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Shanghai, May 26, 2013
Outline

• Background and important concepts
• Research question
• Data
• Analytical results
• Tentative conclusions
• Limitations and future work
Background:
Innovation and Its Role

• Knowledge-based economy: Innovation-driven

• Definition of innovation
  – New (Schumpeter 1934, 1943)
  – Combined with better performance or efficiency (Komninos 2008)

• How to achieve innovative capacities
  – Old notion: entrepreneurship of firms (Schumpeter 1934, 1943; Cantwell 1989; among many others)
    • Innovation is affected by factors outside a business
    • Spillovers from public R&D are important
    • The size of population and the geographical agglomeration of universities and industries also matter
Background: The Context of China

• The transition of public administration
  – Building service-oriented government

• Service-oriented government (Wu et al 2012)
  – Goal: serve the society consisting of citizens and social organizations
  – Function: providing effective public services and quality public goods

• The focus on cities
  – The importance of cities
    • Major source of economic outcomes (>70% GDP; >80% tax revenue)
    • Key locations for national innovative capacity building and S&T spillovers (>90% universities & research institutes)
    • Models for PA transformation
  – Actual efforts on urbanization in China
    • The rate of urbanization exceeded 50% in 2012
Research Question

Put together the new trends

– Innovation-driven global competition
– The emerging service-oriented government in China
– The critical position of cities in both the competition and the PA transformation

to inquire:

*Do city governments provide quality services to facilitate local business innovation?*
Data: Sources

• Panel data from Lien Survey
  – 30+ cities surveyed annually in 2010-12
  – Around 700 and 100 valid responses from residents enterprises were collected respectively in each city
  – Business survey (~20 questions)
    • Overall satisfaction
    • Business environment
    • Business participation in policymaking & implementation
    • Government effectiveness

• Government official statistics
  • City government annual reports
  • China city statistical yearbooks
  • National Statistics of the 2009 R&D Census
Data: Key Variables

• Innovation outcome
  – Technology contract turnover (its share in local GDP)

• The quality of public services that may promote innovative business environment and innovation outcomes (10-point scale)
  – Overall infrastructure
  – Taxation
  – Protection of intellectual property rights (IPR)
  – Access to financial resources
  – Legal guarantee of performance of contract

• The direct support from government on innovation (1 yr lag)
  – The R&D expenditure (its share in local GDP)
Data: The Quality of Public Services

Overall Infrastructure

- Yr2012 (average: 7.24)
- Yr2011 (average: 6.28)
- Yr2010 (average: 6.12)

Mean Score

Cities: Xiamen, Hangzhou, Chongqing, Shanghai, Chengdu, Beijing, Guangzhou, Shenzhen, Dalian, Hefei, Qingdao, Nanjing, Nanning, Fuzhou, Tianjin, Jinan, Shijiazhuang, Zhengzhou, Xi'an, Changchun, Shenyang, Harbin, Guiyang, Taiyuan, Wuhan, Nanjing, Kunming, Haikou.
Data: The Quality of Public Services

Taxation

Mean Score

Yr2012 (average: 7.04)

Yr2011 (average: 6.47)

Yr2010 (average: 6.32)
Data: The Quality of Public Services

Protection of Intellectual Property Right (IPR)

Yr2010 (average: 6.33)
Yr2011 (average: 6.28)
Yr2012 (average: 6.90)

Mean Score

Chongqing, Xiamen, Hangzhou, Ningbo, Changsha, Nanjing, Qingdao, Zhengzhou, Dalian, Hefei, Tianjin, Jinan, Chengdu, Shenzhen, Shanghai, Shijiazhuang, Beijing, Fuzhou, Nanning, X’ian, Changchun, Wuhan, Kunming, Guangzhou, Guiyang, Haikou, Nanchang, Shenyang, Lanzhou, Harbin, Taiyuan.
Data: The Quality of Public Services

Access to Financial Resources

Mean Score

Yr2012 (average: 8.18)
Yr2011 (average: 5.84)
Yr2010 (average: 6.14)

Shenzhen
Zhengzhou
Xiamen
Chengdu
Ningbo
Tianjin
Qingdao
Shanghai
Nanjing
Shijiazhuang
Changsha
Beijing
Chongqing
Xi'an
Dalian
Wuhan
Shenyang
Nanning
Tianjin
Nanchang
Jinan
Hefei
Fuzhou
Harbin
Haikou
Lanzhou
Kunming
Taiyuan
Guangzhou

Data: The Quality of Public Services
Data: The Quality of Public Services

Legal Guarantee of Performance of Contract

Mean Score

Yr2010 (average: 6.45)  
Yr2011 (average: 6.51)  
Yr2012 (average: 7.85)  

Xiamen  Hangzhou  Nanning  Chengdu  Changchun  Harbin  Nanjing  Qingdao  Jinan  Dalian  Changsha  Xi’an  Zhengzhou  Hefei  Shenzhen  Beijing  Shijiazhuang  Chongqing  Shanghai  Shenyang  Fuzhou  Guangzhou  Taiyuan  Haikou  Guiyang  Tianjin  Kunming  Lanzhou  Wuhan  Nanchang

Data: The Quality of Public Services
Data: Direct Support from Government

The Share of R&D Expenditure in GDP
<table>
<thead>
<tr>
<th>City</th>
<th>2012</th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>2458.5</td>
<td>1890.3</td>
<td>1579.5</td>
</tr>
<tr>
<td>Changchun</td>
<td>X</td>
<td>21.05</td>
<td>17.2</td>
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<tr>
<td>Changsha</td>
<td>19.85</td>
<td>15.37</td>
<td>23.54</td>
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<tr>
<td>Changsha</td>
<td>X</td>
<td>X</td>
<td>48.22</td>
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<tr>
<td>Chongqing</td>
<td>223.5</td>
<td>X</td>
<td>147.53</td>
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<tr>
<td>Dalian</td>
<td>131</td>
<td>105.8</td>
<td>X</td>
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<tr>
<td>Fuzhou</td>
<td>12.65</td>
<td>14.38</td>
<td>X</td>
</tr>
<tr>
<td>Guangzhou</td>
<td>X</td>
<td>159.52</td>
<td>136.8</td>
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<tr>
<td>Guiyang</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Haikou</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Hangzhou</td>
<td>X</td>
<td>43.37</td>
<td>41.73</td>
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<td>Harbin</td>
<td>64.2</td>
<td>57.6</td>
<td>50.93</td>
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<tr>
<td>Hefei</td>
<td>42.3</td>
<td>33.42</td>
<td>29.78</td>
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<td>Jinan</td>
<td>32.9</td>
<td>27.4</td>
<td>21.1</td>
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<tr>
<td>Kunming</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Lanzhou</td>
<td>X</td>
<td>16.86</td>
<td>X</td>
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<td>Nanchang</td>
<td>14.5</td>
<td>12</td>
<td>10.1</td>
</tr>
<tr>
<td>Nanjing</td>
<td>145.38</td>
<td>120.27</td>
<td>76.89</td>
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<tr>
<td>Nanning</td>
<td>1.59</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Ningbo</td>
<td>10.64</td>
<td>10.9</td>
<td>9.82</td>
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<tr>
<td>Qingdao</td>
<td>34.17</td>
<td>20.75</td>
<td>16.01</td>
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<td>Shanghai</td>
<td>588.52</td>
<td>550.32</td>
<td>525.45</td>
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<tr>
<td>Shenyang</td>
<td>X</td>
<td>81</td>
<td>73.9</td>
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<td>Shenzhen</td>
<td>X</td>
<td>111.27</td>
<td>X</td>
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<td>Shijiazhuang</td>
<td>10.7</td>
<td>9.6</td>
<td>7.6</td>
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<tr>
<td>Taiyuan</td>
<td>12.3</td>
<td>10.09</td>
<td>7.65</td>
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<tr>
<td>Tianjin</td>
<td>172.11</td>
<td>113.99</td>
<td>119.79</td>
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<td>Wuhan</td>
<td>169.69</td>
<td>107.51</td>
<td>88.87</td>
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<td>Xian</td>
<td>303.75</td>
<td>204.59</td>
<td>57.3</td>
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<td>Xiamen</td>
<td>59.28</td>
<td>38.71</td>
<td>X</td>
</tr>
<tr>
<td>Zhengzhou</td>
<td>65.1</td>
<td>50</td>
<td>43</td>
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</table>
Data: Innovation Outcome

The distribution on the share of technology contract turnover in GDP
## Analysis: Correlations

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>1. The share of technology contract turnover in GDP</td>
<td>1.000</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Overall infrastructure</td>
<td>0.148</td>
<td>1.000</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>3. Taxation</td>
<td>-0.025</td>
<td>0.783</td>
<td>1.000</td>
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<tr>
<td>4. Protection of IPR</td>
<td>0.008</td>
<td>0.815</td>
<td>0.791</td>
<td>1.000</td>
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<tr>
<td>5. Access to financial resources</td>
<td>0.053</td>
<td>0.792</td>
<td>0.652</td>
<td>0.680</td>
<td>1.000</td>
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<tr>
<td>6. Legal guarantee of performance of contract</td>
<td>0.080</td>
<td>0.847</td>
<td>0.743</td>
<td>0.779</td>
<td>0.876</td>
<td>1.000</td>
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<tr>
<td>7. The share of R&amp;D expenditure in GDP</td>
<td><strong>0.725</strong></td>
<td>0.036</td>
<td>-0.160</td>
<td>-0.151</td>
<td>-0.075</td>
<td>-0.079</td>
<td>1.000</td>
</tr>
</tbody>
</table>
## Analysis: Multivariate Regressions

**OLS Regression on the share of technology contract turnover in local GDP**

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall infrastructure</strong></td>
<td>1.95*</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>(0.90)</td>
<td>(0.68)</td>
</tr>
<tr>
<td><strong>Taxation</strong></td>
<td>-1.23</td>
<td>-0.25</td>
</tr>
<tr>
<td></td>
<td>(0.92)</td>
<td>(0.67)</td>
</tr>
<tr>
<td><strong>Protection of IPR</strong></td>
<td>-0.94</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>(1.03)</td>
<td>(0.75)</td>
</tr>
<tr>
<td><strong>Access to financial resources</strong></td>
<td>-0.45</td>
<td>-0.14</td>
</tr>
<tr>
<td></td>
<td>(0.58)</td>
<td>(0.41)</td>
</tr>
<tr>
<td><strong>Legal guarantee of performance of contract</strong></td>
<td>0.46</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>(1.03)</td>
<td>(0.74)</td>
</tr>
<tr>
<td><strong>The share of R&amp;D expenditure in GDP</strong></td>
<td>1.55***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.20)</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td>2.98</td>
<td>-5.58</td>
</tr>
<tr>
<td></td>
<td>(3.89)</td>
<td>(2.98)</td>
</tr>
<tr>
<td><strong>Obs.</strong></td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td><strong>R^2</strong></td>
<td>0.094</td>
<td>0.547</td>
</tr>
</tbody>
</table>
Tentative Conclusions

• Direct R&D expenditure is strongly and positively associated with technology contract turnover

• Business environment relevant public services provided by local governments seem to have weak relationship with innovation outcomes.
Limitations and Future Work

• Limitations
  – Small sample
  – Only quantitative data
  – Simple model

• Directions for future work
  – Refine the questionnaire
  – Collect qualitative data
    • Search of meaning
    • Specifications for model-building
Thank You!