

Appendix

Appendix A DEA Studies in Bank Efficiency

Author	Year	Country/region	# DMUs	Inputs	Outputs
Abuzayed et al.	2009	Jordan	15	Deposits, labor, capital	Total loans, securities and OEA, OBSI
Alam	2001	USA	166	DD, other deposits, purchased funds, capital, labor, equity	Real-estate loan, commercial loan, industrial loan, installment
Al-Muharrami	2007	GCC countries	52	FA, FTE, deposits	Loans, other OI, OEA, OBSI
Al-Shammari and Salimi	1998	Jordan	16	NaN	ROI, ROE, EPS, credits to total assets, credits to deposits, cash and portfolio investment to deposits.
Al-Sharkas et al.	2008	USA	440	Purchased funds, core deposits, labor	Consumer loans, business loans, real-estate loans, securities
Amirteimoori and Nashtaei	2006	India	28	Computer terminals, FTE	Deposits, loans, premium, benefit, customer satisfaction
Asaftai	2008	USA	6,716 (obs)	Deposits, purchased funds, FTEs, FA	Business loans, household loans, low-yielding assets, other assets, deposits
Asmild et al.	2004	Canada	5	FTEs, book value of physical assets, other NIE	Deposits, loans, securities, deposits with other banks, other NIR
Ataullah and Le	2006	India	566 (obs)	M1 & 2: OE, IE	M1: loans and advances, investments; M2: IR, OI
Ataullah and Le	2004	India, Pakistan		Financial expenses, OE	Loans and advances, investments, deposits
Ataullah et al.	2004	India, Pakistan		M1 & 2: OE, IE	M1: loans, advances, investments; M 2: IR, NIR

Author	Year	Country/region	# DMUs	Inputs	Outputs
Avkiran	1999b	Australia	19	M1: IE, NIE; M2: Deposits, FTE	M1: IR, NIR; M2: net loans, NIR
Avkiran	2009	Australia, New Zealand	15	IE, NIE	IR, NIR
Ayadi et al.	1998	Nigeria	10	Deposits, total expenses	IR, NIR, loans
Barr et al.	2002	USA		Salary expense, premises and fixed assets, other NIE, IE, purchased funds	Earning assets, IR, NIR
Barros et al.	2009	Japan	291	Deposits, FTEs, FA	Loans, securities
Bdour and Al-khoury	2008	Jordan	17	Total OEs, total assets, FTEs	Deposits, net direct credits, OI
Beccalli et al.	2006	Five countries	90	Total costs	Loans, OEA
Bergendahl	1998	Four countries	48	FTE cost, material cost, credit losses	Loans, deposits, gross revenue
Bergendahl	1995	Germany	5 groups	FTE cost, material cost, funding cost	Loans, floating rate deposits, fixed rate deposits, interbank placements, net margins
Bergendahl and Lindblom	2008	Sweden	88	M1 & 2: credit losses, FTE expenses; M1: NIE; M2: interest-rate margins	M1: loan, deposit, OEA M2: loan, deposit, branches
Bhattacharyya et al.	1997	India	70	IE, NIE	Deposits, advances, investments
Brissimis et al.	2008	Ten countries	364	OE, total deposits and short-term funding	Loans, securities
Brockett et al.	1997	USA	16	IE, NIE, provision for loan losses, deposits	IR, NIR, allowances for loan losses, loans
Brockett et al.	2006	USA	136	TD, DD, labor, premises	C&I loans, real-estate loans, other loans, securities
Brown and Gardener	2004	EU	25	Capital, labor	IR, NIR
Casu and Girardone	2010	15 countries	1,571	Total costs	Loans, OEA
Casu and Girardone	2004	Five countries	1,895 (obs)	Total costs	Loans, OEA
Casu and Girardone	2002	India	32,78	Physical capital, deposits, labor cost	Loans, OEA
Casu and Girardone	2002	Italy	32	Physical capital, deposits, labor cost	Loans, OEA
Casu and Molyneux	2003	Five countries	530	Total costs, deposits	Loans, OEA
Casu et al.	2004	Five countries	2,086 (obs)	Labor costs, deposit, capital	Loans, securities, OBSI
Chang and Chiu	2006	Taiwan	26	FTEs, assets, deposits	Loan services, portfolio investments, market risk, credit risk
Chen	2001	Taiwan	41	M1: FTE, # of branches, CD, TD; M2: deposit IE, other IE, NIE	M1: IR (loan, investment), Non-IR; M2: government securities, P&PE securities, loans

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Chen	2002	Taiwan	41	NaN	Capital adequacy, asset quality, management capability, earning, liquidity
Chen	2004	Taiwan	44	Labor, assets, deposits, IE, # branches	Loans, investments, noninterest and interest revenue
Chen and Yeh	1998	Taiwan	34	FTE, assets, # branches, operating costs, deposits, IEs	Providing loan services, portfolio investment, IR, NIR
Chen and Yeh	2000	Taiwan	34	Dtaff, assets, deposits	Provision of loan services, portfolio investment, NIR
Chen and Zhu	2004	USA	27	FA, FTEs, IT investment	Profits, % of loans recovered
Chen et al.	2005	China	43	IEs, NIEs	Loans, deposits, NIR
Chen et al.	2009	USA	283 CEO	Compensation, NIE, assets, deposits, #, branches, FTEs	Revenue, net income
Chiu and Chen	2009	Taiwan	29	FTEs, deposits, fixed assets	Loans, investment, NIR
Chu and Lim	1998	Singapore	6	Shareholder's fund, IE, OE	Annual average assets increase, total income, profits
Cook et al.	2005	Tunisia	10	M1: IE, Non-IE; M2: deposits, capital, interbank borrowing, bonds	M1: net profit; M2: portfolio investments, interbank loan, customer loans, illiquid assets
Damar	2006	Turkey	38	# ATMs, # shared network ATMs, # branches, FTEs, deposit interest, OE	Atm transaction, deposits, loans, fees and commissions
Das and Ghosh	2009	India	74	Funds, labor, capital, equity	Investments, loans and advances, other income
Das and Ghosh	2006	India	98	M1: deposits (demand, saving, fixed), OEs, labor; M2: labor, OEs, IE; M3: IE, FTE expenses, OEs	M1: advances, investments; M2: advances, investments, DD, SD, FD; M3: IR, NIR
Delis and Papani-kolaou	2009	Ten countries	364	OEs, deposits and short-term funding	Loans, securities
Denizer et al.	2007	Turkey	53	M1: production resources, OE, interests and fees; M2: intermediation resources and expenses, deposit	M1: deposits, NIR; M2: loans, total income
Drake and Hall	2003	Japan	149	General and administrative expenses, FA, retail	Loans and bills discounted, liquid assets and other

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				and wholesale deposits	investments in securities, other income
Drake et al.	2006	Hong Kong	66	FTE expenses, other NIEs, loan loss provisions	Net IR, commissions, other income
Drake et al.	2009	Japan	136	M1: deposits, OE, provisions; M2 and 3: provisions, NIE, other OE	M1 & 2: loans, OEA, commissions, other OI; Model 3: commissions, other OI, NIR
Duncan and Elliott	2004	Australia	14	Deposits, NIE	Total income
Efthymios et al.	2010	Greece	19	Labor, physical capital, deposits	Loans, investments, liquid assets
Emrouznejad and Anouze	2009	Arab	85	Assets, capital	Net profit, ROA, ROE
Erdem and Erdem	2007	Turkey	10	FTEs, physical capital, interest bearing liabilities	Pretax profit
Ferrier and Hirschberg	1997	Italy	94	Labor, capital, deposit accounts (consumer, commercial, industrial)	Loans, deposits at other financial institutions, investments, # branches
Figueira et al.	2006	Africa	267	Labor costs, nonlabor costs, capital costs, IE	Loans, OEA
Fiordelisi and Molyneux	2010	Four countries		Labor, physical capital, financial capital	DD, loans, OEA
Fukuyama and Weber	2004	Japan	122	Labor, physical capital, deposits	Loans, securities' investments
Fukuyama and Weber	2008	Japan	126	Labor, physical capital, funds	Loans, other interest bearing assets, NPL
Fukuyama and Weber	2010	Japan	135	M1: labor, physical capital, equity; M2: funds	M1: funds; M2: loans, securities investments, other assets, total problem loans
Fukuyama and Weber	2002	Japan	141	Labor, physical capital, funds	Loans, security investment, other IBA
Fukuyama and Weber	2005	Japan	141	FTEs, capitals, funds	Loans, security investment, other IBA
Fukuyama and Weber	2009	Japan	292	Labor, physical capital, FA, funds	Loans, securities investments
Garcia-Cestona and Surroca	2008	Spain	50	FTEs expenditure, OE, depreciation expenses	Deposits, Herfindahl index, profits after taxes, interest rates for overdrafts, charitable-social programs, loans
Hahn	2009	Austria	747	Labor costs, capital costs	Loans, deposits, OEA
Hahn	2007	Austria	1,007 (obs)	FTE expenses, NIEs, assets	Other income, IR, commissions

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Halkos and Salamouris	2004	Greece	18	NaN	Return difference Of IBA, ROE, ROA, profit(loss)/FTE, operational expenses/profit
Haslem et al.	1999	USA	33	Cash, labor expense, real capital, materials expense, funds	Domestic loans, foreign loans, investments, noninterest bearing deposits
Hauner	2005	Germany, Austria	97	Interest-bearing funds, FTEs	Loans to banks, loans to customers, fixed- interest securities
Havrylchuk	2004	Poland	9	FAs, labor, deposits	Loans, government bonds
Havrylchuk	2006	Poland	53	Deposits, FA, labor	Loans, treasury bonds, off-balance items
Ho and Wu	2009	Taiwan	32	Deposits, operating cost, FTE, equipment	Revenue, daily reach
Ho and Zhu	2004	Taiwan	41	M1: Capital stocks, assets, branches, FTE; M2: sales, deposits	M1: sales and deposits; M2: net income, NIR, IR
Huang et al.	2008	Taiwan	42	IEs, NIEs, deposits	Interest revenue, noninterest revenue, loans
Isik	2008	Turkey	794 (obs)	Labor, capital, loanable funds	Short-term loans, long- term loans, OEA
Isik and Hassan	2002	Turkey	53	Labor, capital, loanable funds	Short-term loans, long- term loans, risk- adjusted off balance items, OEA
Isik and Hassan	2003a	Turkey	54	Labor, capital, loanable funds	Short-term loans, long- term loans, risk- adjusted off balance items, OEA
Isik and Hassan	2003b	Turkey	56	Labor, capital, loanable funds	Short-term loans, long- term loans, risk- adjusted off balance items, OEA
Jemric and Vujcic	2002	Croatia	48	M1: interest costs, commissions, labor costs, capital costs; M2: FA and software, FTEs, deposits	M1: interest revenues, noninterest revenues; M2: loans, short- term securities
Kao and Hwang	2010	Taiwan	27	IT budget, FA, FTEs, deposit	Profits, percentage of loans recovered
Kao and Liu	2004	Taiwan	24	Deposits, IEs, NIEs	Loans, IR, NIR
Kao and Liu	2009	Taiwan	48	Labor, physical capital, purchased funds	Demand deposits, short and medium-term loans
Kenjegalieva et al.	2009	13 countries	159	Deposits and short-term funding, FTE expenses, FAs, other OEs	Loans, OEA, IRs, other income, commissions, deposits, loan loss provisions

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Kirkwood and Nahm	2006	Australia	10	M1 & 2: FTEs, PPE, interest-bearing liabilities	M1: IBAs, NIR; M2: profits
Krishnasamy et al.	2003	Malaysia	10	Labor, assets	Deposits, loan, advances
Krishnasamy et al.	2004	Malaysia	10	Labor, assets	Deposits, loan, advances
Kumar and Gulati	2008	India	27	Physical capital, labor, loanable funds	Interest spread, NIR
Kumar and Gulati	2010	India	27	Physical capital, labor, loanable funds	Advances, investments
Leong and Dollery	2004	Singapore	35	M1: IE, OE; M2 & 3: deposits, FA	M1: IR, other income; M2: loans; M3: assets
Leong et al.	2003	Singapore	35	M1: IE, OE; M2 & 3: deposits, FA	M1: IR, other income; M2: loans; M3: assets
Lim and Randhawa	2005	Hong Kong, Singapore	19	M1: FTE expense, equity, IE; M2: deposits, NIEs	M1: deposits, fees; M2: loans, IR
Lin et al.	2007	Taiwan	37	IE, non-IE	IR, non-IR, pretax revenue
Liu	2009	Taiwan	24	Deposits, IE, non-IE	Loans, IR, NIR
Liu	2010	Taiwan	25	Labor, physical capital, purchased fund	Demand deposits, short and medium-term loans
Liu and Chen	2009	Taiwan	24	Deposits, IE, non-IE	Loans, IR, NIR
Liu and Tone	2008	Japan	138	IE, credit costs, general and administrative expenses	Interest-accruing loans, lending revenues
Lozano-Vivas and Pastor	2010	11 countries	700	Labor, funds, physical capital; environmental factors: capital ratio, banks/inhabitant, intermediation ratio	Loans, OEA
Lozano-Vivas et al.	2001	Ten countries	612	FTE expenses, Non-IE; environmental factors: income/capita, salary/capita, population density	Loans, deposits, OEA
Lozano-Vivas et al.	2002	Ten countries	612	FTE expenses, non-IE; environmental factors: income/capita, salary/capita, population density, demand density, income/branch, deposit/branch, branches/capita, branch density	Loans, deposits, OEA; environmental factors: equity/total assets, ROE
Luo	2003		245	M1: FTEs, assets, equity; M 2: revenue, profit	M1: revenue, profit; M2: market value, stock price, EPS
Mercan et al.	2003	Turkey		FTE expenses/earning assets, total expenses/total income	Earning assets/total assets, (shareholders' equity + net profit)/total liabilities, ROE

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Miller and Noulas	1996		201	Transactions deposits, nontransactions deposits, IE, non-IE	C&I loans, consumer loans, real-estate loans, investments, IR, NIR
Mokhtar et al.	2008	Malaysia	22	Deposits, total overhead expenses	Total earning assets
Mostafa	2009	Arab	85	Assets, equity	Net profit, ROA, ROE
Mostafa	2007b	Arab	85	Assets, capital	Net profit, ROA, ROE
Mostafa	2007a	GCC	50	Assets, equity	Net profit, ROA, ROE
Mukherjee et al.	2003	India	27	M1: establishment, technology, FTE quality, marketing effort; M2: M1 outputs, OE	M1: physical facility, employee responsiveness, performance reliability, employee knowledge and courtesy; M2: deposit, advance, NIR
Mukherjee et al.	2002	India	68	Net worth, borrowings, OE, FTEs, branches	Deposit, profit, advances, NIR, interest spread
Mukherjee et al.	2001	USA	201	Transaction deposits, nontransaction deposits, equity, labor, capital	C&I loans, consumer loans, real-estate loans, investments, NIR
Neal	2004	Australia	26	Branches, loanable funds	Loans, advances, demand deposits, other OI
Necmi and Avkiran	2009	UAM	15	IE, non-IE	IR, NIR
Noulas	2001	Greece	19	IE, NIE	Interest revenue, noninterest revenue
Oliveira and Tabak	2005	41 Countries	41	STD of profitability of bank stocks, betas of bank stocks	Profitability of bank stocks
Omar et al.	2007	Indonesia	21	Deposits, FTE expenses, capital expenses	Loans and advances, capital market investments, money market investments
Ozkan-Gunay and Tektas	2006	Turkey	61	FTE expenses, administrative expenses, IE	Deposits, loans, securities, IR, NIR
Pasiouras	2008a	Greece	18	FA, customer deposits and short-term funding, FTEs, loan loss provisions	Loans, OEA, off-balance items
Pasiouras	2008b	95 Countries	715	Deposits, total costs, equity	Loans, OEA, NIR
Pasiouras and Sifodas-kalakias	2010	Greece	13	FA, FTEs, deposits	Loans, liquid assets, investments
Pastor	2002	Four countries	2,598 (obs)	FTE expenses, operating costs	Loans, deposits, OEA
Pastor et al.	1997	Eight countries	427	Non-IE, personal expenses	Loans, other productive assets, deposits
Paul and Kourouche	2008	Australia	10	IE, non-IE	IR, NIR
Post	2001	Indonesia	49	Customer deposits, IE, other expenses	Loans, IR, other income

Author	Year	Country/region	# DMUs	Inputs	Outputs
Prior	2003	Spain	50	Material consumption, FTE, branches	Loans, current and savings accounts, fixed-term savings accounts, service charges applied
Prior and Surroca	2006	Spain	109	Depreciation expenses/OI, FTE expenses/OI, loan loss provisions and write-offs/OI	Commercial loans/FI, securities/FI, liquid assets/FI, commissions/PFA, S&DA/liability, FMP/liability, geographical reach, customer proximity
Ramanathan	2007	GCC	55	Fixed assets, deposits, short-term funding, equity, FTE expenses	Loans, OEA
Ray and Das	2010	India	71	Funds, labor, capital, quasi-fixed inputs	Investments, earning advances, other income
Resti	1997	Italy	270	Labor, capital	Loans, deposits, NIRs
Rho and An	2007	USA	27	FA, IT budget, FTEs	Deposits, profit, fraction of loans recovered
Saha and Ravisankar	2000	India	25	Branches, FTEs, establishment expenditure, nonestablishment expenditure	Deposits, advances, investments, spread, total income, IR, NIR, working funds
Sahoo and Tone	2009a	India	78	FA, funds, labor	Investments, performing loan assets, NIR
Sahoo and Tone	2009b	India	71	Funds, FA, labor	Investments, performing loan assets, NIR
Sanjeev	2006b	India	27	IE, non-IE	IR, fees
Sanjeev	2006a	India	94	IE, non-IE	IR, fees
Sathye	2002	Australia	17	IE, non-IE	IR, NIR
Sathye	2001	Australia	29	Labor, capital, loanable funds	Loans, demand deposits
Sathye	2003	India	94	M1: IE, NIE; M2: deposits, FTE	M1: IR, NIR; M2: loans, NIR
Seiford and Zhu	1999	USA	55	M1: FTEs, assets, stockholder's equity; M2: revenues, profits	M1: revenues, profits; M2: market value, return to investors, EPS
Siriopoulos and Tziogkidis	2010	Greece	18	M1: NaN; M2: FTE expenses, provisions and operational expenses	M1:ROE, financial independence ratio, operating margin, ROA, service concentration index; M2: financial claims, OI, pretax earnings
Staub et al.	2010	Brazil	127	Labor, capital, purchased funds	Loans, deposits, investments
Stavárek	2006	11 countries	126	Labor, capital, deposits	Loans, net IR
Sturm and Williams	2004	Australia	26	M1: FTE, deposits, borrowed funds, Equity; M2: IE, NIE	M1: loans advances and other receivables, commitments, contingent liabilities; M2: IR, NIR

Author	Year	Country/region	# DMUs	Inputs	Outputs
Sufian	2007b	Malaysia	15	Deposits, labor, FA	Loans, income
Sufian	2009	Malaysia	36	Deposits, labor, capital, IE, NIE	Loans, investments, IR, NIR
Sufian	2007a	Singapore	141	Deposits, FA	Loans, other income
Sufian and Majid	2007a	Singapore	5	Deposits, IE, NIE	Loans, IR, NIR
Sufian and Majid	2007b	Singapore	6	Deposits, IE	Loans, IR
Taylor et al.	1997	Mexico	13	Deposits, NIE	IR and NIR
Thompson et al.	1997	USA	100	Capital, FTEs	IR, NIR less provisions
Thoraneenitiyan and Avkiran	2009	Five countries	110	Deposits, labor capital, physical capital	Loans, investments and OEA, fees, OBSI
Tortosa-Ausina	2002	Spain	121	Labor, funding, capital	Loans, OEA, savings deposits
Tortosa-Ausina	2004	Spain	165	Labor, funding, capital	Loan, security, nontraditional output
Tortosa-Ausina et al.	2008	Spain	50	Labor, capital, purchased funds	Loan, deposit, nontraditional output
Tsionas et al.	2003	Greece	19	Labor, physical capital, deposits	Loans, investments, liquid assets
Wang and Huang	2007		22	Deposits and borrowed money, Physical capital, FTEs	Government and corporate securities, short-term loan, long-term loan
Wang et al.	1997		22	M1: IT budget, FA, FTEs; M2: deposits	M1: deposits; M2: profits, % loans recovered
Webb	2003	UK	7	Deposits, deposit costs, IE, operational expenses	Total income, loans
Weill	2004	Five countries	688	FTE expenses, IE, NIE	Loans, investment assets
Wheelock and Wilson	1999	USA	14,108 (obs)	Labor, physical capital, purchased funds	Real-estate loans, C&I loans, consumer loans, other loans, demand deposits
Wong et al.	2009	UK	7	Branches, # ATMs, FTEs	Revenue, corporate image, customer satisfaction
Wu	2008	Australia	36	Labor, physical capital, loanable funds	Loans, investment, branches
Yalama and Coskun	2007	Turkey	18	Value added intellectual coefficient, market value /book value	Net income/assets, net income/equity, loans/Deposits
Yildirim	2002	Turkey	43	DD, TD, IR, NIR	Loans, IR, NIR
Zha and Liang	2010	USA	30	FTEs, assets, equity	Market value, earnings, returns

Notes: *CD* Current deposits; *C&I* Commercial & industrial; *DD* Demand deposits; *EPS* Earnings per share; *FA* Fix assets; *FD* Fixed deposits; *FI* Financial investments; *FMP* Financial market position; *FTE* Full time equivalent employees or staff or personnel; *IBA* Interest bearing assets; *IE* Interest expenses; *IR* Interest revenue or interest income; *M* Model; *M1* & *2* Variables employed by both models; *NIR* Noninterest revenue or noninterest income; *NPL* Nonperforming loans; *P&PE* Public and private enterprises; *PFA* Products of financial activity; *PPE* Property, plant and equipment; *obs* Observations; *OEA* Other earning assets; *OI* Operating income; *OE* Operating expenses; *OBSI* Off-balance sheet items or activities or business; *ROA* Return on assets; *ROE* Return on equity; *ROI* Return on investment; *S&DA* Savings & deposit accounts; *SD* Saving deposits; *STD* Standard deviation; *TD* Time deposits; *UAM* United Arab emirates

Appendix B DEA Studies in Bank Branch Efficiency

Author	Year	Country/region	# DMUs	Inputs	Outputs
Alirezaee and Afsharian	2007a	Canada	79	Sales FTE, service FTE, other FTE	Loans, mortgages, RRSP, LC
Alirezaee and Afsharian	2007b	Canada	79	Sales FTE, service FTE, other FTE	Loans, mortgages, RRSP, LC
Al-Tamimi and Lootah	2007	UAM	15	M1: OE, IE; M2: IE, FTE expenses, other OE	M1: IR, loans, deposits, NIR; M2: IR, NIR
Amirteimoori and Kordrostami	2005	Iran	20	FTE, computer terminals, square meters of premises	Deposits, loans, charge
Athanassopoulos	1997	Greece	68	M1: FTEs, online and ATMs, computer terminals; M2: IE, NIE	M1: deposit accounts, credits TR, debits TR, loan applications, TR with commission; M2: loans, TD accounts, SD accounts, CD accounts, NIR
Athanassopoulos	1998	UK	580	M1: TR, potential market, sales representatives, internal automatic facilities, branches; M2: labor costs, technology facilities	M1 & 2: liability sales, loans and mortgages, insurances and securities, cards; M2: TR
Athanassopoulos and Giokas	2000	Greece	47	M1: labor hours, branch size, computer terminals, OE; M2: labor costs, OE, running costs of building	M1: deposit and transfer TR, credit TR, foreign receipt TR; M2: SD, CD, DD, TD, loans, NIR
Avkiran	1999a	Queensland	65	# Teller windows, FTE, FTE conduct; ND inputs: AAFE, # small business establishments, competitors	New deposit accounts, new lending accounts, new investment centre referrals, fees
Bala and Cook	2003	Canada	180	FTEs, accounts opened, deposits/transfers, withdrawals/updates	Retirement savings plans sold, loans
Camanho and Dyson	2006	Portugal	144	FTEs, OE	Savings, loan, other revenues, # TR
Camanho and Dyson	2008	Portugal	39	Branch/account managers, administrative/commercial FTE, tellers, OE	Deposits, loans, OBSI, general service TR
Camanho and Dyson	2005a	Portugal	144	Branch/account managers, administrative/commercial FTE, tellers, OE	# TR
Camanho and Dyson	2005b	Portugal	144	M1: branch/account managers, administrative/commercial FTE, tellers, OE; M2: NIE,	M1: deposits, loans, OBSI, general service TR; M2: deposits, loans, OBSI

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				IE from deposits, IE from loans	
Cook and Hababou	2001	Canada	20	M1: service FTE, support FTE, other FTE; M2: sale FTE, support FTE, other FTE	M1: menu account TR, visa cash advance, CD TR; M2: RSP account openings, mortgages transacted, variable rate consumer loans transacted
Cook and Zhu	2005	Canada	100	Sales FTE, service FTE, other FTE	Service output, sales output
Cook and Zhu	2006	Canada	100	Sales FTE, service FTE, other FTE	Deposits, account openings, withdrawals TR, passbook updates, visa cash, RRSP openings, LC, loans opening accounts
Cook and Zhu	2010	Canada	100	Sales FTE, service FTE, other FTE	Service output, sales output
Cook et al.	2000	Canada	1,300	Sales FTE, service FTE, support FTE, other FTE	Counter level deposits, transfers between accounts, RSP openings, mortgage accounts opened
Cook et al.	2004	Canada	1,200	FTE, OE	Service TR, sales TR
Coughlan et al.	2010	UK	232	Rent, FTE, tills, ATMs, BIR, customers at start of five months	ATM cash TR, ATM noncash TR, in-branch cash TR, in-branch noncash TR, sales, customers at end of 5 months
Das et al.	2009	India	222	Officers, support FTE, clerks, physical capital	Deposit, credit, NIR
Dekker and Post	2001	Netherland	314	Front-office FTE, facilitating FTE	Revenue
Deville	2009	France	1,161	Human resources, operational resources, customer capital	Cash savings products, P&B loans, access to services related to management of account services, DI products, FS products
Drake and Howcroft	2002	UK	190	BIR, ATMs, floor area, management FTE, clerical FTE, stationery costs	Counter TR, new and closed accounts (P&B lendings, P&B deposits), direct debits and standing orders, clearing items, TR (ancillary, insurance products)
Estrada et al.	2009	Canada	79	Sales FTE, service FTE, other FTE	Loans, mortgages, RRSP, LC
Gaganis et al.	2009	Greece	458	IE, NIE, loan loss provisions	IR, NIR

Author	Year	Country/region	# DMUs	Inputs	Outputs
Giokas	2008a	Greece	44	M1 & 2: FTE costs, running and other OE; M3: IE, NIE	M1: loans, deposits, NIE; M2: loan TR, deposit TR, remaining TR; M3: IR, NIR
Giokas	2008b	Greece	171	FTE costs, running costs, OE	Deposits, loans, NIR
Golany and Storbeck	1999	US	182	Teller OH, nonteller OH, retail space, mailing expense/customer, unemployment statistics	Loans, deposits, accounts/customer, customer satisfaction
Hartman et al.	2001	Sweden	50	FTE, computer terminals, square meters of premises	Deposits, loans, house mortgages
Howland and Rowse	2006	Canada	162	M1: nonsales FTE, sales FTE, branch size, city employment rate; M2: support and other FTE, sales and service FTE, % customers – branch, visa % of volumes	M1: loan, deposit, products/customer, customer loyalty; M2: nonwealthy business, wealthy business, growth in funds managed, customer loyalty
Jablonsky et al.	2004	Czech Republic	81	FTEs, OE, floor space	Accounts, TRs, savings
Jahanshahloo et al.	2004a	Iran	31	FTE, computer terminals, square meters of premises	Deposits, loans, premium, customer satisfaction
Jahanshahloo et al.	2004b	Iran	39		
Jahanshahloo et al.	2009	Iran	20	Payable interest, FTE, NPL	Deposits, loans, IR, fees
Kantor and Maital	1999	Mideast country	250	M1: labor costs, services, services area; M2: labor costs, TR, TR area	M1: DD accounts, customer service TR, queue replacing actions; M2: credit cards, TR, commissions, savings account activities
Krivonozhko et al.	2002	Russia	150	Assets, IE, NIE	IR, NIR, profit
Lin et al.	2009	Taiwan	117	FTE, IE, deposit operating amount, CD operating amount	Loan operating amount, IR, operating revenue, earning
Lotfi et al.	2010	Iran	20	Payable interest, FTE, NPL	deposits, loans, received interest, fee
Lovell and Pastor	1997	Spain	545	NaN	17 branch performance targets
Manandhar and Tang	2002			M1: FTE-related expenses, supplies, office space, technology; M2: Labor, supplies, office space,	M1: market focus, flexibility, internal organizational efficiency, empowerment; M2: TR, SQ; M3: IR, NIR

Author	Year	Country/region	# DMUs	Inputs	Outputs
McEachern and Paradi	2007	Seven countries	70	technology, size of different accounts; M3: IE, NIE M1: interest, remuneration costs, others; M2: managers, tellers, personal banking officers	M1: IR, NIR; M2: teller transactions, new accounts opened
Meepadung et al.	2009	Thailand	165	M1: labor, IE, NIE, internal customer SQ; M2:M1 outputs and external customer SQ	M1: deposits, loans, IT-based transactions, cross-selling; Model 2: IR, NIR
Noulas et al.	2008	Greece	58	Labor expenses, other OE	Deposit, loans, financial products
Paradi and Schaffnit	2004	Canada	90	M1 & 2: FTE, IT, rent, other NIE; M2: nonaccrual loans	M1: deposits, loans, operating services, account maintenance; M2: deposits, loans, operating services, deposit spread, loan spread
Paradi et al.	2010a	Canada	1,213	M1 & 2: FTE, equipment, occupancy costs, other general expenses; M 2: deposits	M1: Personal deposits, mortgage loans, personal loans and secured lines of credit, SBL; M2: personal sales revenue, personal service revenue
Paradi et al.	2010b	Canada	816	M1: 9 staff types; M2: cash balances, FA, other liabilities, net NPL, loan loss experience; M3: FTE expense, occupancy/computer expense, loan losses, cross charges, other expenses, sundry	M1: No. of nine types of transactions; M2: WM, HM, consumer lending, CL, commercial deposits, consumer deposits; M3: revenues generated from commissions, consumer deposits, consumer lending, WM, HM, commercial deposits, CL
Porembski et al.	2005	Germany	140	FTEs, office space	Private DD, business DD, TD, SD, credits, bearer securities, recourse guarantees, bonds, ID, insurances, contributions to society
Portela and Thanassoulis	2005	Portugal	57	FTE, supply cost	Value of current accounts, other resources, value credit by bank, value of credit associates

Author	Year	Country/region	# DMUs	Inputs	Outputs
Portela and Thanassoulis	2007	Portugal	57	M1: ETMs, rent, clients not registered; M2: FTE, rent; M3: FTE, supply costs	M1: new internet registrations, TR in CATs, deposits in ETMs; M2: Δ of clients, Δ of current accounts, Δ of other resources, Δ of titles deposited, Δ of credit by bank, Δ of credit by associates, TR; M3: value of current accounts, value of other resources, value of credit over bank, value of credit associates
Schaffnit et al.	1997	Canada	291	Tellers, typing FTE, accounting FTE, supervision FTE, credit FTE	Counter TR, counter sales, security TR, deposit sales, PL and CL sales, term accounts, PL and CL accounts
Ševčovič et al.	2001	Slovakia	37	Credits granted, banking expenditures, salaries, OE	Credit profits, deposits, OI
Sherman and Rupert	2006		217	Platform FTE, manager, teller, OE	Teller TR, new accounts, safe deposit box visits, night deposits, ATMs, loan TR
Sherman and Zhu	2006	US	225	Platform FTEs, teller FTEs, management FTEs, other expenses	Deposits, bank checks, bond TR, night deposits, safe deposit box visits, new accounts, mortgage and consumer loans, ATMs
Soteriou and Stavrinides	2000	Mediterranean	28	Clerical FTE, managerial FTE, computer terminals, working space, PA, SA, BA, credit applications	Service quality
Soteriou and Zenios	1999	Cyprus	28,39	Total branch cost	FCA, Interbranch TR, current PA and SA, credit applications and renewals
Soteriou and Zenios	1999	Cyprus	28,39	Total branch cost	FCA, Interbranch TR, current and SA, credit accounts, loan initializations and renewals
Sowlati and Paradi	2004	Canada	79	Sales FTEs, support FTEs, other FTEs	Loans, mortgages, RRSP, LC
Stanton	2002	Canada	352	Capital, deposit, relationship costs, portfolio risk	Net income

Author	Year	Country/region	# DMUs	Inputs	Outputs
Valami	2009	Iran	24	Payable interest, FTE, NPL	Deposits, loans granted, received interest, fee
Wu et al.	2006a	Canada	808	FTE, equipment, occupancy, other expenses	Mortgage, nonterm deposit, PL, small business loan, term deposit
Wu et al.	2006b	Canada	142	FTE, other general expenses	Deposit, revenues, loans
Yang and Paradi	2006	Canada	70	FTE expenses, premise/IT expenses, other expenses	Loan, deposit, securities, gross revenue
Yavas and Fisher	2005	US	31	Retail deposits, small business deposits	FTE, lobby hours, ATMs, safety deposit boxes, average wait time
Zenios et al.	1999	Cyprus	145	Managerial FTE, clerical FTE, computer terminals, Space, current accounts, SA, CA, and FCA, credit applications	Work (hours) produced by branch

Note: *AAFI* Average annual family income; *AO* Account openings; *BA* Business accounts; *BIR* Branch interview rooms; *CA* Commercial accounts; *CL* Commercial loans; *DA* Deposit accounts; *DI* Damage insurance; *FCA* Foreign currency accounts; *FS* Financial savings; *GST* General service transactions; *HM* Home mortgages; *ID* Investment deposits; *LC* Letter of credit; *ND* Nondiscretionary; *OH* Operating hours; *PA* Personal accounts; *P&B* Personal and business; *PL* Personal loan; *RRSP* Registered retirement saving plans; *SA* Saving accounts, *SBL* Small business loans; *SQ* Service quality; *TR* Transactions; *WM* Wealth management