Introduction

Asset indices are used to gauge wealth and welfare, and circumvent the known issues with more direct measures of income and wealth, such as expenditure data (Filmer and Scott 2012). The standard asset index proxies for wealth using asset ownership. As these assets are often durable goods, and sometimes include housing quality variables, they are more indicative of the permanent component of wealth. This is in contrast with the concept of transitory wealth, which represents the noisier, less expected fluctuations in wealth. This division into a stable, long-term component and a short-term shock component is similar to the classic separation of income into permanent and transitory parts. This division is a defining characteristic of the permanent income hypothesis (PIH) (Friedman 1957). The PIH states that individuals determine consumption based on permanent income, that which is anticipated, rather than transitory income, which includes unexpected shocks. Rather than examining how income shocks affect consumption, we are interested in understanding how fertility shocks/family building affects wealth.

The direction of causality from fertility to wealth is less frequently addressed in the literature than the reverse mechanism. Findings examining income/wealth as predictors tend to reflect the PIH. The importance of permanent income and other stable aspects of socioeconomic status on outcomes such as fertility and health has been demonstrated repeatedly (Easterlin 1969; Mueller and Short 1983; McLeod and Shanahan 1993; Bollen, Glanville, and Stecklov 2006). Transitory income is considered a less important predictor of these outcomes (Lordan et al 2012; Bollen, Glanville, and Stecklov 2006).

We are interested in exploring how fertility shocks affect wealth. To that end, it is likely that permanent and transitory wealth respond differently, varying in both severity and duration. Traditional asset scores, comprised of durables, may remain relatively unaffected by health shocks, at least in the short term; asset ownership is likely to be relatively static from year to year. However, consumption of non-durables will likely be more immediately and severely reduced in the face of the more limited resource constraint (Wagstaff 2007). This paper discusses our efforts to construct an index capturing transitory wealth, and the ability of this index to explain economic well-being alongside and independently from the classic asset index for permanent wealth.

Data collection

The Family Health and Wealth Study, initiated in 2009, collected two rounds of household data from six peri-urban sites in 5 African countries: Ethiopia, Ghana, Nigeria, Malawi and Uganda. The goal of this study was to examine how fertility and family building affect family and individual-level health and wealth outcomes. The study included a "wealth module" that contained a series of questions about asset ownership, including durables and non-durables, and also asked about expenditures in categories such as eating out, entertainment, child and health care. Data were also collected on perceived economic well-being, including satisfaction with current income, aspirational wealth and a self-evaluation of own wealth rank with a 9-point scale.

Method and Data Analysis

Using data from the wealth module, measured at the household level, we constructed a fixed asset score, largely reflecting housing quality and durable ownership, as well as a "middle-class index" that captures expenditures and ownership of non-durable items. Both indices are constructed using principal components analysis, relying on the first component to generate the

two new scores. The middle class index is assumed to represent transitory wealth. Typically studies use current income as a measure of transitory income or wealth, but these are generally recognized as unreliable due to measurement error and the inability to account for aspects of non-traditional livelihoods such as seasonality and in-kind trade. By pooling 47 durable ownership items and 34 expenditure and non-durable items for the fixed asset (FA) and middle class (MC) indices, respectively, we circumvent these issues.

To examine the ability of the middle-class index to capture transitory wealth, and reflect a dynamic not captured in the asset index, we undertook regression analyses of data for the six sites using four perceived economic well-being variables – surplus income, satisfaction with current income, aspirational wealth and self rated wealth. Surplus Income is defined as the difference between reported total family earnings in a month and reported amount needed to live normally. The means shown in USD equivalents (table 1) vary from negative values of -$4.42 (Ethiopia) to +$52.95 (Nigeria/Ife). Satisfaction with current income is highest in Ethiopia (81.3% rather or fully satisfied), while lowest in Malawi and the two Nigeria sites where being not at all or less than satisfied is about 87.7% among household respondents. Ghana and Uganda respondent satisfaction with current income levels falls in between the other sites.

Based on average self-rated economic wellbeing on a 9-point scale (1=poorest, 9=richest), Ethiopian households perceive themselves to be poor (mean=2.71, SD=0.93), whereas Nigeria/Ibadan households better off (mean=4.88, SD=1.66). Ghana, Nigeria/Ife, Uganda and Malawi had higher averages (4.59, 4.03, 3.92, 3.37) than Ethiopia, although income satisfaction was highest in the latter setting and lowest in the two Nigeria and Malawi sites.

FA component eigenvalues ranged between 2.87 (Nigeria/Ife) to 4.89 (Ethiopia); MC component eigenvalues ranged between 3.30 (Nigeria/Ibadan) to 7.67 (Uganda). These eigenvalues suggest the first component's factors adequately account for the most variance.

To assess multi-collinearity, we examined both the correlations between the FA and MC indices and the Variable Inflation Factor (VIF) values following ordinary least squares (OLS) regression models. The correlations range from 0.177 in Ghana to 0.414 in Nigeria/Ife (Ife), to 0.435 in Uganda, to 0.704 in Ethiopia, to 0.745 in Nigeria/Ibadan and to 0.764 in Malawi. The VIFs, where values over 5.0 suggest high multi-collinearity, ranged between 1.04 and 2.85 (table not shown). Thus the two scores can be considered as independent measures of permanent and transitory wealth.

Income satisfaction and aspirational wealth outcomes are ordered categories; therefore, we estimated ordinal logistic regression models (result table not shown). Male years of schooling and number of children 0-4 and 5-14 are used as control factors, with the required monthly amount to live on (monthly need logged) also included in the surplus income model. The metrics are local currencies according to country specific conversion rates.

The Middle Class Index (MCI) is positively and significantly associated with surplus income (a proxy for discretionary income) in Ethiopia and Nigeria/Ibadan and positively but not significantly in Malawi and Nigeria/Ife. MCI is negatively but not significantly associated with surplus income in Uganda, and negatively and significantly in Ghana. The fixed asset score is positively associated with surplus income in all 6 sites but statistically significant in only two (Ghana and Uganda).

MCI is positively and significantly associated with reported income satisfaction in Malawi and Ethiopia, and positively but not significantly in Nigeria/Ife and Nigeria/Ibadan. It is negatively and significantly associated with reported income satisfaction in Ghana and Uganda. FA has positive associations in all sites, and statistically significant ones in all but Malawi and

Nigeria/Ibadan.

As seen from Table 1, aspirational wealth is based on responses to a question, "Do you think that one year from now your family will live better than today or worse?" All coefficients from the ordinal logistic regressions for MC and FA are positive except for MC in Nigeria/Ibadan and reach statistical significance in Nigeria/Ife and for MC only in Ethiopia and Malawi and for FA only in Nigeria/Ibadan and Uganda (Table not shown).

The middle-class index is a statistically significant, positive predictor of the self-rated wealth measure, both in a simple linear regression and in a regression including the asset index and other covariates. The MC index positively increases self-rated wealth in Ethiopia, Ghana and Malawi and independently of FA. FA is a strong predictor in the foregoing three countries as well as Nigeria/Ife and Uganda.

We interpret the statistical significance of the two indices when included together in regressions of economic well-being as confirmation that they do indeed capture different components of wealth. These results are also robust to controls for father's education and family size. Interestingly negative coefficients for young and middle-aged children suggest the costs of raising children may impact discretionary income and perceived economic wellbeing.

While considered the lesser component of wealth in terms of predictors of outcomes related to consumption, health, and socioeconomic status, transitory wealth is likely a more sensitive outcome when trying to predict how changes to factors such as family size or health affect economic well-being. These findings suggest that the middle-class index is a viable alternative representation of transitory wealth, avoiding the well-known issues of using direct expenditures while explaining economic status independent of permanent wealth.

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Table 1. Characteristics of Family Health and Wealth Study Populations

Characteristic	Ethiopia (Sebeta)		Ghana (Asawase)		Malawi (Lunzu)		Nigeria (Ipetumodu)		Nigeria (Akinyele)		Uganda (Wakiso)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
N of households/couples	997		800		602		777		497		488	
Age, years, mean (SD)	35.17(8.10)	28.55(6.23)	40.84(7.60)	33.46(6.38)	33.53(7.34)	27.91(6.39)	38.51(8.47)	31.75(6.88)	36.19(7.84)	29.49(5.59)	33.86(7.99)	27.30(6.56)
Schooling, years, mean (SD)	8.97(4.61)	7.07(4.61)	6.74(3.96)	5.96(3.64)	8.28(3.57)	7.12(3.26)	10.00(4.66)	9.09(4.36)	10.83(3.72)	10.30(3.63)	10.67(3.33)	9.51(3.15)
Persons living in household, mean (SD)												
Persons under age 5	0.65(0.66)		0.84(0.75)		0.86(0.70)		0.83(0.74)		1.07(0.74)		1.13(0.82)	
Persons age 5 to 14	1.02(1.10)		1.43(1.19)		1.36(1.27)		1.31(1.19)		1.13(1.18)		1.07(1.35)	
Wealth-related outcomes												
Surplus income (a), mean (SD) in US$	-4.42(170.28)		-724.16(1322.81)		-97.36(306.40)		52.95(874.07)		-124.05(329.10)		-35.40(242.89)	
Self-reported monthhly amount needed to live normally, mean (SD) in US$	106.84(97.07)		2322.34(1153.83)		201.21(340.01)		239.59(287.54)		263.30(180.95)		197.49(186.07)	
Self-reported total earnings by family members in past month, mean (SD) in US$	102.42(173.30)		1598.18(988.13)		105.69(154.06)		286.27(841.04)		140.59(292.64)		162.09(215.95)	
Satisfaction with present income	n	%	n	%	n	%	n	%	n	%	n	%
Not at all satisfied	117	11.8	143	17.9	422	70.9	244	32.3	189	39.3	80	17.0
Less than satisfied	255	25.8	346	43.3	100	16.8	280	37.0	178	37.0	261	55.4
Rather satisfied	553	55.9	234	29.3	42	7.1	130	17.2	79	16.4	74	15.7
Fully satisfied	65	6.6	77	9.6	31	5.2	102	13.5	35	7.3	56	11.9
Will family live better or worse than today one year from now (aspirational wealth)												
	n	%	n	%	n	%	n	%	n	%	n	%
Much worse	3	0.3	9	1.1	0	0.0	2	0.3	1	0.2	3	0.6
Somewhat worse	26	2.6	1	0.1	6	1.0	1	0.1	2	0.4	21	4.5
No change	118	11.9	48	6.0	110	18.4	8	1.1	18	3.7	146	31.1
Somewhat better	650	65.5	300	37.5	235	39.4	230	30.9	169	35.0	226	48.2
Much better	196	19.7	442	55.3	246	41.2	503	67.6	293	60.7	73	15.6
Self-rated wealth of family with poorest on 1st rung and wealthiest on 9th rung of ladder, mean (SD)	2.71(0.93)		4.59(1.09)		3.37(1.32)		4.88(1.66)		4.03(1.65)		3.92(1.42)	

(a) Surplus income is difference between family's monthly amount needed to live normally and cash earnings in last month