ple is complete down to a dynamical mass roughly equivalent to $M_{\rm h} = 5\times10^{13}\ M_\odot$. It could be that the abundance of groups of lower masses is larger than that given in Heinämäki et al. (2003), though it is difficult to accept that blue galaxies are completely absent in the centers of small and loose groups of a few (> 2) members.

Last but not least, in Figure 8 we include observational estimates for our Galaxy (open circle). The uncertainties in the estimates of $M_{\rm h}$ for the Milky Way are still large but better than most of the determinations for other individual galaxies. For recent reviews on different results see Guo et al. (2010) and Dutton et al. (2010). In Figure 8 we plot a recent estimate of $M_{\rm h}$ based on observations of 16 high velocity stars (Smith et al. 2007). These authors find $M_{\rm h} = 1.42^{+1.14}_{-0.54} \times 10^{12}\ M_\odot$, which is in good agreement with several previous works (e.g., Wilkinson & Evans 1999; Sakamoto, Chiba, & Beers 2003; Li & White 2008), though results from Xue et al. (2008) suggest lower values (but see a recent revision by Przybilla et al. 2010). For its $M_{\rm h}$, the $M_{\rm s}$ of the Milky Way seems to be at the high extremum of blue galaxies, close to values typical of red galaxies. It should be said that it is an open question whether the Milky Way is an average galaxy or not. In the stellar Tully-Fisher and radius–$M_{\rm s}$ relations (e.g., Avila-Reese et al. 2008), the Milky Way is shifted from the average to the high-velocity and low-radius sides, respectively.

4.2. *Interpretations and consistency of the results*

Although our main result is that the differences between the $M_{\rm s}$–$M_{\rm h}$ and $M_{\rm b}$–$M_{\rm h}$ relations for central blue and red galaxies are marginal (within the uncertainties of our determinations), we will explore whether such differences are expected or not. For this it is important to approach the problem from an evolutionary point of view.

In Firmani & Avila-Reese (2010, hereafter FA10), the determinations of the $M_{\rm s}$–$M_{\rm h}$ relation for all galaxies at different redshifts, out to $z = 4$ (BCW10), and the average ΛCDM individual halo mass aggregation histories (MAHs) were used to determine the individual *average* $M_{\rm s}$ growth of galaxies in general as a function of mass (called in that paper as Galaxian Hybrid Evolutionary Tracks, GHETs). It was found that the more massive the galaxies, the earlier transit from their active (star-forming, blue) regime of $M_{\rm s}$ growth to a passive (red) phase (population 'downsizing'), while their corresponding halos continue growing, more efficiently at later epochs the more massive they are ('upsizing'). The inferred trend for the transition stellar mass is $\log(M_{\rm tran}/M_\odot) \approx 10.30 + 0.55z$. Therefore, galaxies of mass $M_{\rm s} \approx 10^{10.3}\ M_\odot$ are on average becoming passive (red) today. For $M_{\rm s} \gtrsim M_{\rm tran}$, the larger the mass, the redder will be the galaxy on average. The opposite applies for $M_{\rm s} \lesssim M_{\rm tran}$, the smaller the mass, the bluer will be the galaxy. Interestingly enough, $M_{\rm s} \approx 10^{10.3}\ M_\odot$ is roughly the mass where the overall YMB09 blue and red *GSMF*s cross: for masses larger than this crossing mass, $M_{\rm cross}$, redder galaxies become more and more abundant than bluer ones and the inverse happens at smaller masses (see Figure 1).

Galaxies that are transiting from active to passive at $z \sim 0$ (those around $M_{\rm tran} \approx 10^{10.3}\ M_\odot$) have probably been subject recently to a process that induced an *efficient* transformation of the available gas into stars in such a way that their stellar populations started to redden passively. Hence, for a given $M_{\rm h}$, they are expected to have a higher $M_{\rm s}$ (or $f_{\rm s}$) than those galaxies of similar mass that did not suffer (yet?) the above process (bluer ones). The relatively small difference in $f_{\rm s}$ for blue and red galaxies we have found here (whose maximum is attained around $M_{\rm tran} \sim M_{\rm cross}$, Figure 5) would imply that the scatter around $M_{\rm tran}$ is moderate.

Galaxies more massive than $M_{\rm tran}$ (or $M_{\rm cross}$), according to the evolutionary analysis by FA10, underwent the process of efficient gas consumption into stars (and the further cessation of $M_{\rm s}$ growth) earlier on average than more massive galaxies, while their halos continue growing. Therefore, one expects that the more massive the galaxy, the redder and the lower its stellar (and baryonic) mass fraction $f_{\rm s}$ will be on average. The few blue massive galaxies may have slightly smaller stellar masses (lower $f_{\rm s}$) than the corresponding red ones because they should have transformed gas into stars less efficiently in the past. Therefore, by including gas, i.e. when passing to $f_{\rm b}$ the difference between blue and red massive galaxies at large masses should become negligible. This is indeed what happens (see Figure 5).

Galaxies less massive than $M_{\rm tran}$ (or $M_{\rm cross}$) at $z \sim 0$, according to FA10, are in general the more actively assembling their stellar masses the smaller they are ('downsizing' in specific SFR), while their dark halo mass growth is already very slow. This implies the existence in the galaxies of relatively larger reservoirs of cold gas the smaller they are (gas not related to the halo-driven infall) because the SF has been delayed in the disk and/or cold gas is being lately (re)accreted into the galaxy. However, if for some reason the gas reservoir in these galaxies is lost,