Fiscal instruments for sustainable development: The case of land taxes

Matthias Kalkuhl, Blanca Fernandez Milan, Gregor Schwerhoff, Michael Jakob, Maren Hahnen, Felix Creutzig

21 March 2017

We thank Jetske Bouma and Stefan van der Esch from the PBL Netherlands Environmental Assessment Agency for their input and for funding this project.
Motivation

Land rent taxation: an old topic
• Adam Smith (1776), David Ricardo (1817), Henry George (1879)

New relevance
• Increase in the concentration of wealth (Piketty, 2014)
• Fast growth of (land) rents (Stiglitz, 2015)
• Increasing demand for land due to population growth and new uses like biofuels
• Decreasing supply of land through degradation and climate change

Developing countries
• Comparatively low tax-to-GDP ratio, to be increased for Addis Ababa Action Agenda
• Low investment in infrastructure for basic services, in particular in Africa

Our approach
• Literature review of existing knowledge on land taxation
• Case studies of Ghana, Peru, Nicaragua, Indonesia using household surveys
Overview

1. Costs and benefits of land rent taxation

2. Data and methods

3. Case study results

4. Conclusion
# Unit and value taxes

<table>
<thead>
<tr>
<th>Type of tax</th>
<th>Relation to land rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land value tax</td>
<td>Tax on pure land rents (if quality of land is exogenous to landowner)</td>
</tr>
<tr>
<td>Unit tax</td>
<td>Tax on pure land rents (tax higher than the land rent is possible)</td>
</tr>
<tr>
<td>Property tax</td>
<td>Tax on part of pure land rents Part of the pure land rent plus tax on structures (buildings); equal share.</td>
</tr>
<tr>
<td>Split rate tax</td>
<td>Tax on part of pure land rents plus tax on structures (buildings); equal or different shares.</td>
</tr>
<tr>
<td>Stamp tax and transaction taxes</td>
<td>Transactions of property - land and structures (buildings). No direct land rent taxation.</td>
</tr>
</tbody>
</table>

Our focus: pure land taxes (land value and unit tax)
 Efficiency effects

Economic performance
• Main advantage: no distortive effect on tax base, MCF close to 1.0
• MCF for capital and labor taxes: ca. 1.5, import taxes: 1.2, consumption taxes: 1.1 (Auriol and Warlter, 2012)
• Growth effect through reduced inequality in land ownership (Galor et al., 2009)

Environmental performance
• Land taxes reduce appropriation of open-access land for agriculture
  • Protection of land for biodiversity and ecosystem services (sparing effect)
  • Kalkuhl and Edelhofer (2016)
• Land taxes reduce land use and promote investment in buildings
  • Shift from quantity to quality of land use
  • Bento et al. (2009), Banzhaf and Lavery (2009), Plassmann and Tideman (2000)
Distributional effects

Vertical equity
• Progressive effect if land is highly concentrated among rich

Horizontal equity
• If households of similar wealth own different shares of land, tax may appear “unfair”

General equilibrium
• Which other taxes are reduced?
• Who benefits from higher government revenue?
Practical requirements and feasibility

Land registry and cadaster
- Land registration can be expensive, but many countries already have property taxes
- Co-benefits: land tenure security, more investments, improved access for women etc.

Administrative cost
- Set-up costs: World Bank projects for land registration less than 3% of land rents
- Recurrent cost: 1-20% of revenue in LA, at low tax rates, improvement potential

Compliance
- Generally: tax evasion depends on how well tax can be observed
- Reason for non-compliance: incomplete cadaster, dysfunctional sanctions

Political feasibility
- Olson’s asymmetry: a few (rich) pay more, many gain (comparatively) little
- Enabling conditions: benefits like public investments, co-benefits like land rights
2. Data and Methods
Data

Aggregate data:
- GDP data: World Bank (2016), Doing Business Report
- Land rent data: Lee et al. (2009)
- Financial needs for infrastructure: Jakob et al. (2016)
- Deforestation data: FAO (2016): Global Forest Resources Assessment
- Quality of land administration: World Bank (2015), Doing Business Report
- …

Household surveys:

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peru</td>
<td>2015</td>
<td>Encuesta Nacional de Hogares 2015 – Encuesta Continua</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>2014</td>
<td>Encuesta Nacional de Hogares sobre Medición de Nivel de Vida 2014</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2014-2015</td>
<td>Indonesian Family Life Survey 5 (IFLS 5)</td>
</tr>
</tbody>
</table>
## Benefits of land taxation in developing countries

<table>
<thead>
<tr>
<th>Region</th>
<th>Sub-Saharan Africa</th>
<th>Latin America &amp; Caribbean</th>
<th>South East Asia and Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy</td>
<td>Rwanda*</td>
<td>Peru*</td>
<td>Indonesia*</td>
</tr>
<tr>
<td></td>
<td>Ghana</td>
<td>Nicaragua*</td>
<td>Vietnam</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low income</td>
<td></td>
<td>Upper middle</td>
<td>Lower middle</td>
</tr>
<tr>
<td>Population (mill.)</td>
<td>11.34</td>
<td>30.97</td>
<td>257.60</td>
</tr>
<tr>
<td>Population growth (annual %)</td>
<td>2.30</td>
<td>1.30</td>
<td>1.20</td>
</tr>
<tr>
<td>Urban share (%)</td>
<td>28.81</td>
<td>78.61</td>
<td>53.74</td>
</tr>
<tr>
<td>GDP/cap (US$)</td>
<td>690</td>
<td>5934</td>
<td>3834</td>
</tr>
<tr>
<td>Agricultural land rents (% of GDP)</td>
<td>29.63</td>
<td>4.21</td>
<td>5.10</td>
</tr>
<tr>
<td>Agricultural land rents (% of GDP)</td>
<td>10.88</td>
<td>11.74</td>
<td>10.85</td>
</tr>
<tr>
<td>Financial needs (% of GDP)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.00 (est.)</td>
<td>16.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade tax revenues (% of GDP)</td>
<td>1.25</td>
<td>0.30</td>
<td>0.74</td>
</tr>
<tr>
<td>Deforestation rate (% of total area)</td>
<td>266</td>
<td>-1.40</td>
<td>-2.10</td>
</tr>
<tr>
<td>Quality of land administration</td>
<td>0.86</td>
<td>0.55</td>
<td>0.21</td>
</tr>
<tr>
<td>Control of Corruption</td>
<td>0.77</td>
<td>0.30</td>
<td>0.35</td>
</tr>
<tr>
<td>Yields (Mcal/ha)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7102</td>
<td>5731</td>
<td>11530</td>
<td>13269</td>
</tr>
</tbody>
</table>

Indices represent the indicators, where 1: deforestation; 2: yields; 3: agricultural land rents; 4: financial needs; 5: tax distortions; 6: share of small farm holders.

* Countries for which household surveys were used.
Calculating land rents: general

Generally: no comprehensive data available, in particular for private sector

Land rent
• annual flow of revenues from land under the control of household
• financial or in-kind
• Includes also land that is not formally owned

If only land value given: calculate rent with price-to-income ratio

Agricultural land
• Rent flow from renting out land

Household quintiles
• based on per capita income or expenditure data (depending on data availability)
Calculating land rents: housing land

Housing land
- Estimation of household-specific land to property ratio
- Regression analysis:
  - Structure-based factors (construction material, property size)
  - Land-based factors (accessibility of basic public infrastructure)
- Regression factors depend on data available in respective survey
- Land value on average about 40-50 percent of property value (similar to estimated from other countries)

Land value shares

Rwanda

Peru

Nicaragua

Indonesia
# Magnitude and distribution of land rents

<table>
<thead>
<tr>
<th></th>
<th>Rwanda</th>
<th>Peru</th>
<th>Nicaragua</th>
<th>Indonesia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agricultural land rents (% GDP)</strong></td>
<td>3.91</td>
<td>-</td>
<td>4.70</td>
<td>0.97</td>
</tr>
<tr>
<td><strong>Housing land rents (% GDP)</strong></td>
<td>1.48</td>
<td>0.98</td>
<td>2.78</td>
<td>2.11</td>
</tr>
<tr>
<td><strong>Total land rent (% GDP)</strong></td>
<td>5.39</td>
<td>-</td>
<td>7.48</td>
<td>3.42</td>
</tr>
<tr>
<td><strong>Land ownership (% of HH)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorest quintile</td>
<td>95.31</td>
<td>96.97</td>
<td>75.41</td>
<td>96.46</td>
</tr>
<tr>
<td>Middle quintile</td>
<td>93.50</td>
<td>90.34</td>
<td>73.34</td>
<td>93.46</td>
</tr>
<tr>
<td>Wealthiest quintile</td>
<td>69.92</td>
<td>87.10</td>
<td>76.24</td>
<td>85.61</td>
</tr>
<tr>
<td><strong>Median rent income share of land owners (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorest quintile</td>
<td>16.77</td>
<td>3.64</td>
<td>9.21</td>
<td>9.96</td>
</tr>
<tr>
<td>Middle quintile</td>
<td>13.95</td>
<td>2.30</td>
<td>6.28</td>
<td>5.81</td>
</tr>
<tr>
<td>Wealthiest quintile</td>
<td>7.82</td>
<td>1.72</td>
<td>5.31</td>
<td>3.44</td>
</tr>
<tr>
<td><strong>Property tax revenue (% of GDP) [OECD.Stata]</strong></td>
<td>0.00</td>
<td>0.22</td>
<td>0.12</td>
<td>0.22</td>
</tr>
</tbody>
</table>
Land ownership

Ruanda

Peru

Nicaragua

Indonesia
Rent as percentage of income

Ruanda

Peru

Nicaragua

Indonesia
Median rent values

Ruanda

Peru

Nicaragua

Indonesia
3. Case study results
Two different designs of land taxes:
- Linear tax at 25% or 50%
- Tax free amount for the poorest plus 25% or 50% tax
## Land tax revenue

<table>
<thead>
<tr>
<th></th>
<th>Rwanda</th>
<th>Peru (housing only)</th>
<th>Nicaragua</th>
<th>Indonesia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Linear tax scheme</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nº tax paying households</td>
<td>2,219,040</td>
<td>7,741,249</td>
<td>1,069,663</td>
<td>64,082,198</td>
</tr>
<tr>
<td>Tax revenue (% of GDP) at 25% tax rate</td>
<td>1.35</td>
<td>0.25</td>
<td>1.87</td>
<td>0.86</td>
</tr>
<tr>
<td>Tax revenue (% of GDP) at 50% tax rate</td>
<td>2.69</td>
<td>0.49</td>
<td>3.74</td>
<td>1.71</td>
</tr>
<tr>
<td>Government budget increase (%) at 25% tax rate</td>
<td>8.40</td>
<td>1.30</td>
<td>9.17</td>
<td>7.03</td>
</tr>
<tr>
<td>Government budget increase (%) at 50% tax rate</td>
<td>16.76</td>
<td>2.58</td>
<td>18.35</td>
<td>14.06</td>
</tr>
<tr>
<td><strong>B. Non-linear tax scheme</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxpayers drop out (nonlinear vs. linear) (%)</td>
<td>35.36</td>
<td>30.06</td>
<td>33.43</td>
<td>45.97</td>
</tr>
<tr>
<td>Total revenue reduction (nonlinear vs. linear) (%)</td>
<td>27.10</td>
<td>39.79</td>
<td>22.20</td>
<td>28.76</td>
</tr>
<tr>
<td>Average tax rate of non-linear 25% tax (%)</td>
<td>18.21</td>
<td>15.08</td>
<td>19.43</td>
<td>17.81</td>
</tr>
<tr>
<td>Average tax rate of non-linear 50% tax (%)</td>
<td>36.43</td>
<td>30.23</td>
<td>38.86</td>
<td>35.62</td>
</tr>
</tbody>
</table>

### Key insights:

- Land taxes could make significant contribution to government budget
- Tax exemption reduces number of taxpayers (reduced administrative cost)
- Average tax rate much below linear rate of 25% or 50%.
Distributional implications of different land tax systems

Ruanda

Peru

Nicaragua

Indonesia
Rwanda

Existing land taxes: Land Leases Fee and Fixed Asset Tax

Problems with system
• Very low revenue
• Disincentive to register land

Planned reform
• Broadening of tax base and increase of tax rates
• Administrative improvements
• Payment independent of legal status

Further potential
• 25% tax on all land rents would increase revenue from 0.2% of GDP to 1.35%
• Increased land tenure security and transparency through full registration
• Tax-free amount plus 50% rate: less than 2% of income for all households
Peru

Existing taxes: real estate property tax

Problems with system
• 70% of landholders lack official proof of property
• Contested land ownership

Planned reform
• No plans currently

Further potential
• Increase land taxes
  • to reduce distortionary taxes like VAT and income taxes
  • To provide basic services like clean water and electricity
• Centralize system for redistribution among regions
• Potential to reduce deforestation
Nicaragua

**Existing taxes:** different local taxes, generating more than 2% of GDP

**Problems with system:**
- Assessed values well below market values
- Many exemptions for existing taxes

**Planned reform**
- No plans currently

**Further potential**
- Assigning formal land titles would benefit mainly the poor
- Taxation as incentive for productive use of land
- Large potential to raise revenue
- Strong redistribution effect of land taxes as there is a small and very rich rural elite
- Finance need for education and access to credit for poor farmers
Indonesia

**Existing taxes:** real property tax, regional design elements

**Problems with system:**
- Very complex, more than 572 laws regulate land
- Coordination problems between tax agencies

**Planned reform**
- Revision of taxation of financial transactions involving property
- Initiatives to improve regulation

**Further potential**
- Potential to slow down deforestation and urban sprawl
- Substantial revenue from previously untaxed agricultural companies (foreign and domestic)
- Improved land rights
Conclusion, part 1: the potential

Land rent taxation can have major benefits for developing countries:

1) Less tax evasion
   • Alternative taxes (VAT, labor income, capital income) cause an evasion effect
   • In developing countries: additional evasion into informal sector
   • Land taxes are difficult to evade since tax base is obvious

2) Multiple co-benefits
   • Land registration can improve property rights thus triggering more investment
   • Land sparing effect (less urban sprawl, less deforestation)
   • Incentive to use land productively (speculation becomes less profitable)

3) Large revenue potential
   • So far: less than 1% of GDP coming from land taxes
   • Potential: 1 to 5% (according to household data), 10-20% (macro data)
Conclusion, part 2: the obstacles

There are obstacles to land rent taxation, but also realistic ways to overcome them:

1) Administrative cost
   • Land taxation does require substantial administrative cost
   • However: administrative cost are similar to cost of alternative taxes
   • Cost-to-collection ratio more favorable at higher rates

2) Compliance
   • Low compliance and taxpayer morale will reduce efficiency
   • Other taxes face even higher compliance problems (visibility of land!)
   • Improving quality of land tax authority can increase compliance

3) Distribution
   • In developing countries, land ownership is widespread, in particular among the poor
   • Solution: tax-free amount, already employed in Rwanda, Nicaragua, etc.
   • Additional revenue can be invested for the poor (rural infrastructure etc.)