mediterranean coast of the Gaza Strip has no seaport, Palestine is effectively landlocked. Foreign trade—mainly with Israel—represents over 80% of GDP. Israel controls the main border crossings and transport routes, and has, for reasons of security or policy, frequently imposed administrative restrictions, blocked roads, tightened security measures at checkpoints, or closed crossings. Such measures constrain trade and the movement of workers. Even moving goods or workers within the Palestinian Territories is problematic: the Gaza Strip and the West Bank are separated by about 45 km (28 miles) of land, and the West Bank is fragmented by settlements and restricted roads. Higher trade transaction costs act as a barrier to trade: they reduce the gains from specialization and economies of scale, and as a result decrease the productive capacity of the Palestinian economy. Although Palestine has bilateral trade agreements with amongst others Israel, Jordan, Egypt, the European Union, and the United States, Palestinian firms have not been able to make significant advances in international trade, mostly due to barriers placed on the execution of these agreements by Israel and the corresponding high trade transaction costs. Uncertainty prevents accurate planning. Timely delivery of goods—crucial in international trade—is all but impossible due to administrative delays at crossings and checkpoints.

Trade transaction costs can fall for several reasons: loosening of the restrictions imposed by Israel, simplification of administrative procedures (trade facilitation), or the construction of a seaport in Gaza or a corridor linking the West Bank and the Gaza Strip. We calibrated a small general equilibrium model of the Palestine economy on an updated social accounting matrix for 2007. We then used the model to quantify how big the effect would be of a reduction in trade transaction costs and which sectors would benefit most.

2 Trade Transaction Costs: Theory and Evidence

A transaction cost is a cost due to making an economic exchange. Trade transaction costs include the costs of obtaining information, of transport (determined by geographical factors like distance or being a landlocked economy), of administrative procedures (customs clearance, other non-tariff barriers), and of uncertainty (for instance about exchange rates). They drive a wedge between the supply price and the demand price and result in resources being used up in exchange, as a simple partial-equilibrium model illustrates (Bussolo and Whalley, 2003). Suppose that supply and demand in a competitive market are linear:
\[ P_d = b - aQ_d \]  
\[ P_s = c + hQ_s \]  

The transaction unit cost of the good exchanged \( T \) represents the difference between the supply price received by the producers and the demand prices paid by the consumers:

\[ P_d = P_s + T \]  

The market clears when

\[ Q_d = Q_s \]  

The equilibrium quantity \( Q_e \) is:

\[ Q_e = \frac{b - c - T}{a + h} \]  

The comparative statics result is:

\[ \frac{\partial Q_e}{\partial T} = -\frac{1}{a + h} \]  

that is, the transaction cost \( T \) has a negative impact on equilibrium quantity \( Q_e \). If the transaction cost exceeds \( b - c \) (the autarky limit), no exchange takes place.

If the transaction cost is a payment to an intermediary or a tax, the welfare loss is the Harberger deadweight loss triangle. If the transaction cost purely represents resources used up in the process of exchange, the welfare loss is the Harberger deadweight loss triangle plus the rectangle associated with the product \( T \times Q_e \).

Samuelson (1954) coined the term *iceberg* transaction costs: for each good that is exported a certain fraction “melts away” during the trading process, as if an iceberg were shipped across the ocean.

As transaction costs affect prices in one market, relative prices are likely to change. In that case, the effects spill over to other markets, calling for a general equilibrium approach (Hines, 1999): “...[transaction costs caused by the inefficiencies of crossing the border] also cause welfare losses to the entire economy because of the distortions they introduce to consumption and sourcing decisions” (Fox, Francois, and Londoño-Kent, 2003, p. 1).

Trade transaction costs can be large. Henderson, Shalizi and Venables (2001) estimated that transportation margins range from a few percent of the value of trade to 30–40 percent for remote and landlocked economies. Limão and Venables (2002)
found that being landlocked raises transport costs by more than half. Subramanian and Arnold (2001) examined transportation and logistics networks in South Asia and found that the principal problems for traders were related to the time, reliability and safety of logistics services. For example, logistics accounted for more than a third of the cost of door-to-door shipment of carpets from Nepal to Germany and teabags from India to the United Kingdom. Time is an important factor: Hummels (2001) found that each day saved in shipping time due to faster transport and customs clearance was worth 0.8 percent, ad valorem, for manufactured goods.

Unreliable logistic services force firms to maintain higher inventories. Guasch and Kogan (2001) found that on average Latin American countries—faced with longer delays in shipments and larger costs for small shipments—hold twice as much raw material and finished products as the United States. Maintaining high levels of inventories ties up expensive capital: to cut inventories by 50 percent could reduce unit production costs by 20 percent.

Weak institutions act as barriers to international trade (Anderson and Marcouiller, 2002). Weak institutions can express themselves through corruption at various points in the supply chain, which increases the trade transaction costs faced by traders. Francois and Manchin (2007) measured institutional quality through economic freedom, focusing on the size of government, freedom of trade, protection of property rights, and business regulation. They found that strong institutions are associated with increased trade. Moreover, high trade costs can themselves lead to extortion and corruption: higher trade costs are associated with a higher level of (perceived) corruption (Gatti, 1999).

Transaction costs are one reason why international trade flows are smaller than trade theory predicts. The effects of distance and being landlocked have been well documented in gravity models. Typically, an increase of distance by 1 percent lowers trade by something 0.7 to 1.0 percent (Krugman and Obstfeld, 2009, p. 17), and the median landlocked economy has only 40 percent of the trade volume of a coastal economy with the same distance and income (Lima˜o and Venables, 2002). An international border has a large dampening effect on trade (the home bias in trade): McCallum (1995) finds that—for equal distance and income—trade between two Canadian provinces is about 20 times larger than trade between a Canadian province and a U.S. state. Obstfeld and Rogoff (2000) have argued that trade transaction costs can explain much of the home bias for goods.

3 Why Trade Transaction Costs in Palestine are High

The Protocol on Economic Relations between the Government of the State of Israel and the Palestine Liberation Organization (the Paris Protocol, signed in 1994) es-
tablished a customs union between Israel and the Palestinian Territories. It grants Palestinian and Israeli traders equal treatment at Israeli border points. However, since signing the Paris Protocol, Israel has taken administrative, logistical and security measures which have become serious obstacles to Palestinian trade. After the start of the Second Palestinian Intifada in 2000, Israel expanded and intensified its closures at the main commercial crossing points along the West Bank’s and Gaza Strip’s borders with Israel, Jordan, and Egypt. Israeli checkpoints, roadblocks, and customs and transport procedures have imposed prohibitive transaction costs on Palestinian exporters and importers weakened the competitiveness of Palestinian goods, making trade barriers of greater effect than tariffs (UNCTAD, 2006).

More specifically, Israel requires a “back-to-back” procedure at crossings. The secretary-general of the World Customs Organization describes the procedure as follows:

(…) the reality at the border of the Palestine Authority is very different from the normal customs landscape. In coming to Ramallah I passed through Israel and saw the ‘back-to-back crossing’ at the land border with the Palestine Authority. A Palestinian truck arrives at the back-to-back crossing for inspection. The Israeli Ministry of Defence inspects all the consignments with scanning equipment for security purposes before Israeli Customs inspects them for tax purposes where necessary. After these procedures the consignments are loaded onto an Israeli truck and are then cleared at the customs office at the Israeli gate.
(Mikuriya, 2009)

The back-to-back system causes damage to agricultural products and perishable goods. Dairy products transported from Hebron on the West Bank to Gaza Strip have to undergo a security inspection at the Tarqoumia checkpoint on the way out of the West Bank because they have to cross Israeli territory. Before entering Gaza Strip at Karni crossing, the same products have to wait on trucks to go through security inspection again.

Within the West Bank, road blocks, closed areas and restricted roads have cut the Palestinian areas into isolated cantons (World Bank, 2007). Roadblocks and security checkpoints have increased the cost to transport products by truck from Nablus to Ramallah (both on the West Bank, 47 km or 29 miles apart) fivefold between September 2000 and 2005 (Palestine Trade Center, 2005). In addition to the internal movement restrictions in the West Bank, Israel has constructed commercial crossing points in the Israeli West-Bank separation barrier that have the potential to become another serious constraint to the Palestinian economy. Once the 703 km (437 miles) separation barrier is complete, all Palestinian commercial traffic leaving the West Bank will have to move through the commercial crossings using a
back-to-back system.

In sum, routes become longer and distances harder to cross, more damage is caused to vehicles and goods, storage costs increase and perishables are lost due to delays. It is estimated that Palestinian trade transaction costs in 2003 were at least 30 percent higher than at the start of the Second Intifada in September 2000 (UNCTAD, 2003). The Israeli closure policy and the security measures account for more than half of the transport costs (UNCTAD, 2006). The Agreement on Movement and Access, signed on 15 November 2005 between the Palestinian Authorities and the Government of Israel, sought to facilitate movement within the West Bank and between the West Bank and Gaza Strip, but has had little effect.

The restrictions have changed the structure and functioning of all sectors of the Palestinian economy through multiple channels. They limit producers’ access to imported inputs needed to maintain the capital stock or to produce goods, and block their access to local and international markets. Loss in income due to the restrictions constrains output from the demand side; uncertainty and the higher cost of imported inputs constrain output from the supply side. The World Bank (2008a) points at the closures and restrictions as a key obstacle for the Palestinian economy.

4 How Trade Transaction Costs May Fall

Obviously, better political relations between Israel and the Palestinian Authorities and a reduction of perceived security risks would lower transaction costs. But three specific measures have been proposed to reduce transaction costs in Palestine: the construction of a corridor between Gaza Strip and the West Bank, the construction of a seaport in Gaza, and trade facilitation.

Corridor between Gaza Strip and the West Bank  In the 1995 Interim Agreement on the West Bank and the Gaza Strip, the two sides recognized the West Bank and Gaza Strip as a single territorial unit (article XI), and set out arrangements for the safe passage of persons and transportation between the West Bank and the Gaza Strip (Article XXIX and Annex 1). Palestinians and Israeli’s alike have argued that safe passage will require a physical territorial link between the West Bank and Gaza Strip (Palestine Trade Center, 2005, p. 2). To avoid that such a physical corridor splits Israel into two entities, it has been proposed by then Israeli prime minister Ehud Barak in 1999 and others that the corridor take the form of an elevated multi-lane highway with a cargo and passenger train link, plus telecommunications connections and water and fuel pipelines (Lonergan, 2004). Alternatively, the safe passage can take the minimalist form of convoys (World Bank, 2005)
Gaza seaport  Palestinian enterprises are mainly dependent on Israeli seaports for participating in international trade. Given the difficulties to transport goods by road to and from the Israeli seaports, and given the desire for sovereignty, Palestinians have since the early 1990s expressed the wish to construct a seaport on the Gaza Strip. The Gaza seaport will provide Palestinian (and, if the corridor is realized, Jordanian) traders with an alternative transit route to Europe and North America. Construction of a seaport just south of Gaza City began in 1999 but was suspended after the conflict erupted in September 2000. Even though the Agreement on Movement and Access (2005) gave the go-ahead for the construction of a seaport in Gaza and Western creditors promised funding, little progress has been made since.

Trade Facilitation  Trade facilitation (in the narrow sense) seeks to reduce trade transaction costs through the “simplification, harmonisation, standardisation and modernisation of trade procedures” (Grainger 2008, p. 17), such as customs procedures and safety, health, and security controls at the border. The European Union supports the Palestinian Authority by providing technical assistance aimed at trade facilitation and modernization of customs (European Commission, 2009).

5 Modeling Trade Transaction Costs in Palestine

A computable general equilibrium model  Computable general equilibrium models are a useful tool to measure the effect of border trade barriers and to model how a reduction in the transaction costs might affect trade volumes and welfare, as illustrated by Fox, Francois, and Londoño-Kent (2003), who use the General Trade Analysis Project (GTAP) model to assess the costs and times of crossing the border between the United States and Mexico. We present a model for the Palestinian economy using the computable general equilibrium modeling framework developed specifically for developing countries by Lofgren, Harris, and Robinson (2002), in the neoclassical modeling tradition originally presented in Dervis, de Melo, and Robinson (1982). The small country assumption implies that producers take world prices as given when making their decisions. Demand for exports is infinitely elastic at fixed prices, and import demand is met by an infinitely elastic supply of imports at fixed prices. The model includes three macroeconomic accounts: the current account, the government balance, and the savings and investment account. To have equilibrium in the different macro accounts, a set of macro-closures or rules provide a mechanism for adjustment. The model is flexible to accommodate a wide range of views on how the economy adjusts to exogenous shocks and the use of policy changes. For more details on the model structure, see Lofgren, Harris, and Robinson (2002). The GAMS file containing program and data is available upon request.
Let us now briefly turn to the treatment of transactions costs, the social accounting matrix, and the parameter values.

**Transaction costs**  One salient feature is that the model allows for explicit treatment of transaction costs (Lofgren, Harris, and Robinson, 2002, pp. 4–7). Trade transaction costs are the costs of supplying goods to the markets. The social accounting matrix distinguishes between the trade transactions costs of import commodities, of export commodities, and of the supply of domestically produced commodities to the domestic market. The model has a price equation for each imported, exported, or domestically produced and consumed commodity. Import transaction costs express the cost of transporting imported goods and preparing it for sale on the domestic market. The import price is the price paid by domestic users for imported commodities, and includes import tariffs and transaction costs per import unit. Export transaction costs are the cost of transporting goods and preparing goods for sale on the foreign market. The export price is the price received by domestic producers for their exports. The export price is affected by export taxes and transaction costs, which reduce the price received by the domestic producers of exports. Finally, the model defines prices for domestic output that is used domestically. Prices paid by consumers exceed prices received by producers. Part of the prices paid by consumers is transaction costs. The demand price is the supply price plus the transaction costs per unit of domestic sales of the domestic commodity. The domestic producer prices are net of transaction costs.

**The Social Accounting Matrix**  A social accounting matrix provides the data needed to implement a computable general equilibrium model. It is a consistent data framework that captures the information contained in the national income and product accounts and the input-output table, and takes into consideration the monetary flows between institutions within the economy. The social accounting matrix provides a complete account of the circular flows in the economy, representing the flows of money and the flows of goods and services. It shows the distribution of factor incomes of both domestic and foreign origin over institutional sectors (households, firms, and government) and the expenditure of these sectors on consumption, investment and savings. The social accounting matrix represents the initial equilibrium and the market clearing conditions in the economy, because in the matrix expenditure (row sum) has to equal income (column sum) for every agent.

We updated the social accounting matrix for Palestine by Dessus (1998) using the most recent data available, mostly from 2007. The resulting social accounting matrix is consistent with the computable general equilibrium model by Lofgren, Harris, and Robinson (2002). The data came from diverse sources: the input-
output matrix, national accounting data, household surveys, expenditure surveys, firm surveys, labor market surveys, government accounts, international trade accounts, information on taxes, revenues and the composition of expenditures. The social accounting matrix for Palestine used for the model is a square $(31 \times 31)$ matrix (but many of the cells take value zero). The complete matrix—too large to display here—is available on request. The social accounting matrix explicitly associates trade flows with trade transaction costs, more specifically domestic transaction costs, export transaction costs, and imports transaction costs (table 1). We assume that services have no trade transaction costs. The values for the transaction costs in table 1 are those for 1998, increased by 30 percent—the shock reported by UNCTAD (2003).

**Parameter values** Values for the elasticities data are necessary to calibrate the model. Expenditure elasticities by commodity and households, trade elasticities for the Armington and transformation functions and substitution elasticities between factors of production were obtained from Missaglia and de Boer (2004). The substitution elasticities between factors and intermediates are assumed to be constant across all activities and set equal to 0.6 where applicable. The aggregator elasticities, which allow for commodities to be produced by various industries according to a constant elasticity of substitution specification, are all set at four. The Frisch parameter, which allows for the determination of household expenditures, was set to a constant at a value of two.

6 Simulations

We simulated a 50 percent reduction of transaction costs, roughly a return to the level of mid-2000. Possible reasons for a reduction were discussed in section 4: better political relations between Israel and the Palestinian Territories, a corridor between Gaza Strip and the West Bank, construction of Gaza seaport, and trade facilitation. Tables 2 and 3 show the effects on selected endogenous variables of the Palestinian economy for a joint 50 percent decrease of all three types (import, export and domestic) of transaction costs.\(^1\) The base-year (benchmark) values correspond to the values found in the Palestinian social accounting matrix. The results of changes in the import, export and domestic transaction costs separately are not reported for brevity.

The impact of a 50 percent decrease in overall transaction costs is to increase GDP by about 21 percent, household income by 17 percent, private consumption

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\(^1\)Because the model is nonlinear the effects of a 50 percent increase are not symmetric. They do have the opposite sign but tend to be somewhat smaller.
by 31 percent, imports by 29 percent, and exports by 55 percent (table 2). The trade deficit falls by 7 percentage points, to 73 percent of GDP. Government revenue increases by 10 percent and government consumption by 14 percent. Fixed investment falls somewhat because demand for consumption increases, lowering the savings rate. Overall absorption increases by 19 percent.

Income distribution is affected as well: the income of capital increases by 32 percent, that of labor only by 14 percent (table 2). As a result, the share of capital in income increases by 3.5 percentage points to 48.3 percent of national income, at the expense of labor, falling to 51.7 percent of income. As anecdotal evidence suggests that capital is held mainly by non-refugees, this will further deepen the divide between refugee and non-refugee Palestinians. We will further explore this issue in a future paper.

The impact of lower transactions costs on trade differs across sectors (table 3). On the export side, agriculture (plus 90 percent), manufacturing (plus 83 percent) and construction (plus 3 percent) show gains, but service exports all drop. Imports increase for all goods and services except, as expected, for wholesale and trade (minus 28 percent).

7 Conclusion

The economy of Palestine is burdened by stifling trade transaction costs resulting from geographical fragmentation, frequent border closures, the absence of a seaport, and checkpoint controls. Better political relations between Israel and the Palestinian Authorities, construction of a seaport in Gaza or a corridor between the West Bank and the Gaza Strip, or trade facilitation may lower trade transaction costs. We used a general equilibrium model to quantify the effect of a 50 percent reduction in trade transaction costs. The effects are substantial: income would increase by over 20 percent, exports by 55 percent. The results suggest that policies to lower trade transaction costs (diplomacy or investment in infrastructure) have big payoffs.
<table>
<thead>
<tr>
<th></th>
<th>Agriculture</th>
<th>Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>8.9</td>
<td>49.1</td>
</tr>
<tr>
<td>Exports</td>
<td>21.0</td>
<td>153.2</td>
</tr>
<tr>
<td>Imports</td>
<td>88.5</td>
<td>652.1</td>
</tr>
</tbody>
</table>
Table 2. Effects of a 50 percent decrease in transaction costs on output and income

<table>
<thead>
<tr>
<th>GDP and its components</th>
<th>benchmark (US$ millions)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorption</td>
<td>7143.463</td>
<td>19</td>
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<tr>
<td>Private Consumption</td>
<td>4463.840</td>
<td>31</td>
</tr>
<tr>
<td>Government Consumption</td>
<td>1421.465</td>
<td>14</td>
</tr>
<tr>
<td>Fixed Investment</td>
<td>1237.190</td>
<td>-1</td>
</tr>
<tr>
<td>Exports</td>
<td>530.164</td>
<td>55</td>
</tr>
<tr>
<td>Imports</td>
<td>3039.837</td>
<td>29</td>
</tr>
<tr>
<td>Net Taxes</td>
<td>1007.319</td>
<td>16</td>
</tr>
<tr>
<td>GDP</td>
<td>4633.790</td>
<td>21</td>
</tr>
</tbody>
</table>

GDP at factor cost by activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>benchmark (US$ millions)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>323.683</td>
<td>19</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>455.737</td>
<td>55</td>
</tr>
<tr>
<td>Construction</td>
<td>101.566</td>
<td>61</td>
</tr>
<tr>
<td>Education</td>
<td>316.858</td>
<td>33</td>
</tr>
<tr>
<td>Wholesale and Trade</td>
<td>406.085</td>
<td>-32</td>
</tr>
<tr>
<td>Transport, Storage, and Communications</td>
<td>477.742</td>
<td>9</td>
</tr>
<tr>
<td>Private Services</td>
<td>651.625</td>
<td>31</td>
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<tr>
<td>Public Services</td>
<td>893.185</td>
<td>23</td>
</tr>
<tr>
<td>GDP at Factor Cost</td>
<td>3626.471</td>
<td>22</td>
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</tbody>
</table>

Income by source

<table>
<thead>
<tr>
<th>Source</th>
<th>benchmark (US$ millions)</th>
<th>% change</th>
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</thead>
<tbody>
<tr>
<td>Capital Income</td>
<td>1623.362</td>
<td>32</td>
</tr>
<tr>
<td>Labor Income</td>
<td>2003.109</td>
<td>14</td>
</tr>
</tbody>
</table>

Household income by source

<table>
<thead>
<tr>
<th>Source</th>
<th>benchmark (US$ millions)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Income</td>
<td>1641.590</td>
<td>29</td>
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<tr>
<td>Labor Income</td>
<td>2313.772</td>
<td>13</td>
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<tr>
<td>Government transfers</td>
<td>403.006</td>
<td>—</td>
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<tr>
<td>Income from rest of world</td>
<td>292.604</td>
<td>—</td>
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<tr>
<td>Household income (total)</td>
<td>4650.972</td>
<td>17</td>
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</tbody>
</table>

Government income

<table>
<thead>
<tr>
<th>Source</th>
<th>benchmark (US$ millions)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government income</td>
<td>2100.337</td>
<td>10</td>
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</table>
Table 3. Effects of a 50 percent decrease in transaction costs on trade by commodity

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Exports Benchmark (mn US$)</th>
<th>% change</th>
<th>Imports Benchmark (mn US$)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>47.835</td>
<td>90</td>
<td>633.524</td>
<td>25</td>
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<tr>
<td>Manufacturing</td>
<td>139.805</td>
<td>83</td>
<td>2748.832</td>
<td>31</td>
</tr>
<tr>
<td>Construction</td>
<td>22.615</td>
<td>3</td>
<td>1.845</td>
<td>4</td>
</tr>
<tr>
<td>Education</td>
<td>0.704</td>
<td>-65</td>
<td>1.060</td>
<td>72</td>
</tr>
<tr>
<td>Wholesale &amp; Trade</td>
<td>—</td>
<td>—</td>
<td>2.970</td>
<td>-28</td>
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<tr>
<td>Transport, Storage &amp; Comm.</td>
<td>62.741</td>
<td>-11</td>
<td>266.974</td>
<td>25</td>
</tr>
<tr>
<td>Private Services</td>
<td>0.621</td>
<td>-20</td>
<td>217.692</td>
<td>38</td>
</tr>
<tr>
<td>Public Services</td>
<td>81.687</td>
<td>-10</td>
<td>85.961</td>
<td>14</td>
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References


