Magnetic interactions in correlated insulators with orbital degrees of freedom are described by superexchange spin-orbital models, which are characterized by nontrivial quantum effects [1]. We analyze the spin interactions in $A$-type antiferromagnetic phase of KCuF$_3$ with one hole in $e_g$ orbital ($S = 1/2$) and of LaMnO$_3$ with $t_{2g}^3e_g$ high-spin ($S = 2$) electronic configuration. The spin exchange constants along cubic axes $J_{ab}$ and $J_c$ sensitively depend on three parameters: (i) overall energy scale $J = 4t^2/U$, where $t$ is $(dd\sigma)$ hopping and $U$ is on-site Coulomb repulsion, (ii) the Hund’s exchange $\eta = J_H/U$, and (iii) the parameter $R = 2U/(2\Delta + U_p)$, where $\Delta$ and $U_p$ are charge transfer (CT) energy and Coulomb repulsion on oxygen, and (iv) on the $e_g$ orbital order. One finds that quasi one-dimensional spin interactions $J_c \gg |J_{ab}|$ in KCuF$_3$ are intrinsically related to its CT type insulating state. On the contrary, the effects of CT superexchange terms are moderate in a Mott insulator LaMnO$_3$. Finally, using partial optical sum rules [2], we discuss experimental constraints on the microscopic parameters of LaMnO$_3$.