MAPPING ELDERLY MIGRATION IN BRAZIL USING DATA OF 2000

INTRODUCTION:

Brazil finds itself in an advanced phase of the process of demographic transition. The shrinking of the base of the aging pyramid and the growth of its vertex are already noticeable. The elderly population that formerly comprised just 4% of the population in the beginning of the transition process (1940 census) ended up as almost 9% in the 2000 census and is predicted to reach more than 12% in the 2020 census.

A new phenomena that concern these migratory fluctuations has been taken to note and has been the studies of various research projects in the academic environment: a decline in net migration rate from traditionally underdeveloped regions (mainly the northeast) to more industrialized regions (primarily the southeast).

This decline in the net migration rate can be partly explained by return migration. Considering that part of this return migration occurs mainly by elderly people and that participation of the elderly will grow in the country, it is of fundamental importance to know migratory patterns of the elderly vis-à-vis the younger so as to foresee the spatial redistribution of the elderly population that will eventually result in the reformulation of social policy to better regionally allocate national resources.

Spatial analysis and GIS are widely used in order to study such events (Bailey and Gatrell, 1996). Specifically in this case, Tobler's approach is used (Tobler, 1976) for mapping the flows and, for the identification of migration patterns.

TOBLER'S APPROACH:

If a potential migrant is taken at random in a population sample and is "thrown in the air", there will be a general migration tendency that this person will follow. Tobler calls this tendency a "wind" (Tobler, 1976). He has focused on the difficulties associated with the symmetry of the gravity model and tried to remove this problem introducing the "wind" in order to account for interaction in particular

directions. The approach facilitates the description of large flow matrices by analyzing the asymmetric part of the from-to-tables.

It is interesting to see that the antecedents of the approach were motivated by the calculation of geographical locations from data on separations or on interaction. The inversion of models was used: for example, the social gravity model can be written as:

$$M_{ij} = K.P_i.P_j f\left(D_{ij}\right)$$

And the inversion is

$$D_{ij} = f^{-1}\left(\frac{M_{ij}}{KP_iP_j}\right)$$

The problem was that the social gravity model is symmetric, i. e, $D_{ij} = D_{ji}$ and M_{ij} must be equal to M_{ji}. In practice the data are different ($M_{ij} \neq M_{ji}$). This would imply that if the model is inverted, $D_{ij} \neq D_{ji}$.

He stated that has “the consequence that the tri-lateration solution can result in more than one geometrical configuration or that the standard errors of the position determination are increased” (Tobler, 1976. p .2).

To overcome this problem, a “wind” was introduced in order to facilitate interaction in some direction. This vector is estimated by the data. In its formal aspect, each location i, with coordinates (x, y), has associated with a vector with magnitude and direction:

$$vi = \frac{1}{n-1}\sum_{\substack{i=1\\j=1}}^{n}\frac{m_{ij} - m_{ji}}{m_{ij} + m_{ji}}.\frac{1}{D_{ij}}\left[\left(x_j - x_i\right)\left(x_j - y_i\right)\right]$$

Where $D_{ij}^2 = \left(x_j - x_i\right)^2 + \left(y_j - y_i\right)^2$. For the complete algebraic development, see Tobler (1979).

When we have an incomplete matrix for a set of data, to overcome that situation a complete set of data is generated, using Baxter entropy program (Tobler, 1976). The program follows Wilson's derivations of the gravity model using entropy-maximizing techniques. It has three variations and one can use a complete matrix or only the marginals as input. The program permits two variations with the gravity model or with the entropy model. In our case the last option was used and gave a correlation coefficient with real data of 82%.

In the research described here we have found also that a twenty seven by twenty seven movement table with 729 entries can be studied fairly easily using GIS environment. This size corresponds to a state-to-state Brazilian migrations table. Looking to other examples, it is usually not necessary to draw more than 25% of the flow arrows. The Wind and Pot flow programs of Waldo Tobler are used to plot the basic flows and Transcad and Map viewer are used to construct the final maps. The micro data of 2000 Brazilian Population Census is used for the migration tables.

RESULTS:

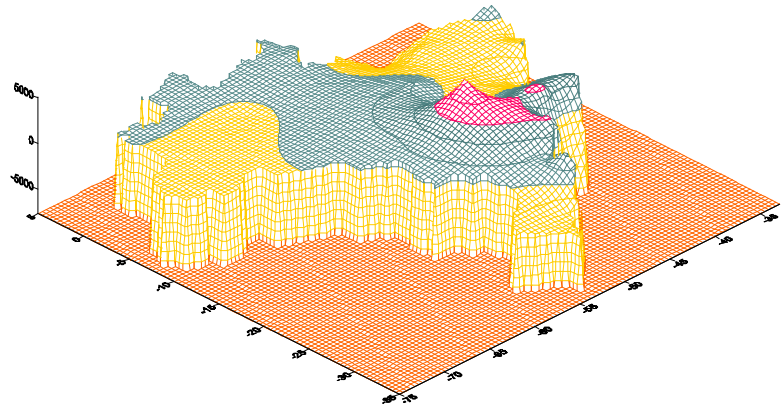
Figures 1-3 show the results of the application of this technique to Brazil for 1995/ 2000. It is interesting to see general tendencies going to south west, and north because the attractions of São Paulo. Tables 1 to 3 present the data base (tables 1 and 2) and some analisyses (table 3) that are carried out in this paper. The migration flows among all the states including the intra-state migration (main diagonal) is presented in table 1and 2. The data related to youngest population is presented in table 1, and the data for elderly flows in table 2. Looking for these tables some important aspects are pointed out:

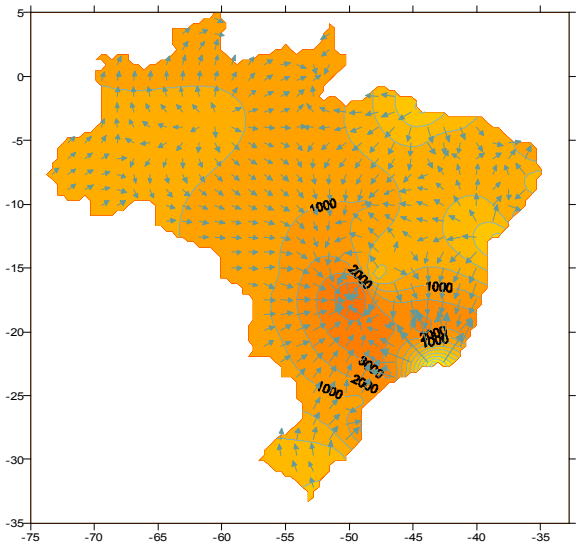
First of all one can find a much smaller number of the elderly migrants in any observed flow. This result is expected, due not only to the size of the elderly population, but also to the fact that this population is characterized by little mobility. The data shows a phenomenon well known among the demographers that the elderly mobility is less intense and those mouvements are basically short distances flows.

In order to verify patterns and find profiles Table 3 generated and represent “normalized” data. In this table zero indicates there is no difference between the behavior of the young and of the elderly. The positive value indicates that relative migration of the elderly is higher than that of the young, and, consequently, a negative value indicates the opposite. Most of flows do not show significant differences between the young and the elderly. The main diagonal shows the intra-state migration and the more intensive elderly migration flows. Out of the main diagonal some flows are important: the elderly migration from Minas Gerais to Rio de Janeiro and São Paulo, from Paraná to São Paulo and from Rio Grande do Sul to Paraná and São Paulo. Probably, these flows are return migration. Related probably in function of economic factors.

TABLES AND MAPS :

BRAZIL - 1995/2000
ELDERLY MIGRATION FIELDS
NETMIGRATION

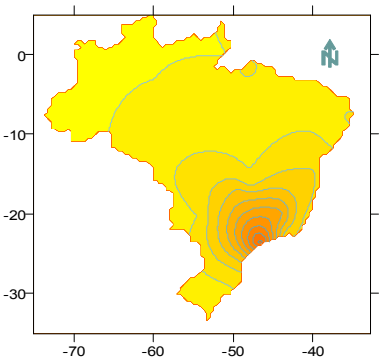




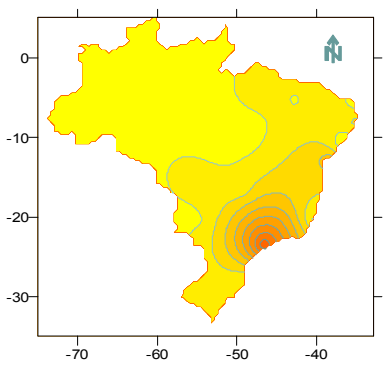
SOURCE : IBGE

PUCMINAS
JFA/CCM/2001

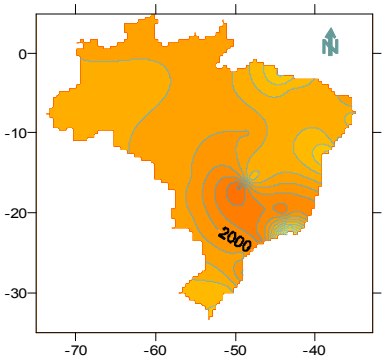
FIG 1



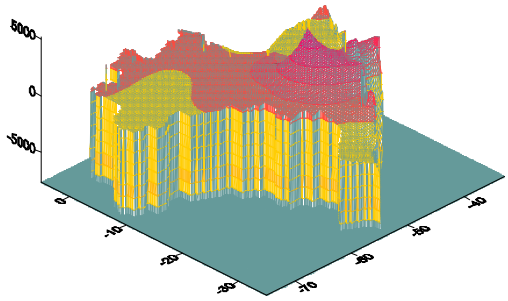
BRAZIL 1995-2000
INMIGRATION (POP 60+)



BRAZIL 1995-2000
OUTMIGRATION (POP 60+)



BRAZIL 1995-2000
NETMIGRATION (POP 60+)



BRAZIL 1995-2000
NETMIGRATION (POP 60+)-3D

SOURCE :IBGE

JFA/2004
PUCMINAS

TABLE 1 - BRAZIL - INTER-STATE MIGRATION (1995 - 2000) 0 - 59 YEARS

STATES TO / FROM	Rondonia	Acre	Amazonas	Roraima	Para	Amapá	Tocantins	Maranhão	Piaui	Ceara	Rio Grande Norte	Paraíba	Pernambuco	Alagoas	Sergipe	Bahia	Minas Gerais	Espirito Santo	Rio de Janeiro	São Paulo	Paraná	Santa Catarina	Rio Grande Sul	Mato Grosso Sul	Mato Grosso	Goias	Distrito Federal	**Inter + Intra state out**	**inter state out**	**% inter-state out**
% inter-state	39.3%	32.8%	47.7%	79.2%	30.4%	75.9%	48.5%	23.7%	47.5%	32.4%	31.5%	40.5%	29.8%	27.6%	33.9%	28.1%	28.9%	39.5%	36.1%	36.2%	27.5%	33.5%	13.4%	38.8%	40.2%	49.1%	99.9%	34.5%		
Intra + inter state in	204,164	39,735	182,548	58,391	581,530	57,280	189,214	411,463	180,870	481,845	235,480	239,013	527,519	192,257	145,419	855,923	1,462,409	309,040	855,262	3,286,371	1,023,630	566,077	813,535	240,103	399,279	730,793	210,292	14,479,442		
inter state in	80,257	13,050	87,129	46,231	176,556	43,476	91,841	97,460	85,828	156,062	74,215	96,871	157,316	52,994	49,362	240,235	422,676	121,938	308,498	1,188,133	281,651	189,911	109,342	93,142	160,397	359,078	210,143	4,993,792		
Rondonia	123906	3409	6195	1084	1482	109	574	1182	313	1967	604	838	586	73	106	1086	3914	2000	1098	6940	7546	1474	1132	2554	19885	2981	1147	194,184	70,277	36%
Acre	4865	26686	4181	322	230	53	80	52	5	504	322	187	32	14	30	68	429	220	264	765	579	130	85	177	494	941	424	42,140	15,454	37%
Amazonas	6924	4486	95420	8309	11365	460	331	1520	765	3657	762	453	1211	177	307	712	1475	339	3528	3377	1456	513	1127	716	521	1198	1255	152,365	56,945	37%
Roraima	628	82	2436	12160	1737	95	104	1435	457	1081	516	283	216	40	32	265	568	184	954	553	387	49	232	329	325	799	215	26,163	14,003	54%
Para	2605	417	41010	13446	404974	32814	18616	27731	3779	8168	1641	972	2177	272	234	2811	6445	2271	7934	13540	2914	1077	1342	1125	5847	20724	6366	631,254	226,280	36%
Amapá	179	40	751	437	8037	13803	137	1141	129	847	307	111	266	15	42	29	274	53	278	465	174	36	256	49	167	315	164	28,503	14,700	52%
Tocantins	413	14	383	624	14990	160	97373	6602	1148	712	238	413	507	140	76	1453	3153	104	584	4194	756	54	633	308	2954	34077	5183	177,249	79,876	45%
Maranhão	2676	103	5762	13055	68922	5161	22649	314003	23561	7963	1384	1032	2012	562	408	1905	4907	874	12228	32071	1547	472	749	537	4764	28440	23506	581,252	267,249	46%
Piaui	683	31	1437	814	4854	308	2738	16133	95043	11602	692	523	3152	172	389	2811	1870	257	5531	45034	606	310	510	450	812	14633	21048	232,442	137,399	59%
Ceara	2099	343	3624	1339	6850	599	1802	5107	7906	325783	7549	4820	8285	966	798	6444	5351	916	26779	65134	1479	1288	1745	1039	1528	7485	9982	507,039	181,256	36%
Rio Grande Norte	535	41	846	505	996	328	240	815	786	7372	161264	8517	4603	282	528	1624	2571	459	9376	18806	724	648	766	290	437	3009	3426	229,793	68,529	30%
Paraíba	985	88	566	672	1330	184	782	1419	998	5083	12880	142142	17457	1068	962	4245	2515	518	43219	47882	1166	558	645	405	852	4733	6726	300,080	157,938	53%
Pernambuco	1499	77	1496	367	2952	245	2032	2438	3514	10916	6781	19828	370204	16427	3133	22207	5041	1292	21840	127434	2258	1035	1348	1808	2325	5585	5540	639,621	269,417	42%
Alagoas	341	18	183	92	1082	0	641	601	451	1959	667	1338	18056	139263	10890	7570	3598	889	5236	61288	977	465	381	1126	3772	1757	1043	263,686	124,422	47%
Sergipe	238	17	105	110	262	40	564	304	352	680	429	654	1992	4441	96057	12913	1565	812	4314	21032	1022	244	259	459	668	1074	708	151,312	55,256	37%
Bahia	2544	179	808	198	4875	163	2018	1668	3609	7088	2881	4458	16789	3655	16286	615687	35499	30820	28206	271571	4919	1872	2061	1587	4297	31012	25152	1,119,902	504,215	45%
Minas Gerais	6478	507	1309	506	5619	346	5045	3122	1393	3196	1831	1504	3693	1005	762	18730	1039734	36539	46152	171590	9002	2895	3072	3260	6251	32858	25379	1,431,777	392,043	27%
Espirito Santo	7515	117	260	97	1787	84	297	587	282	954	324	355	1144	400	147	14166	28148	187102	17146	10558	1351	661	735	166	959	1173	1743	278,257	91,155	33%
Rio de Janeiro	1471	530	5114	579	6211	258	564	3924	2163	14946	9536	15683	9940	2483	2697	13967	51441	26235	546764	44305	7218	5629	7816	3700	1400	4207	11671	800,451	253,687	32%
São Paulo	8238	614	4005	634	8764	623	5119	9560	22979	50661	17217	27365	56313	18233	9612	101572	190119	11163	43185	2098238	122901	26662	13894	34135	18921	26591	11876	2,939,198	840,960	29%
Paraná	8573	488	973	492	3370	348	1264	1304	317	1695	845	610	1413	595	304	3980	13473	1285	5478	125739	741979	77463	21395	16346	26946	4997	3349	1,065,021	323,042	30%
Santa Catarina	1232	140	511	197	1272	38	504	435	214	1043	429	178	562	117	161	1196	2729	583	3291	15724	51331	376167	39858	2356	7486	1948	1607	511,312	135,146	26%
Rio Grande Sul	1265	216	1266	534	2128	199	1000	1036	805	2581	857	668	1431	381	352	3459	3641	762	7408	17551	22405	55322	704193	4080	8915	3701	3833	849,988	145,795	17%
Mato Grosso Sul	3585	267	538	204	1064	104	693	443	317	999	906	555	948	220	151	1210	4142	387	3136	33469	17895	3171	3245	146960	20660	4646	1849	251,764	104,803	42%
Mato Grosso	11960	475	1333	829	6674	246	2003	1944	875	1290	548	522	850	495	302	1820	6192	620	1829	20605	16749	4139	2878	11739	238882	19310	2551	357,661	118,778	33%
Goias	2168	290	924	557	7694	342	18856	3131	2122	2225	1553	1598	1413	284	296	7367	29287	628	2609	18945	2593	2238	1505	3612	17785	371715	34402	536,140	164,425	31%
Distrito Federal	560	61	1111	226	2010	167	3187	3826	6586	6870	2518	3406	2266	480	357	6624	14329	1728	6895	9561	1696	1505	1674	788	1425	100885	148	180,891	180,742	5%
0 - 59 population	1,307,725	527,122	2,675,497	311,269	5,835,745	457,589	1,078,686	5,245,561	2,606,324	6,771,672	2,526,188	3,093,259	7,213,458	2,618,739	1,653,304	11,992,349	16,266,513	2,847,036	12,850,528	33,715,446	8,754,027	4,925,927	9,122,314	1,920,908	2,360,035	4,644,412	1,941,508	155,263,141		
% In-migrants / Total Population	6.1%	2.5%	3.3%	14.9%	3.0%	9.5%	8.5%	1.9%	3.3%	2.3%	2.9%	3.1%	2.2%	2.0%	3.0%	2.0%	2.6%	4.3%	2.4%	3.5%	3.2%	3.9%	1.2%	4.8%	6.8%	7.7%	10.8%	3.2%		

TABLE 2 - BRAZIL - INTER-STATE MIGRATION (1995 - 2000) 60 AND + YEARS

STATES TO / FROM	Rondonia	Acre	Amazonas	Roraima	Para	Amapá	Tocantins	Maranhão	Piaui	Ceara	Rio Grande Norte	Paralba	Pernambuco	Alagoas	Sergipe	Bahia	Minas Gerais	Espirito Santo	Rio de Janeiro	São Paulo	Paraná	Santa Catarina	Rio Grande Sul	Mato Grosso Sul	Mato Grosso	Goias	Distrito Federal	**Inter + Intra state out**	**inter state out**	**% inter-state out**
% inter-state	40.0%	28.3%	37.7%	76.1%	25.1%	74.7%	43.6%	15.7%	31.9%	24.0%	25.7%	30.7%	21.5%	25.9%	37.5%	22.2%	30.3%	37.7%	19.4%	20.1%	27.5%	33.8%	88.7%	37.0%	39.4%	40.7%	100.0%	29.4%		
Intra + inter state in	7,667	2,064	6,623	1,998	21,852	1,481	8,238	21,420	9,129	28,638	14,417	16,726	35,184	11,461	7,335	46,617	82,738	19,178	58,071	177,776	57,031	28,823	28,823	12,337	14,997	33,467	6,057	760,148		
inter state in	3,068	585	2,499	1,521	5,487	1,106	3,589	3,356	2,912	6,863	3,701	5,134	7,555	2,972	2,749	10,335	25,106	7,230	11,251	35,678	15,660	9,742	25,558	4,567	5,902	13,624	6,057	223,807		
Rondonia	4599	122	112	35	45	0	24	10	0	88	24	0	0	0	12	48	122	116	7	296	424	38	38	75	722	97	22	7,073	2,474	35%
Acre	205	1480	112	9	6	0	0	0	21	65	7	0	6	0	0	8	20	0	27	9	37	11	11	6	0	50	0	2,091	612	29%
Amazonas	162	264	4124	252	254	27	0	26	22	106	39	0	4	15	0	42	29	11	119	91	48	19	19	5	30	45	43	5,798	1,674	29%
Roraima	22	0	120	477	23	0	0	21	14	84	0	10	0	0	0	12	6	0	16	9	0	0	0	0	10	19	12	853	376	44%
Para	197	0	1175	536	16365	930	953	856	210	377	110	35	40	0	13	133	236	140	301	372	149	13	13	40	200	739	203	24,337	7,972	33%
Amapá	0	0	0	0	230	375	0	13	0	44	16	0	0	0	0	0	15	11	12	31	10	0	0	0	0	13	7	777	402	52%
Tocantins	0	0	0	10	517	0	4649	198	40	61	19	29	7	21	25	82	181	13	22	71	53	0	0	8	191	837	158	7,193	2,544	35%
Maranhão	99	8	150	419	2034	59	961	18064	972	255	28	49	55	18	17	36	172	39	213	480	42	16	16	0	60	726	295	25,283	7,219	29%
Piaui	0	0	33	10	167	0	92	729	6217	384	42	18	203	13	0	113	66	0	111	543	6	0	0	0	9	448	429	9,633	3,416	35%
Ceara	25	19	99	47	263	23	61	239	430	21776	314	256	449	30	45	211	175	42	569	1250	43	28	28	11	81	406	333	27,249	5,474	20%
Rio Grande Norte	17	0	24	24	72	0	0	42	40	239	10716	528	149	44	68	49	102	10	282	645	20	37	37	18	23	103	199	13,487	2,771	21%
Paraíba	22	15	61	0	46	17	25	53	18	195	1033	11592	1344	56	48	178	110	21	927	896	58	26	26	17	33	144	202	17,164	5,573	32%
Pernambuco	13	8	32	22	169	10	39	146	141	764	305	1215	27630	987	156	932	175	29	755	4053	88	89	89	54	120	315	237	38,574	10,944	28%
Alagoas	11	13	13	0	17	2	20	12	17	42	0	65	769	8489	428	261	60	37	173	1321	58	7	7	47	27	82	40	12,022	3,533	29%
Sergipe	0	5	12	0	10	0	19	5	4	10	0	77	24	174	4586	519	34	40	137	473	44	14	14	11	11	32	16	6,273	1,687	27%
Bahia	77	11	11	27	125	6	53	61	128	258	82	241	907	230	808	36282	1273	923	829	5735	226	33	33	34	181	1055	435	50,060	13,778	28%
Minas Gerais	221	14	46	0	163	10	134	115	79	189	120	43	132	68	46	1129	57632	1977	2172	6833	461	155	155	97	307	1403	618	74,316	16,684	22%
Espirito Santo	240	0	4	2	68	0	19	19	38	34	36	52	52	10	8	281	1382	11948	1104	268	117	66	66	7	22	53	35	15,930	3,982	25%
Rio de Janeiro	101	28	166	33	376	0	13	255	68	1069	526	1078	926	288	331	1313	5608	2692	46821	2654	624	498	498	149	157	343	777	67,391	20,570	31%
São Paulo	464	12	171	36	238	7	211	304	387	1840	638	984	2051	873	681	4119	11761	687	1920	142099	8193	1681	1681	2115	872	1385	644	186,053	43,955	24%
Paraná	435	9	17	15	135	4	74	19	26	100	71	43	55	47	9	43	582	120	315	5555	41371	3442	3442	840	996	145	123	58,032	16,661	29%
Santa Catarina	7	0	0	4	22	0	34	0	5	45	9	43	10	0	0	19	122	0	79	410	1962	19080	19080	109	249	47	48	41,385	22,305	54%
Rio Grande Sul	125	7	11	0	44	11	24	10	10	83	22	7	84	9	20	141	126	49	347	608	1264	3264	3264	178	356	78	217	10,359	7,095	68%
Mato Grosso Sul	163	9	25	0	63	0	15	0	0	16	8	5	0	0	0	89	235	23	112	1344	800	131	131	7769	642	141	16	11,738	3,969	34%
Mato Grosso	405	40	48	25	111	0	38	67	8	58	19	30	55	9	27	71	315	18	62	849	845	92	92	541	9095	1044	89	14,052	4,958	35%
Goias	58	0	25	4	242	0	679	78	50	123	95	59	66	19	0	213	1331	52	101	619	15	40	40	174	524	19843	858	25,305	5,462	22%
Distrito Federal	0	0	32	11	47	0	101	80	183	333	139	266	167	61	8	293	870	180	537	266	71	43	43	31	81	3874	0	7,716	7,716	100%
60 + population	72,062	30,404	137,060	13,128	356,562	19,443	78,412	405,914	236,954	658,989	250,594	350,566	704,886	203,882	131,171	1,077,901	1,624,981	250,196	1,540,754	3,316,957	809,431	430,433	1,065,484	157,093	144,318	358,816	109,638	14,536,029		
% In-migrants / Total Population	4.3%	1.9%	1.8%	11.6%	1.5%	5.7%	4.6%	0.8%	1.2%	1.0%	1.5%	1.5%	1.1%	1.5%	2.1%	1.0%	1.5%	2.9%	0.7%	1.1%	1.9%	2.3%	2.4%	2.9%	4.1%	3.8%	5.5%	1.5%		

TABLE 3 - BRAZIL - DIFERENCE BETWEEN ABSOLUTE VALUE (60 and +) - (0-59 years) MIGRATION - (1995 - 2000) - Normalized - Total = 100.000

STATES FROM \ TO	Rondonia	Acre	Amazonas	Roraima	Para	Amapá	Tocantins	Maranhão	Piaui	Ceara	Rio Grande Norte	Paraíba	Pernambuco	Alagoas	Sergipe	Bahia	Minas Gerais	Espirito Santo	Rio de Janeiro	São Paulo	Paraná	Santa Catarina	Rio Grande Sul	Mato Grosso Sul	Mato Grosso	Goias	Distrito Federal	**out migration diferencial**
Rondonia	-251	-8	-28	-3	-4	-1	-1	-7	-2	-2	-1	-6	-4	-1	1	-1	-11	1	-7	-9	4	-5	-3	-8	-42	-8	-5	-411
Acre	-7	10	-14	-1	-1	0	-1	0	3	5	-1	-1	1	0	0	1	0	-2	2	-4	1	1	1	0	-3	0	-3	-16
Amazonas	-26	4	-116	-24	-45	0	-2	-7	-2	-11	0	-3	-8	1	-2	1	-6	-1	-9	-11	-4	-1	-5	-4	0	-2	-3	-289
Roraima	-1	-1	-1	-21	-9	-1	-1	-7	-1	4	-4	-1	-1	0	0	0	-3	-1	-4	-3	-3	0	-2	-2	-1	-3	0	-68
Para	8	-3	-129	-22	-644	-104	-3	-79	2	-7	3	-2	-10	-2	0	-2	-13	3	-15	-45	-1	-6	-8	-2	-14	-46	-17	-1158
Amapá	-1	0	-5	-3	-25	-46	-1	-6	-1	0	0	-1	-2	0	0	0	0	1	0	1	0	0	-2	0	-1	0	0	-95
Tocantins	-3	0	-3	-3	-36	-1	-61	-20	-3	3	1	1	-3	2	3	1	2	1	-1	-20	2	0	-4	-1	5	-125	-15	-278
Maranhão	-6	0	-20	-35	-208	-28	-30	208	-35	-21	-6	-1	-7	-1	-1	-8	-11	-1	-56	-158	-5	-1	-3	-4	-25	-101	-124	-688
Piaui	-5	0	-6	-4	-12	-2	-7	-16	161	-30	1	-1	5	1	-3	-5	-4	-2	-24	-240	-3	-2	-4	-3	-4	-42	-89	-338
Ceara	-11	0	-12	-3	-13	-1	-4	-4	2	615	-11	0	2	-3	0	-17	-14	-1	-110	-285	-5	-5	-8	-6	0	2	-25	83
Rio Grande Norte	-1	0	-3	0	3	-2	-2	0	0	-19	296	11	-12	4	5	-5	-4	-2	-28	-45	-2	0	0	0	0	-7	3	187
Paraíba	-4	1	4	-5	-3	1	-2	-3	-5	-9	47	543	56	0	0	-6	-3	-1	-177	-213	0	0	-1	-1	-2	-14	-20	186
Pernambuco	-9	1	-6	0	2	0	-9	2	-6	25	-7	23	1078	16	-1	-31	-12	-5	-51	-347	-4	5	2	-5	0	3	-7	657
Alagoas	-1	2	0	-1	-5	0	-2	-3	-1	-8	-5	-1	-23	155	-19	-18	-17	-1	-13	-249	1	-2	-2	-2	-22	-1	-2	-240
Sergipe	-2	1	1	-1	-1	0	-1	-1	-2	-3	-3	6	-11	-8	-60	-21	-6	0	-12	-83	-1	0	0	-2	-3	-3	-3	-220
Bahia	-7	0	-4	2	-17	0	-7	-4	-8	-15	-9	1	3	5	-6	521	-78	-91	-86	-1121	-4	-9	-10	-6	-6	-75	-117	-1149
Minas Gerais	-16	-2	-3	-3	-17	-1	-17	-6	1	3	3	-5	-8	2	1	19	401	8	-33	-286	-2	0	-1	-10	-3	-42	-94	-112
Espirito Santo	-20	-1	-1	0	-3	-1	0	-2	3	-2	2	4	-1	-1	0	-61	-13	280	27	-38	6	4	4	0	-4	-1	-7	174
Rio de Janeiro	3	0	-13	0	7	-2	-2	6	-6	37	3	33	53	21	25	76	382	173	2383	43	32	27	11	-6	11	16	22	3337
São Paulo	4	-3	-5	0	-29	-3	-8	-26	-108	-108	-35	-60	-119	-11	23	-160	234	13	-46	4202	229	37	125	42	-16	-1	3	4177
Paraná	-2	-2	-4	-1	-6	-2	1	-6	1	1	3	1	-2	2	-1	-22	-17	7	4	-138	318	-82	305	-2	-55	-15	-7	279
Santa Catarina	-8	-1	-4	-1	-6	0	1	-3	-1	-1	-2	4	-3	-1	-1	-6	-3	-4	-12	-55	-96	-88	2235	-2	-19	-7	-5	1913
Rio Grande Sul	8	-1	-7	-4	-9	0	-4	-6	-4	-7	-3	-4	1	-2	0	-5	-9	1	-5	-41	12	47	-4434	-5	-15	-15	2	-4508
Mato Grosso Sul	-3	-1	0	-1	1	-1	-3	-3	-2	-5	-5	-3	-7	-2	-1	3	2	0	-7	-54	-18	-5	-5	7	-58	-14	-11	-195
Mato Grosso	-29	2	-3	-2	-32	-2	-9	-5	-5	-1	-1	0	1	-2	1	-3	-1	-2	-4	-31	-5	-16	-8	-10	-453	4	-6	-622
Goias	-7	-2	-3	-3	-21	-2	-41	-11	-8	1	2	-3	-1	0	-2	-23	-27	3	-5	-49	-16	-10	-5	-2	-54	43	-125	-374
Distrito Federal	-4	0	-3	0	-8	-1	-9	-16	-21	-4	1	12	6	5	-1	-7	16	12	23	-31	-2	-5	-6	-1	1	-187	-1	-234
In-migratio diferential	(401)	(3)	(389)	(140)	(1,142)	(201)	(223)	(24)	(48)	440	270	550	985	180	(39)	221	785	389	1,733	690	433	(118)	(1,827)	(35)	(785)	(644)	(656)	0

Normalized young migration flows diferences greather than 100

Normalized elderly migration flows diferences greather than 100

BIBLIOGRAPHY:

Abreu, J. F (82): *"Migration and Money Flows in Brazil. A Spatial Analysis". U. of Mi. Press, Ann Arbor, Michigan.*

Bailey, T. C and Gatrell, A. C (96): *"Interactive Spatial Data Analysis" W. S. Press, N. Y.*

Carvalho, J. A. M. (88): *"O tamanho da população brasileira e sua distribuição etária: uma visão prospectiva. "In VI Encontro Nacional de Estudos Populacionais.*

v. 1, p. 37 – 66. Recife.

Machado, C.C. and Abreu, J. F. (91): *"The Elderly Mobility Transition in Brazil, An Exploratory Analysis". Paper presented at Elderly Mobility Transition Seminar – Aspen Colorado.*

Tobler, W. (76): *"Spatial Interaction Patterns" Journal of Environment Systems 6; 264-299.*

Tobler, W. (79): *"Estimation of Attractivities from Interactions" Environment and Planning A, 11, 121 – 127.*