# APPENDICES

1. Table A

*Selected Research*

|  |  |  |  |
| --- | --- | --- | --- |
| Study/Country | Price elasticity | Income elasticity | Method/data span |
| Blazquez et al. (2013),  Spain (residential) | Short run: –0.07  Long run: –0.19 | Short run: 0.23  Long run: 0.61 | GMM estimator, provincial panel data, 2000–2008 |
| Jamil and Ahmad (2011), Pakistan (aggregate and by sectors) | Aggregate:  Short run: –0.07  Long run: –1.27  Residential:  Short run: 0.07  Long run: –1.22 | Aggregate:  Short run: 0.32  Long run: 1.56  Residential:  Short run: 0.49  Long run: 1.97 | VAR and ECM, annual time series, 1970–2005, |
| Nakajima (2010),  Japan (residential) | –1.13 | 0.60 | Group-mean DOLS, annual panel, 1975–2005 |
| Halicioglu (2009), Turkey (residential) | Short run: –0.33  Long run: –0.52 | Short run: 0.44  Long run: 0.70 | ARDL, annual time series, 1968–2005 |
| Amusa et al. (2009), South Africa (aggregate) | Short run: 0.04  Long run: 0.30 | Short run: 0.22  Long run: 1.67 | ARDL, annual time series, 1960–2007 |
| Derigiades and Tsoulfidis (2008), USA (residential) | Short run: –0.39  Long run: –1.06 | Short run: 0.10  Long run: 0.27 | ARDL, annual time series, 1965–2006 |
| De Vita et al. (2006), Namibia (aggregate) | Long run: –0.298 | Long run: 0.589 | Cointegration method, quarterly time series, 1980–2002 |
| Narayan and Smyth (2005), Australia (residential) | Short run: –0.26  Long run:  –0.54 to –0.47 | Short run:  0.01 to 0.04  Long run:  0.32–0.41 | Cointegration and error correction, annual time series, 1969–2000 |
| Filippini and Pachauri (2004), India (residential) | –0.42 to –0.29 | 0.60 to 0.64 | Panel data estimation, monthly surveys, 1993–1994 |
| Holtedahl and Joutz (2004), Taiwan (residential) | –0.15 | 1.04 to 1.57 | Cointegration and error correction, annual time series, 1955–1995 |
| Al-Faris (2002), GCC countries (aggregate) | Short run:  –0.18 to –0.04;  Long run:  –3.39 to –0.82 | Short run:  0.02–0.70  Long run:  0.33–5.39 | Cointegration approach, annual time series data,  1970–1997 |
| Silk and Joutz (1997), United States (residential) | Long run: –0.48 | Long run: 0.52 | Cointegration approach, annual time series, 1949–1993 |

1. Table B

*Data Sources*

|  |  |  |
| --- | --- | --- |
| Variable | Description | Source |
| Electricity consumption (GWh) | 1. Aggregate: total electricity consumption (GWh) 2. Residential: residential electricity consumption (GWh) | PT PLN. Annual Report |
| Real income  (2000 billion rupiah) | 1. Aggregate: constant GRDP with oil and gas at 2000 (billion Rp) 2. Residential: constant provincial private expenditure at 2000 (billion Rp) | Central Bureau of Statistics (Badan Pusat Statistik) |
| Real average price of electricity  (2000 rupiah/kWh) | 1. Aggregate: total revenue from sales divided by electricity consumption, deflated by GRP deflator (Rp/kWh) 2. Residential: total revenue in residential sector divided by electricity consumption in residential sector, deflated by CPI (Rp/kWh) | Own calculation with data of:   1. average electricity price for aggregate and residential from the Annual Report of PT PLN and 2. GRP deflator and CPI are obtained from Central Bureau of Statistics. |
| The number of customers (million) | 1. Aggregate: the total number of customers 2. Residential: the number of residential customers | PT PLN. Annual Report |

1. Table C

*Descriptive Statistics of Regional Data*

**Java Bali region:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables | Mean | Std. Dev. | Minimum | Maximum |
| Aggregate |  |  |  |  |
| Electricity consumption (GWh) | 12239.81 | 8334.10 | 945.19 | 30720.99 |
| Electricity price (Rp/kWh) | 347.81 | 56.77 | 246.80 | 472.29 |
| GDRP (billion 2000 Rp) | 151160.10 | 117458 | 13480.6 | 395664.50 |
| Number of customers | 3376692 | 2546379 | 573649 | 8206806 |
| Residential |  |  |  |  |
| Electricity consumption (GWh) | 4393.79 | 2999.42 | 554.42 | 11617.13 |
| Electricity price (Rp/kWh) | 300.17 | 70.41 | 172.63 | 464.01 |
| Private expenditures (billion 2000 Rp) | 91743.45 | 73203.55 | 7355 | 243827.20 |
| Number of customers | 3149455 | 2393625 | 516609 | 7740066 |

**Non-Java Bali region:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables | Mean | Std. Dev. | Minimum | Maximum |
| Aggregate |  |  |  |  |
| Electricity consumption (GWh) | 912.09 | 1035.83 | 40.18 | 6636.45 |
| Electricity price (Rp/kWh) | 353.14 | 76.38 | 201.81 | 546.77 |
| GDRP (billion 2000 Rp) | 26839.97 | 26748.33 | 1473.27 | 118640.9 |
| Number of customers | 450374 | 443827 | 47720 | 2551931 |
| Residential |  |  |  |  |
| Electricity consumption (GWh) | 518.02 | 494.20 | 29.04 | 3073.58 |
| Electricity price (Rp/kWh) | 292.67 | 66.65 | 178.39 | 447.66 |
| Private expenditures (billion 2000 Rp) | 13256.32 | 12977.24 | 1230.80 | 74120.4 |
| Number of customers | 452721 | 433761 | 44315 | 2391177 |

1. Partial adjustment mechanism

*Partial adjustment approach* assumes that the change in the log of actual demand between any two periods *t−1* and *t* is only some fraction (λ) of the difference between the logarithm of actual demand in period *t−1* and the logarithm of the long-run equilibrium demand in period *t*. Formally,

, where 0<λ<1

where = reflects the current elasticities and adjusts partially to changes in the desired (LR) estimates. Therefore, we can interpret as follows,

* SR elasticities = LR elasticities (β or **γ**) \* adjustment factor (λ) = the estimates (λβ or λ**γ**) and
* LR elasticities = the estimates (λβ or λ**γ**) / (1 – λ)