Forecast Methodology and Detailed Population Forecast for Allegheny County

The population forecast presented as part of UCSUR's State of Aging report is compiled from the Pittsburgh REMI model. This REMI model is detailed regional econometric model purchased by UCSUR jointly with the Southwestern Pennsylvania Commission (SPC), the designated Metropolitan Planning Organization (MPO) for ten counties of Southwestern Pennsylvania. The model is developed by Regional Economic Models Inc. of Amherst, Massachusetts. The Pittsburgh REMI model is a specific version of the REMI *Policy Insight 9.5* model which is specifically calibrated for 10 counties of Southwestern Pennsylvania and 4 sub-areas within that region. The forecast presented here is for Allegheny County, which by itself is one of the 4 regions built into the Pittsburgh REMI model.

The REMI model was been used by UCSUR since 1991 to assist area researchers and policymakers in the development and evaluation of local policy initiatives through regional forecasts and policy impact simulations. SPC uses REMI to develop long range population and employment forecasts for the Pittsburgh region, for development of their Transportation Improvement Plan and for long range planning. SPC also uses REMI forecasts as inputs into other models to develop sub-county and small area population and employment projections.

The REMI model uses algorithms developed over the last three decades to build customized models for each area using data from the Bureau of Economic Analysis (BEA), the Bureau of Labor Statistics (BLS), the Department of Energy, the Census Bureau and other sources. These data are used to both calibrate the model from historical trends in the regional economy and to provide a comprehensive picture of the current state of the regional economy. These algorithms are grouped into 5 major blocks, each of which captures dynamics of the regional economy: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Compensation, Prices, and Costs, and (5) Market Shares. All five blocks interact within the model and impact the model's population forecasts, but most demographic detail is captured in the *Population and Labor Supply* block.

The *Population and Labor Force block* of the REMI model is based on a "cohort-component" method to forecast population trends in the future. The components of demographic change are calculated every year for each of the age cohorts by sex and race. The population at the end of the year is equal to the population at the beginning of the year (starting population) plus births and net migration, minus deaths. The rate of change for each of the components depends on both observed historical trends in the region and on forecasted national trends.

Population migration is a fundamental part of overall population change for both the Allegheny County and the Pittsburgh region. Migration acts as an equilibrium inducing factor between regions. Regions experiencing greater levels of employment growth are typically attractors of new migrants, while

regions experiencing slower growth, or decline, typically lose population due to migration. Most population migration in the future is induced by economic trends, and as a result is dependent on the economic forecast for the Pittsburgh region. To project future migration of the working age population, the REMI migration model includes a series of equations to forecast the flows of workers between regions. These flows then impact the migration of families and dependents. These equations relate current and past year measures of regional economic opportunity (REO), regional wage levels (RWL) and the influence of regional amenities calibrated from past migration levels.

An alternative set of equations forecasts future flows of retired migrants, those who move after they have left the labor force. Retired migrants are defined within REMI as migrants age 65 and over. Retired migrants are considered non-economic migrants in that they are likely to be less influenced by recent changes in employment conditions and more influenced by regional amenity levels. In addition, special populations including college students are treated separately in the REMI migration module because of the unique migration patterns of both collage matriculants and recent graduates. Certain institutional populations, and certain types of federal workers, to include military personnel, are modeled separately. These groups are all included in the overall population forecast.

The forecast presented as part of the State of Aging report is UCSUR's current forecast, as of August 2014, of the population for Allegheny County based on the results of the REMI model. Allegheny County is one part of, and highly dependent upon, both economic and demographic trends impacting the Pittsburgh metropolitan area. This REMI model projects changes to entire Pittsburgh regional economy, and then incorporates those results into population projections for all areas within the Pittsburgh region including Allegheny County.

Tables 1 through 4 are detailed projections of the population in Allegheny County by age group, race and gender through 2050. Note the race groups used by the REMI model incorporate a slight variation of race definitions typical used in data currently reported by the Census Bureau. There are 4 races in the REMI model, White, Black, Other, and Hispanic. The Census treats race and Hispanic origin as two different concepts in accordance with the guidelines from the Office of Management and Budget (OMB). Each person can be identified as one or more races and a separate Hispanic origin attribute. So a Hispanic person may be of any race. The REMI category White includes non-Hispanic people who are White alone, the Black category includes non-Hispanic people who are Black alone. Non-Hispanics of all other races and combinations of races are grouped into the REMI Other category. The REMI Hispanic category contains all people who are of Hispanic Origin, regardless of their race.

Table 1. Allegheny County Population Forecast 2010 to 2050 – Total Population

Age Range	Total					Men					Women				
	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
0-4	63,549	67,480	66,941	69,556	76,026	32,482	34,349	34,064	35,399	38,686	31,067	33,132	32,877	34,156	37,340
5-9	64,206	67,344	71,177	71,454	77,090	32,683	34,438	36,304	36,448	39,339	31,523	32,904	34,873	35,007	37,752
10-14	68,335	66,309	74,014	73,978	77,388	34,897	33,937	37,803	37,785	39,537	33,438	32,373	36,211	36,194	37,852
15-19	79,629	71,203	77,288	81,516	82,484	40,591	36,071	39,428	41,506	41,996	39,038	35,133	37,861	40,008	40,487
20-24	89,357	78,603	80,191	88,331	89,652	44,140	39,641	40,510	44,601	45,215	45,217	38,962	39,680	43,731	44,438
25-29	85,152	80,668	80,816	87,768	93,788	42,768	40,305	40,248	44,027	47,002	42,384	40,363	40,567	43,741	46,786
30-34	72,990	95,787	86,205	88,990	98,672	36,744	47,470	43,264	44,741	49,644	36,246	48,318	42,943	44,248	49,027
35-39	68,943	89,448	88,284	89,448	97,566	34,287	45,229	44,327	44,825	49,210	34,656	44,220	43,957	44,623	48,357
40-44	76,352	75,491	101,363	92,655	96,424	37,176	37,869	50,240	46,513	48,505	39,176	37,622	51,124	46,142	47,917
45-49	88,122	70,649	94,237	93,705	95,750	42,499	35,120	47,525	46,969	47,948	45,623	35,528	46,712	46,735	47,802
50-54	98,437	76,084	77,935	103,762	96,050	47,380	36,978	38,966	51,289	48,113	51,057	39,107	38,969	52,472	47,939
55-59	90,404	85,192	70,694	94,091	94,279	43,552	40,591	34,738	46,966	46,810	46,852	44,601	35,958	47,123	47,467
60-64	73,561	92,528	73,668	76,157	101,470	34,560	43,634	35,071	37,362	49,305	39,001	48,894	38,595	38,794	52,164
65-69	53,004	80,306	77,679	65,503	87,809	23,707	37,508	35,933	31,313	42,760	29,297	42,798	41,746	34,190	45,049
70-74	42,727	60,125	77,433	62,693	65,861	18,386	27,056	35,079	28,768	31,239	24,341	33,068	42,355	33,926	34,624
75-79	37,833	39,878	61,386	60,280	51,745	15,542	16,808	27,118	26,432	23,543	22,291	23,069	34,269	33,850	28,201
80-84	36,010	27,951	40,491	53,178	44,071	13,734	10,988	16,775	22,244	18,777	22,276	16,963	23,715	30,935	25,293
85+	35,229	35,506	34,984	53,635	62,980	10,887	11,491	11,872	19,483	22,489	24,342	24,015	23,111	34,152	40,491
55-64	163,965	177,720	144,362	170,248	195,749	78,112	84,225	69,809	84,328	96,115	85,853	93,495	74,553	85,917	99,631
65-84	169,574	208,260	256,989	241,654	249,486	71,369	92,360	114,905	108,757	116,319	98,205	115,898	142,085	132,901	133,167
85+	35,229	35,506	34,984	53,635	62,980	10,887	11,491	11,872	19,483	22,489	24,342	24,015	23,111	34,152	40,491
65+	204,803	243,766	291,973	295,289	312,466	82,256	103,851	126,777	128,240	138,808	122,547	139,913	165,196	167,053	173,658

Table 2. Allegheny County Population Forecast 2010 to 2050 - White Population

Age Range	Total					Men					Women				
	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
0-4	43,355	47,391	44,330	44,066	46,991	22,247	24,120	22,552	22,420	23,904	21,108	23,271	21,778	21,646	23,087
5-9	45,622	47,712	48,654	46,102	48,300	23,385	24,395	24,805	23,504	24,635	22,237	23,316	23,848	22,598	23,665
10-14	49,819	45,279	51,894	48,967	49,081	25,584	23,285	26,482	24,985	25,049	24,235	21,994	25,411	23,982	24,033
15-19	58,261	50,472	54,650	55,683	53,467	29,736	25,776	27,892	28,355	27,220	28,525	24,696	26,758	27,327	26,247
20-24	67,569	56,702	54,626	61,238	59,039	33,591	28,741	27,711	30,914	29,755	33,978	27,961	26,915	30,324	29,284
25-29	66,844	57,478	56,104	60,394	62,317	34,088	28,647	28,082	30,252	31,170	32,756	28,831	28,022	30,142	31,147
30-34	56,840	71,784	60,856	59,128	66,416	29,071	35,810	30,668	29,820	33,387	27,769	35,974	30,188	29,308	33,029
35-39	54,027	69,416	62,170	61,117	65,926	27,332	35,634	31,175	30,793	33,234	26,695	33,782	30,995	30,324	32,692
40-44	62,428	58,161	75,393	64,852	63,626	30,756	29,609	37,611	32,700	32,119	31,672	28,552	37,782	32,152	31,506
45-49	73,645	55,138	72,645	65,790	65,187	35,916	27,930	37,178	32,965	32,830	37,729	27,208	35,467	32,824	32,357
50-54	84,013	62,019	59,797	76,932	67,062	40,835	30,487	30,325	38,272	33,748	43,178	31,532	29,472	38,660	33,315
55-59	77,901	71,203	55,035	72,315	66,161	37,957	34,288	27,556	36,634	32,861	39,944	36,915	27,479	35,680	33,299
60-64	63,830	79,093	59,946	58,314	75,152	30,231	37,719	28,898	29,047	36,779	33,599	41,374	31,047	29,266	38,372
65-69	46,194	69,319	64,899	50,882	67,347	20,854	32,759	30,379	24,813	33,302	25,340	36,560	34,521	26,069	34,045
70-74	37,563	52,250	66,241	50,923	50,320	16,263	23,752	30,366	23,663	24,228	21,300	28,498	35,875	27,260	26,092
75-79	33,775	34,826	53,093	50,387	40,133	13,986	14,824	23,749	22,367	18,634	19,789	20,002	29,344	28,021	21,499
80-84	32,822	24,649	35,311	45,637	35,851	12,593	9,777	14,806	19,340	15,475	20,229	14,872	20,504	26,297	20,376
85+	32,552	31,990	30,665	46,544	53,296	10,107	10,426	10,511	17,137	19,253	22,445	21,564	20,154	29,407	34,043
55-64	141,731	150,296	114,981	130,629	141,313	68,188	72,007	56,454	65,681	69,640	73,543	78,289	58,526	64,946	71,671
65-84	150,354	181,044	219,544	197,829	193,651	63,696	81,112	99,300	90,183	91,639	86,658	99,932	120,244	107,647	102,012
85+	32,552	31,990	30,665	46,544	53,296	10,107	10,426	10,511	17,137	19,253	22,445	21,564	20,154	29,407	34,043
65+	182,906	213,034	250,209	244,373	246,947	73,803	91,538	109,811	107,320	110,892	109,103	121,496	140,398	137,054	136,055

Table 3. Allegheny County Population Forecast 2010 to 2050 - Black Population

Age Range	Total 2010	2020	2030	2040	2050	Men 2010	2020	2030	2040	2050	Women 2010	2020	2030	2040	2050
0-4	11,881	10,811	11,416	11,363	12,046	6,016	5,503	5,810	5,784	6,130	5,865	5,309	5,606	5,579	5,916
5-9	11,693	10,750	11,795	11,988	12,401	5,860	5,503	6,018	6,119	6,335	5,833	5,246	5,777	5,869	6,067
10-14	12,663	12,316	11,776	12,557	12,727	6,442	6,218	6,020	6,423	6,515	6,221	6,098	5,757	6,135	6,212
15-19	15,036	11,729	11,391	12,581	12,963	7,646	5,792	5,738	6,330	6,528	7,390	5,937	5,654	6,251	6,434
20-24	13,291	12,626	12,941	12,618	13,746	6,158	6,158	6,264	6,175	6,742	7,133	6,468	6,676	6,443	7,004
25-29	10,496	15,441	13,452	13,489	15,183	4,718	7,858	6,573	6,701	7,540	5,778	7,583	6,878	6,788	7,643
30-34	9,319	14,349	14,814	15,561	15,740	4,171	6,737	7,359	7,683	7,852	5,148	7,612	7,456	7,877	7,887
35-39	9,300	11,028	16,995	15,394	15,812	4,127	5,032	8,683	7,614	7,939	5,173	5,996	8,312	7,780	7,874
40-44	9,547	9,712	15,461	16,177	17,212	4,260	4,424	7,313	8,061	8,537	5,287	5,288	8,148	8,116	8,675
45-49	10,887	9,422	11,765	17,782	16,472	4,868	4,220	5,404	9,054	8,150	6,019	5,201	6,361	8,728	8,322
50-54	11,313	9,343	10,045	15,763	16,662	5,067	4,158	4,595	7,455	8,288	6,246	5,185	5,450	8,308	8,374
55-59	10,048	10,266	9,329	11,721	17,628	4,481	4,540	4,139	5,339	8,879	5,567	5,726	5,190	6,381	8,749
60-64	7,783	10,277	8,886	9,713	15,234	3,466	4,468	3,860	4,351	7,073	4,317	5,809	5,025	5,362	8,161
65-69	5,405	8,580	9,125	8,505	10,835	2,194	3,695	3,891	3,655	4,805	3,211	4,885	5,234	4,849	6,030
70-74	4,136	6,123	8,351	7,432	8,295	1,645	2,567	3,457	3,098	3,585	2,491	3,556	4,894	4,335	4,711
75-79	3,342	3,880	6,326	6,898	6,594	1,225	1,462	2,544	2,762	2,675	2,117	2,417	3,782	4,137	3,919
80-84	2,689	2,578	3,940	5,514	5,074	931	902	1,484	2,065	1,931	1,758	1,676	2,456	3,449	3,142
85+	2,305	2,878	3,323	5,364	6,859	629	808	978	1,730	2,192	1,676	2,070	2,345	3,633	4,667
55-64	17,831	20,543	18,215	21,434	32,862	7,947	9,008	7,999	9,690	15,952	9,884	11,535	10,215	11,743	16,910
65-84	15,572	21,161	27,742	28,349	30,798	5,995	8,626	11,376	11,580	12,996	9,577	12,534	16,366	16,770	17,802
85+	2,305	2,878	3,323	5,364	6,859	629	808	978	1,730	2,192	1,676	2,070	2,345	3,633	4,667
65+	17,877	24,039	31,065	33,713	37,657	6,624	9,434	12,354	13,310	15,188	11,253	14,604	18,711	20,403	22,469

Table 4. Allegheny County Population Forecast 2010 to 2050 – All Other Races Population

Age Range	Total 2010	2020	2030	2040	2050	Men 2010	2020	2030	2040	2050	Women 2010	2020	2030	2040	2050
0-4	6,284	7,617	9,115	11,774	14,452	3,201	3,881	4,644	5,999	7,362	3,083	3,736	4,471	5,775	7,090
5-9	5,172	7,172	8,773	10,956	13,796	2,568	3,680	4,488	5,601	7,051	2,604	3,493	4,286	5,355	6,745
10-14	4,374	6,455	8,467	10,117	12,936	2,135	3,327	4,349	5,192	6,631	2,239	3,129	4,118	4,925	6,305
15-19	4,632	6,721	8,942	10,666	12,985	2,326	3,378	4,660	5,532	6,714	2,306	3,343	4,282	5,133	6,271
20-24	6,377	6,885	9,364	11,541	13,423	3,260	3,548	4,924	6,026	6,976	3,117	3,337	4,440	5,515	6,448
25-29	5,865	5,878	8,554	11,060	13,111	2,932	2,829	4,222	5,639	6,671	2,933	3,049	4,332	5,421	6,440
30-34	5,171	7,342	8,086	10,891	13,364	2,589	3,669	3,997	5,534	6,790	2,582	3,674	4,089	5,357	6,574
35-39	4,216	6,720	7,106	10,025	12,748	2,112	3,308	3,419	4,935	6,464	2,104	3,413	3,687	5,090	6,284
40-44	3,186	5,724	8,122	9,053	12,021	1,569	2,818	4,029	4,454	6,071	1,617	2,906	4,093	4,599	5,949
45-49	2,566	4,611	7,435	7,970	11,008	1,219	2,255	3,649	3,838	5,413	1,347	2,356	3,786	4,132	5,595
50-54	2,217	3,466	6,146	8,610	9,657	1,033	1,707	3,015	4,256	4,743	1,184	1,759	3,131	4,354	4,915
55-59	1,768	2,681	4,833	7,655	8,285	776	1,260	2,331	3,715	3,953	992	1,421	2,503	3,940	4,331
60-64	1,477	2,278	3,585	6,204	8,648	652	1,017	1,706	2,966	4,182	825	1,261	1,879	3,238	4,466
65-69	1,086	1,729	2,663	4,690	7,351	514	735	1,200	2,185	3,467	572	994	1,463	2,506	3,884
70-74	757	1,336	2,068	3,235	5,540	368	566	892	1,488	2,564	389	770	1,177	1,747	2,976
75-79	484	897	1,420	2,191	3,848	228	403	579	945	1,716	256	494	842	1,246	2,131
80-84	330	517	938	1,468	2,335	133	233	370	594	1,012	197	284	568	875	1,323
85+	219	384	708	1,239	2,021	93	158	280	436	740	126	226	427	804	1,281
55-64	3,245	4,959	8,418	13,859	16,933	1,428	2,277	4,037	6,681	8,135	1,817	2,682	4,382	7,178	8,797
65-84	2,657	4,479	7,089	11,584	19,074	1,243	1,937	3,041	5,212	8,759	1,414	2,542	4,050	6,374	10,314
85+	219	384	708	1,239	2,021	93	158	280	436	740	126	226	427	804	1,281
65+	2,876	4,863	7,797	12,823	21,095	1,336	2,095	3,321	5,648	9,499	1,540	2,768	4,477	7,178	11,595

Table 5. Allegheny County Population Forecast 2010 to 2050 – Hispanic Population

Age Range	Total					Men					Women				
	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
0-4	2,029	1,661	2,080	2,353	2,537	1,018	845	1,058	1,196	1,290	1,011	816	1,022	1,156	1,247
5-9	1,719	1,710	1,955	2,408	2,593	870	860	993	1,224	1,318	849	849	962	1,185	1,275
10-14	1,479	2,259	1,877	2,337	2,644	736	1,107	952	1,185	1,342	743	1,152	925	1,152	1,302
15-19	1,700	2,281	2,305	2,586	3,069	883	1,125	1,138	1,289	1,534	817	1,157	1,167	1,297	1,535
20-24	2,120	2,390	3,260	2,934	3,444	1,131	1,194	1,611	1,486	1,742	989	1,196	1,649	1,449	1,702
25-29	1,947	1,871	2,706	2,825	3,177	1,030	971	1,371	1,435	1,621	917	900	1,335	1,390	1,556
30-34	1,660	2,312	2,449	3,410	3,152	913	1,254	1,240	1,704	1,615	747	1,058	1,210	1,706	1,537
35-39	1,400	2,284	2,013	2,912	3,080	716	1,255	1,050	1,483	1,573	684	1,029	963	1,429	1,507
40-44	1,191	1,894	2,387	2,573	3,565	591	1,018	1,287	1,298	1,778	600	876	1,101	1,275	1,787
45-49	1,024	1,478	2,392	2,163	3,083	496	715	1,294	1,112	1,555	528	763	1,098	1,051	1,528
50-54	894	1,256	1,947	2,457	2,669	445	626	1,031	1,306	1,334	449	631	916	1,150	1,335
55-59	687	1,042	1,497	2,400	2,205	338	503	712	1,278	1,117	349	539	786	1,122	1,088
60-64	471	880	1,251	1,926	2,436	211	430	607	998	1,271	260	450	644	928	1,165
65-69	319	678	992	1,426	2,276	145	319	463	660	1,186	174	359	528	766	1,090
70-74	271	416	773	1,103	1,706	110	171	364	519	862	161	244	409	584	845
75-79	232	275	547	804	1,170	103	119	246	358	518	129	156	301	446	652
80-84	169	207	302	559	811	77	76	115	245	359	92	131	187	314	452
85+	153	254	288	488	804	58	99	103	180	304	95	155	185	308	500
55-64	1,158	1,922	2,748	4,326	4,641	549	933	1,319	2,276	2,388	609	989	1,430	2,050	2,253
65-84	991	1,576	2,614	3,892	5,963	435	685	1,188	1,782	2,925	556	890	1,425	2,110	3,039
85+	153	254	288	488	804	58	99	103	180	304	95	155	185	308	500
65+	1,144	1,830	2,902	4,380	6,767	493	784	1,291	1,962	3,229	651	1,045	1,610	2,418	3,539